Department of the Army **TRADOC Pamphlet 71-9**
Headquarters, U.S. Army
Training and Doctrine Command
Fort Monroe, Virginia 23651-1047

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Force Development

Requirements Determination

Summary. This pamphlet describes the processes for determining, documenting, and approving warfighting requirements in the domains of doctrine, training, leader development, organization, materiel, and soldier (DTLOMS). It is to assist and guide Army personnel and organizations, inside and outside U.S. Army Training and Doctrine Command (TRADOC), and to accomplish these functions in accordance with Chief of Staff, U.S. Army (CSA) direction and guidance. The direction and guidance emanate from Army Regulation (AR) 71-9. TRADOC is the Army's approval authority for all warfighting requirements. All Army commanders and staff follow TRADOC-established procedures to determine and document requirements for any new need that may affect warfighting.

Highlights of the changes in this update are:

- The Simulation Support Plan is added as an ICT product. (Chapter 4)

- Concepts are divided into two categories, the capstone concept, which is TRADOC Pamphlet 525-5, and Subordinate Concepts. Subordinate Concepts are either Integrating Concepts or Supporting Concepts. The descriptive term "Concepts of Operations" referring to all other warfighting concepts other than the capstone concept, TP 525-5, is replaced with "Subordinate concepts" (Chapter 5)

- Army future operational capabilities (FOCs) are aligned with the Army universal task list (AUTL), thereby establishing a viable linkage to the universal joint task list (UJTL) and desired operational capabilities (DOCs) produced in the Joint community. TRADOC Pam 525-66 is changed to a biennial publication. Corporate FOCs, a new FOC category, are intended to champion desired capabilities that apply across-the-force as a whole. They will be crafted by Future Capability Teams (FCTs) approved by the Army Science and Technology Working Group (ASTWG) and chartered by HQ TRADOC. The FOCs will be approved by CG, TRADOC. (Chapter 6)

- The Special Access Program (SAP) and how it is incorporated into the science and technology objective (STO)/Advanced Technology Demonstration (ATD) Review process has been added. (Chapter 7)

- The requirement for a Simulation Support Plan (SSP) is detailed. (Chapter 9)

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*This pamphlet supersedes TRADOC Regulation 15-3, 30 April 1984, TRADOC Regulation 71-14, 14 September 1984, and TRADOC Pamphlet 71-9, 1 August 1998.

- The scope of the Force Design Update (FDU) has been expanded to include personnel supportability analysis methodology; the determination of bill payer methodology; and, the integration of unpaid bills into a TRADOC 1-N priority list. (Chapter 10)

- The Operational and Organizational (O&O) description and the Joint NBC and CB defense requirements determination process are defined. (Chapter 11)

- Commercial transport and Computer Network attack considerations are defined. (Chapter 13)

- Examples of an O&O Description and Computer Network Defense requirements have been added. (Appendix R).

- Two new appendixes have been added: Appendix V, Guidance for developing reliability failure definition and scoring procedure (FDSC); and Appendix W, Guidance for the Joint Service Integration Group Operational Requirement Document Process (NBC Requirements).

Applicability. This pamphlet applies to headquarters (HQ) TRADOC and its subordinate commands, centers, schools, and battlefield laboratories. It also guides other Army commands who determine, document, or are otherwise involved in warfighting requirements and Army staff elements who are involved in determining, documenting, and processing requirements. This pamphlet is not subject to the requirements of AR 11-2. It does not contain internal control provisions. Information collection requirements in this pamphlet are exempt from management under AR 335-15, para 5-2b(9).

Supplementation. This pamphlet shall not be supplemented without prior approval of the proponent (Commander, TRADOC, ATTN: ATCD-RP, 20 Whistler Lane, Fort. Monroe, VA 23651-1046).

Suggested improvements. The proponent for this pamphlet is the Deputy Chief of Staff for Combat Developments (DCSCD). Send comments and suggested improvements on DA Form 2028 (Recommended Changes to Publications and Blank Forms) through channels to Commander, TRADOC, ATTN: ATCD-RP, 20 Whistler Lane, Fort. Monroe, VA 23651-1046. Suggested improvements may also be submitted using DA Form 1045 (Army Ideas for Excellence Program (AIEP) Proposal). **Every March, DCSCD will solicit input for an annual change to this pamphlet.**

Availability. This publication is available on the TRADOC Internet Homepage at: http://www.tradoc.army.mil.

Other information concerning the requirements determination process is found on the DCSCD Internet Homepage at: http://www.tradoc.army.mil/dcscd.

Contents

	Paragraph	Page
Chapter 1		
Introduction		
Purpose	1-1	8
References	1-2	8
Explanation of abbreviations and terms	1-3	8
Background	1-4	8
Chapter 2		
New Method of Doing Requirements Business: An Overview		
Requirements determination process	2-1	11
Joint Vision	2-2	11
Joint Concept	2-3	11
U.S., Joint Forces Command (JFCOM) Concepts	2-4	12
Army Warfighting Vision	2-5	12
Army Capstone Concept	2-6	13
Army Subordinate Concepts	2-7	13
Future Operational Capabilities (FOCs)	2-8	13
Assessments	2-9	13
Doctrine, training, leader development, organization, materiel, and soldier (DTLOMS) requirements	2-10	13
Chapter 3		
Organizational and Functional Roles		
Introduction	3-1	14
HQDA, Assistant Secretary of the Army for Acquisition, Logistics and Technology (ASA(ALT))/Army Acquisition Executive (AAE)	3-2	14
HQDA, Assistant Secretary of the Army (Manpower and Reserve Affairs) (ASA(MRA))	3-3	15
HQDA, Assistant Secretary of the Army (Financial Management and Comptroller) (ASA(FM&C))	3-4	15
HQDA, Deputy Chief of Staff for Intelligence (DCSINT)	3-5	16
HQDA, Deputy Chief of Staff for Operations and Plans (DCSOPS)	3-6	16
HQDA, Deputy Chief of Staff for Personnel (DCSPER)	3-7	18
HQDA, Deputy Chief of Staff for Logistics (DCSLOG)	3-8	18
HQDA, Director of Information Systems for Command, Control, Communications, and Computers (DISC4)	3-9	18
Assistant Chief of Staff for Installation Management (ACSIM)	3-10	19
Office of the Chief, Army Reserve (OCAR)	3-11	20
Commanding General, U.S. Army Training and Doctrine Command (CG, TRADOC)	3-12	20
TRADOC Deputy Chief of Staff for Combat Developments (DCSCD)	3-13	21

	Paragraph	Page
TRADOC Deputy Chief of Staff for Doctrine (DCSDOC)	3-14	22
TRADOC Deputy Chief of Staff for Training (DCST)	3-15	23
TRADOC Deputy Chief of Staff for Intelligence (DCSINT)/Senior Intelligence Officer (SIO) for other major Army commands (MACOMs)	3-16	23
TRADOC Deputy Chief of Staff for Simulations and Analysis (DCSSA)	3-17	24
TRADOC Deputy Chief of Staff for Base Operating Systems (DCSBOS)	3-18	24
Director, TRADOC Analysis Center (TRAC)	3-19	24
Director, U.S. Army Nuclear and Chemical Agency (USANCA)	3-20	25
Director, TRADOC Tactical Wheeled Vehicle Requirements Management Office (TWVRMO)	3-21	25
TRADOC System Manager (TSM)	3-22	25
TRADOC Program Integration Officer (TPIO)	3-23	26
Directors of Battlefield Laboratories (Battle Labs)	3-24	26
Commanders, commandants, and directors of combat developments activities (CBTDEV)	3-25	27
Commanders, commandants, and directors of training developments activities (TNGDEV)	3-26	29
Commanders, commandants, and directors of doctrine developments activities (DOCDEV)	3-27	29
Branch Proponency Officers	3-28	30
Proponent (center/school) Threat Support Officers (TSOs)	3-29	30
Commanders of materiel development activities, Program Managers, Project Managers, and Program Executive Officers (MATDEV)	3-30	31
Commander, U.S. Army Materiel Command (AMC)	3-31	31
Commander, U.S. Army Test and Evaluation Command (ATEC)	3-32	32
Army Surgeon General/CG, Medical Command (MEDCOM)	3-33	33
CG, Army Space & Missile Defense Command (SMDC)	3-34	33
CGs of MACOMs and separate Army commands	3-35	34

Chapter 4
Integrated Concept Teams (ICTs)

Introduction	4-1	34
Fundamental characteristics	4-2	34
Integrated Concept Team (ICT) establishment and general guidelines	4-3	35

Chapter 5
Developing and Managing the Capstone and Subordinate Concepts

Introduction	5-1	39
Terms of reference	5-2	39
TRADOC Pamphlet (Pam) 525-series publications	5-3	40
Concept relationships	5-4	41
Concept development	5-5	41
Concept documentation	5-6	42

	Paragraph	Page
Concept staffing and approval	5-7	44
Chapter 6		
Future Operational Capabilities (FOCs)		
Introduction	6-1	45
Overview	6-2	45
Future Operational Capabilities (FOCs) format	6-3	46
Review of FOCs and update of TRADOC Pam 525-66	6-4	46
Chapter 7		
Science and Technology (S&T)		
Introduction	7-1	47
Strategic Research Objectives (SRO) Review	7-2	48
Science and Technology (S&T) Review	7-3	49
Joint User/Developer Science and Technology Objective (STO) Review	7-4	51
Advanced Technology Demonstration (ATD) Review	7-5	53
Army Science and Technology Master Plan (ASTMP)	7-6	53
Army Science and Technology Working Group (ASTWG)	7-7	53
Special Access Program (SAP) Review	7-8	54
Army Science and Technology Advisory Group (ASTAG)	7-9	54
Chapter 8		
Conduct Warfighting Experiments and Technology Demonstrations		
Introduction—Battle Labs' role in experimentation	8-1	54
Experimentation resource management	8-2	57
Simulations	8-3	57
Concept Experimentation Program (CEP)	8-4	58
Advanced Warfighting Experiments (AWEs)	8-5	62
Limited Objective Experiments (LOEs)	8-6	63
Technology Demonstrations (TDs) and Advanced Technology Demonstrations (ATDs)	8-7	64
Advanced Concept Technology Demonstrations (ACTD) program	8-8	65
Advanced Concepts and Technology program II (ACT II)	8-9	75
Joint Test and Evaluation (JT&E) program	8-10	81
S&T and experimentation integrated schedule	8-11	82
Chapter 9		
Studies and Analyses		
Introduction	9-1	83
Determination of mission need	9-2	84
Concept exploration	9-3	86
Program definition and risk reduction	9-4	89
Requirements analysis and Analysis of Alternatives (AoA) reports	9-5	90
Analytic organizations and tools	9-6	90
TRADOC standard scenarios	9-7	92

	Paragraph	Page
TRADOC Study Program (TSP)	9-8	92
Summary	9-9	94
Chapter 10		
Documenting Warfighting DTLOMS Requirements		
Introduction	10-1	94
Doctrine requirements overview	10-2	95
Training requirements overview	10-3	96
Leader development requirements overview	10-4	98
Organization requirements overview	10-5	100
Soldier requirements overview	10-6	106
Materiel requirements overview	10-7	106
Chapter 11		
Warfighting Materiel Requirements		
Introduction	11-1	109
Materiel Requirements Documents (MRDs)	11-2	109
Writing MRDs	11-3	111
Staffing MRDs overview	11-4	114
Certifications and validations	11-5	114
MRD approval overview	11-6	116
Post approval processing overview	11-7	116
Supporting documentation	11-8	116
Special processes	11-9	117
Revising and updating Capstone Requirements Documents (CRDs) and Operational Requirements Documents (ORDs)	11-10	118
Processing changes to Capstone Requirements Document (CRDs) and Operational Requirements Documents (ORDs)	11-11	118
Product improvement	11-12	119
Re-procurement	11-13	121
Joint Potential Designators (JPDs)	11-14	121
Joint requirements	11-15	121
Operational Needs Statement (ONS)	11-16	123
User Functional Description (UFD)	11-17	123
International requirements	11-18	124
Chapter 12		
Models and Simulations (M&S) Requirements Integration and Approval Process		
Introduction	12-1	125
Requirements and documentation	12-2	126
Requirements approval	12-3	128

	Paragraph	Page
Chapter 13		
Special Considerations		
Threat support to requirement process	13-1	129
Information Technology (IT) considerations	13-2	130
Staffing and approval of offensive Information Operations (IO) Special Access Programs (SAP)	13-3	133
Power sources/power management	13-4	133
Transport by commercial assets	13-5	133
Operational Requirements Document (ORD) requirements relationships to other program documents/events	13-6	134
Operational Requirements Document (ORD) to Request for Proposal (RFP) crosswalk	13-7	136
Horizontal Requirements Integration (HRI)	13-8	137
Horizontal Technology Integration (HTI)	13-9	138
Warfighting Rapid Acquisition Program (WRAP)	13-10	140
Warfighting Lens Analysis (WFLA)	13-11	143
Materiel acquisition reviews	13-12	144
Hardware and software configuration control	13-13	144
Software Change Cycle	13-14	146
Information system protection –computer network attack considerations	13-15	148

Appendices

A. References 149
B. Integrated Concept Team (ICT) Guidelines 154
C. Concept Format and Coordination 167
D. Future Operational Capabilities (FOC) Format 170
E. Concept Experimentation Program (CEP) Formats 171
F. Limited Objective Experimentation Plan (LOEP) Format 190
G. Experiment Report Format 192
H. Force Design Update (FDU) Action Officer's Guide 193
I. Materiel Requirement Document (MRD) Formats 212
J. Operational Mode Summary/Mission Profile (OMS/MP) Development Procedures 219
K. Materiel Requirement Document (MRD) Processing 246
L. Materiel Requirement Documents (MRD) Transmittal Memorandum Samples 253
M. Models and Simulations (M&S) Requirements Integration and Approval Process Procedures 264
N. Command, Control, Communications, and Computers Requirements Definition Program (C4RDP) 277
O. Users' Functional Description (UFD) 281
P. Horizontal Technology Integration (HTI) Guidelines 290
Q. Milestone Decision Reviews 297
R. Examples 297
S. Nuclear Survivability (NS) and NBC Contamination Survivability (NBCCS) 307
T. Army Operational Architecture (AOA) 313

	Paragraph	Page
U. Weapon Systems Diagnostics		321
V. Guidance for Developing Reliability Failure Definition and Scoring Criteria (FDSC)		321
W. Joint Service Integration Group Operational Requirement Document Process		348
Index		352
Glossary		358

Chapter 1
Introduction

1-1. Purpose. This pamphlet implements the Army's requirements determination process as described in Army Regulation 71-9. It details the process Army personnel should follow in all DTLOMS domains in TRADOC, other major and separate Army commands, and Headquarters, Department of the Army (HQDA) to determine, document, and process concepts, future operational capabilities, and DTLOMS requirements. Processes are defined to obtain CG, TRADOC's approval of warfighting requirements for all DTLOMS domains, whether originated by TRADOC or by other Army organizations. This pamphlet also identifies processes for TRADOC, other major Army commands (MACOMs), and other separate Army commands to approve requirements for non-warfighting information technology. Recent changes in the Army's materiel requirements documentation processes, responding to revisions in DOD 5000 series, AR 71-9, Federal Acquisition Regulation (FAR), and Chairman, Joint Chiefs of Staff Instruction (CJCSI) 3170.01 (formerly MOP 77) are also described.

1-2. References. Appendix A lists the required and related publications.

1-3. Explanation of abbreviations and terms. The glossary lists abbreviations and special terms used in this pamphlet.

1-4. Background.

a. At the end of the Cold War, HQDA and TRADOC recognized a need to change its requirements process. The threat that had been the centerpiece of the Concept Based Requirements System (CBRS) was gone. More diverse threats emerged from nations with potential for highly robust and technically capable forces. These new threats, combined with reduced resources and the use of U.S. forces in nontraditional roles, demanded that the Army change from a forward-deployed force to a force-projection Army. TRADOC formed the Battle Laboratories to help refocus the force, experiment with new methods for determining requirements, and to make the requirements and acquisition process more efficient.

(1) Former Army Chief of Staff (CSA) General Dennis J. Reimer reflected on the need to change: "We must find smarter ways to do business, streamlining our management processes, reducing overhead, leveraging outside resources, and using what we have more efficiently in order to become more effective."

(2) The Army of the 21st century will be an integral part of a rapidly changing world. New technologies will emerge almost daily to be rapidly proliferated around the globe. The explosive growth of the Internet, Global Positioning System (GPS) navigation, and cellular communications demonstrate how new technologies can change the environment in which future combat operations will take place. To achieve Army XXI objectives and to keep and maintain a land combat force that can accomplish an increasingly wide array of missions, the new requirements determination process must promote horizontal requirements integration (HRI). HRI is the holistic process of developing future, "total force-oriented" requirements based upon approved concepts and related future operational capabilities (FOCs).

b. Requirements determination was an area of study during the 1995 Table of Distribution and Allowances (TDA) Army Functional Area Assessment (FAA). The principal output of this assessment was a revised process endorsed by the CSA and CG, TRADOC. Significant aspects to this new process are:

(1) A holistic approach to requirements for joint and Army capabilities. These capabilities consider new threats in contrast with the full spectrum of Army operations and functions. This is a substantial change from the previous emphasis on Army deficiencies against a single, well-defined threat.

(2) Focus on requirements as a change to any DTLOMS domain, with materiel being the least desirable domain to change because of acquisition costs and schedules. Previously, materiel was the primary domain for developing requirements.

(3) Requirement of a multidisciplinary team effort. Previously, combat developers developed requirements with minimal input from the other DTLOMS agents.

(4) Cost as an independent variable (CAIV) to ensure the preferred solution will include an affordable life cycle cost. The Army can no longer expect performance at any cost or everything it wants. CAIV will not, however, preclude consideration of a new, high potential, leap-ahead technology (often referred to as a "potential silver bullet").

(5) Assignment of CG, TRADOC as the single approval agent for all warfighting requirements. Also, the requirement for all Army commands and the Army staff to follow CG, TRADOC established procedures for determining and documenting requirements (see Figure1-1, bolded sections). Approval is no longer split between and within HQDA and Army proponent commands (e. g., TRADOC, MACOMs, and separate commands). Different procedures and approval authorities previously applied to all DTLOMS areas. For example, within materiel, separate procedures and approvals existed for clothing and individual equipment (CIE); non-system training aids, devices, simulations, and simulators (TADSS); information systems; Acquisition Category (ACAT) I and II materiel programs; and ACAT III and IV materiel programs. Recent changes in DOD 5000 series, AR 70-1, AR 71-9, and AR 25-1 series emphasize one process for all materiel programs.

DEPARTMENT OF THE ARMY
WASHINGTON, D.C.

America's Army is the best fighting force in the world today. It has this distinction because decades ago, farsighted leaders developed warfighting concepts that charted a course to the outstanding equipment, training programs, doctrine and soldiers that comprise today's Army. Our challenge is to be as farsighted and chart the course that will maintain the Army's preeminent status as we move into the 21st century.

This new course must and will be different from the one charted many years ago. The world has changed in countless ways, and we must accept and embrace these and future changes. Today we are a Force Projection Army largely based in the continental United States, employing split-based methodologies and operating as elements of Joint Task Forces. The types of operations we are involved in and the advent of the Information Age make it increasingly difficult to distinguish between tactical, operational, and strategic levels of war and forces. Likewise, the distinction between institutional and operational forces is blurring. Multinationalism and routine interagency partnerships are realities. These factors, in addition to resource constraints, require us to plan for the future based on a holistic **vision** of future warfighting.

I have directed the TRADOC Commander to chart the course for the Army to follow into the 21st century. **Accordingly, the TRADOC Commander will approve all Army warfighting requirements prior to their submission to the Department of the Army (DA).** The Department will review and evaluate requirements based on issues raised by other Services, the Joint Staff, and the Office of the Secretary of Defense and recommend changes to the TRADOC Commander. My Executive Agent for the Departmental-level activity is the Deputy Chief of Staff for Operations and Plans (DA DCSOPS).

All Army commanders and the Army staff will support the TRADOC Commander in this most important mission. If a need is identified that has any potential warfighting impact or utility, follow the procedures he establishes to determine and document requirements. Existing procedures to determine and document institutional force requirements will not change.

The DA DCSOPS, with the direct support of both TRADOC and AMC, will continue as the Army's focal point for response to urgent, non-standard, and/or unprogrammed needs from CINCs or Army forces commanders that arise in the course of operations.

This approach will generate efficiencies for the Army and help us conserve scarce resources. However, do not mistake this as a simple cost cutting drill. Our goal is to speed up the requirements determination process while at the same time improving its product. The only way America's future Army will remain the world's best is for all of us to understand how both requirements and operational needs will be determined and what the entry points are in the systems to satisfy each. The TRADOC Commander is responsible for generating the bulk of our concepts and requirements, but we must all play our roles on the team and in the systems described in this pamphlet if we are to grow into the 21st century.

Dennis J. Reimer
General, U.S. Army
Chief of Staff

Figure 1-1. CSA memo, March 1996

c. As a result of the Federal Acquisition Streamlining Act of 1994, Congress stated a preference for using commercial or nondevelopmental items to satisfy new requirements. Part of the implementing guidance in the law states that requirements must be modified in appropriate cases to ensure that they can be met by commercial or nondevelopmental items. The new law was codified into the FAR, Parts 10 and 11, to recognize the need to conduct market research prior to finalizing requirements in the operational requirements document (ORD). The FAR states, "Acquisitions begin with a description of the Government's needs stated in terms sufficient to allow conduct of market research." The changes in the law and the implementing guidance in the revised FAR will affect how the Army's materiel requirements determination process is conducted.

Chapter 2
New Method of Doing Requirements Business: An Overview

2-1. Requirements determination process. The Army continually upgrades and changes the way it fights so it can maintain battlefield superiority over all potential adversaries and can achieve complementary capabilities with other Services and nations determined holistically, based on desired joint and Army capabilities versus known deficiencies. Requirements are driven by concepts focused on the future and on experimentation in our battle labs providing insights to discern viable requirements. A full description of the requirements determination process can be found in paragraphs 2-2 through paragraph 2-10. Figure 2-1 illustrates the process.

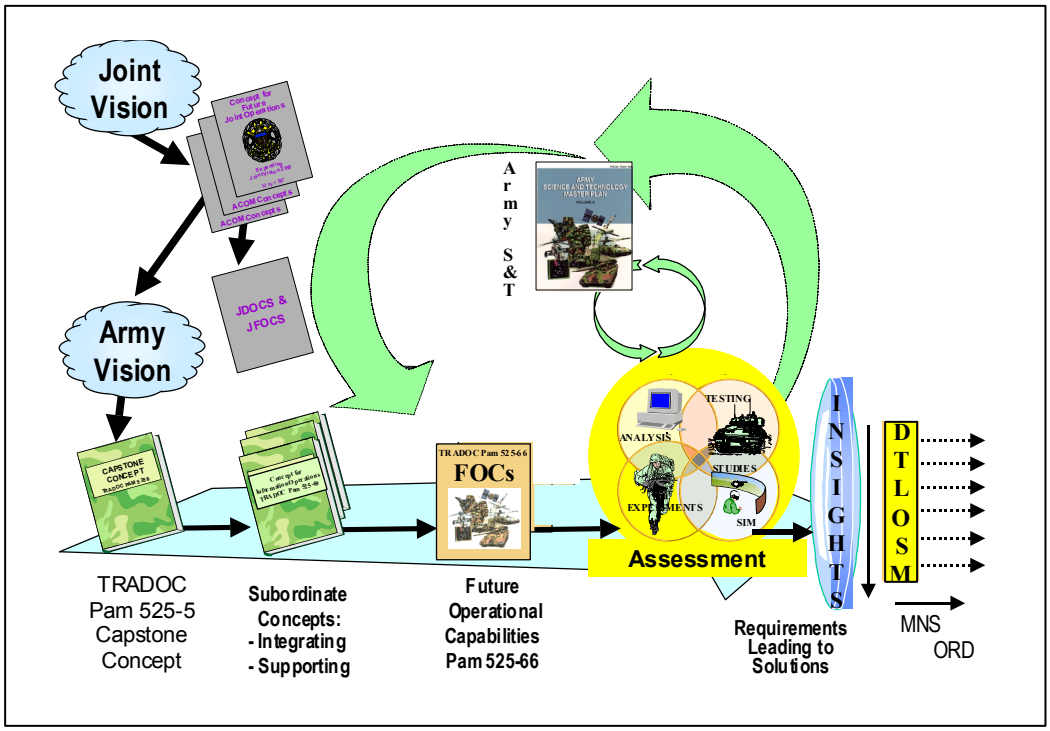


Figure 2-1. Requirements determination process overview

2-2. Joint Vision. The process begins when the Chairman of the Joint Chiefs of Staff (CJCS) issues a Joint Vision that provides a conceptual overview of their armed forces in the future. The Joint Vision establishes the initial conceptual template for how the forces will channel the vitality of their people and leverage their technological opportunities to achieve new levels of effectiveness in joint warfighting.

2-3. Joint Concept. The Concept for Future Joint Operations (CFJO) serves as the joint concept document. The CFJO is a rudimentary, abstract description of a desired goal as seen by the CJCS, as he looks at the future battlefield. The CFJO expands the Joint Vision's new concepts to provide a more detailed foundation for follow-on capabilities assessments. The CFJO also represents an important step toward the objective of achieving the right capabilities for the challenges the armed forces will face in the 21st century. America's armed forces must be able to shape the strategic environment to prevent war, respond when deterrence fails, and begin now to prepare for an uncertain and challenging future. Toward those ends, the CFJO considers future joint operations in the context of the broad range of challenges anticipated. It also helps concept developers identify Joint Desired Operational Capabilities

(JDOCs) and Joint Future Operational Capabilities (JFOCs) which will drive development of better and faster processes for evaluating and adapting emerging warfighting capabilities.

2-4. U.S., Joint Forces Command (JFCOM) Concepts. The Secretary of Defense, in the Joint Warfighting Experimentation Charter, directed the Commander, JFCOM to develop concepts that will provide Joint Staff guidance to the military. The JFCOM staff has initiated the development of concepts that provide a more detailed view of the CFJO. JFCOM is working through the creation of two categories of subordinate concepts: integrating and supporting. Both JDOCs and JFOCs are derived from these concepts. JDOCs identify desired goals to be achieved. The relationship between JFCOM Concepts and TRADOC Army Concepts is shown in Figure 2-2.

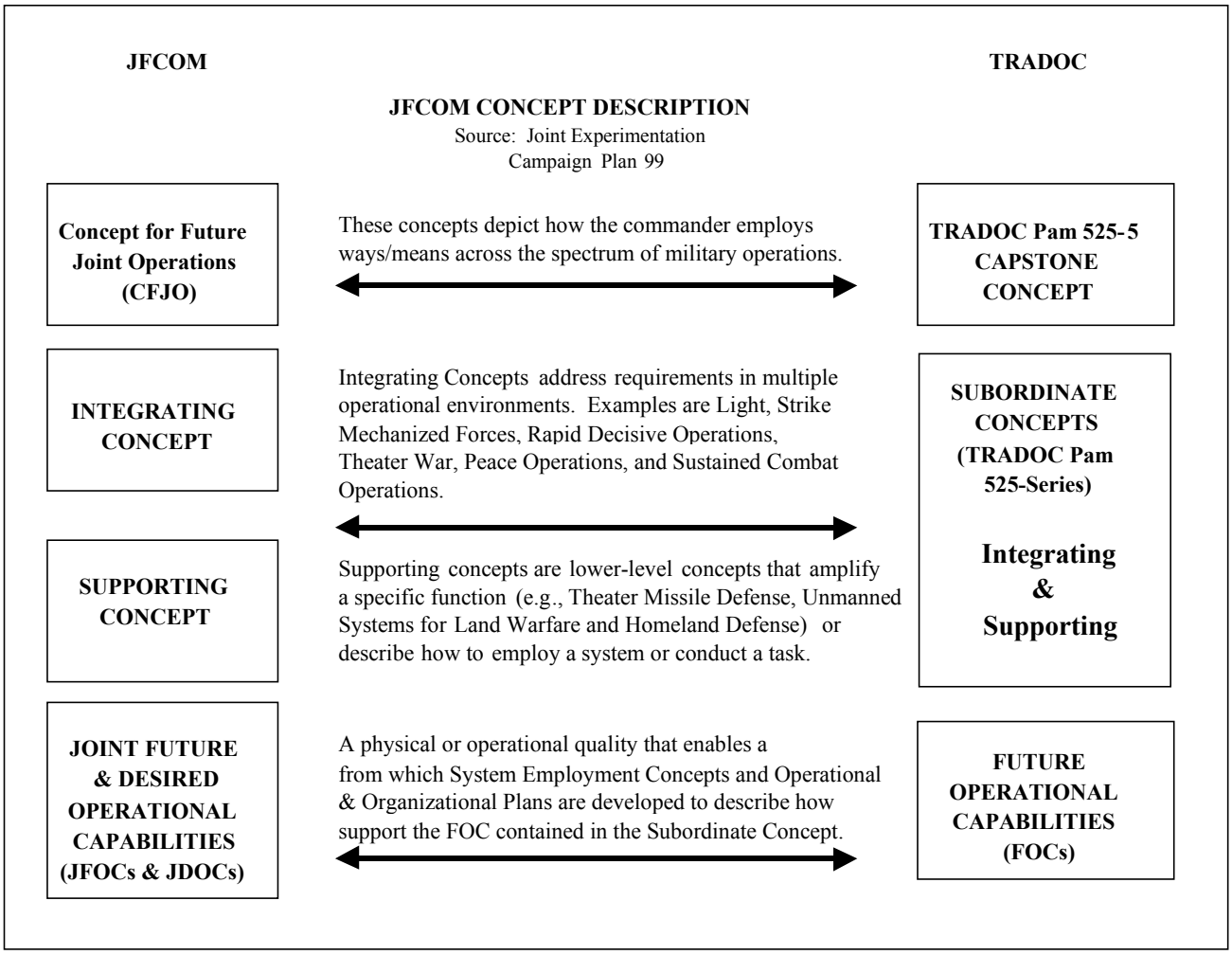


Figure 2-2. TRADOC & JFCOM Concept Relationships

2-5. Army Warfighting Vision. The TRADOC Commander develops the Army's future warfighting vision. It is an abstract description of a desired goal and it integrates the Joint Vision and Army requirements to accomplish the Army's role in that vision. It is influenced by national security and military strategies, with science and technology providing a frame of reference. It is promulgated through a series of white papers designed to provoke thought by the military, academia, industry, and

futurists. When developed sufficiently, the vision is translated into capstone concept—still abstract, but a much more detailed description of the desired goal.

2-6. Army Capstone Concept. An Integrated Concept Team (ICT) (see chap 4) is formed at HQ TRADOC to develop the capstone concept (see chap 5). The ICT is made up of members from TRADOC, U.S. Army Materiel Command (AMC), other Army commands, HQDA, other military Services, academia, industry, and others—taking advantage of the synergy of the group to translate the commander's vision into the next level of detail. The capstone concept reflects direct linkage to the National Military Strategy (NMS), Defense Planning Guidance (DPG), the Joint Vision, the Army Plan, and other documents. In this context, the capstone concept becomes the primary guide for all other Army concept development activities.

2-7. Army Subordinate Concepts. Because the capstone concept provides a macro-level description of the future Army, it must be enabled by more detailed subordinate concepts, called integrating and supporting concepts (see chap 5). The ICT approach is now used by Army school commandants and other Army leaders to develop the integrating and supporting concepts. These concepts describe the full range of future capabilities needed by the Army to execute the capstone concept and the CFJO.

2-8. Future Operational Capabilities (FOCs). FOCs are structured statements of operational capability required by the Army to achieve its goals as stated in approved capstone and subordinate concepts. They are identified in each concept and consolidated in TRADOC Pam 525-66 (see chap 6). This document will be the control mechanism for requirements determination activities and will provide a cross-reference for all capabilities to ensure they support approved subordinate concepts. It will also help guide Army Science and Technology (S&T) activities, as well as industry research and development initiatives (see chap 7). This strategy will form the basis for experiments, analyses, and other requirements determination activities.

2-9. Assessments. Assessments supported by warfighting experimentation and simulation (see chap 8), in combination with studies and analysis (see chap 9) are key to the determination process. When properly planned and executed, warfighting experiments and analyses give the Army an unsurpassed means to understand future warfighting requirements. Progressive and iterative mixes of constructive, virtual, and live experiments, combined with operational experience and appropriate analyses, yield insights to better define not only concepts, but also requirements across the spectrum of DTLOMS. Developmental and operational testing may also support requirements determination assessments.

2-10. Doctrine, training, leader development, organization, materiel, and soldier (DTLOMS) requirements. Requirements determination occurs in the order of doctrine, training, leader development, organization, soldiers and materiel (D-T-L-O-S-M), based on expense and timeliness to field a capability. This pamphlet will identify, in general terms, the procedures needed to develop requirements documents across the DTLOMS domains and will lead the reader to specific documentation that outlines the procedures for warfighting requirements determination in those domains (see chap 10). The specific procedures for developing warfighting materiel requirements documents, including a mission needs statement (MNS) and an operational requirements document (ORD), are contained herein (see chap 11). Special processes apply to model and simulation (M&S) requirements (see chap 12). The new way of handling requirements business and changes in related Army processes,

such as the Warfighter Rapid Acquisition Program (WRAP), Information Technology (IT), and HRI emphasis, demand special consideration (see chap 13).

Chapter 3
Organizational and Functional Roles

3-1. Introduction. The determination of warfighting requirements involves numerous organizations in specific functional roles. Department of the Army and other commands' roles reflect responsibilities assigned in ARs 71-9 and 70-1. Figure 3-1 summarizes these roles with details provided in the succeeding paragraphs.

	Organizations and Major Functional Areas						
	Concept Development	FOC	S&T Research	Warfighting Experiments Analyses	Contemporary Operational Issues	Insights to Requirements	Warfighting Requirements
JROC							Validate: • ACAT I MNS • C4I Certification • ACAT ID ORD • KKP for ACAT ID
DA			• Resource	• Resource	• Resource • Task O, M, & S	• Participate in ICT	• Resource & Task O, M, & S • Participate in ICT • CIO Validation
HQ TRADOC	• Produce Cap Concept • Lead ICT • Approve Subordinate Concepts	• Produce TRADOC Pam 525-66 & Future Capabilities Strategy	• Prioritize S&T Initiatives (w/AMC)	• Resource • AWE Concept	• Support DA • Resource D, T, & L	• Participate in ICT	• Integrate All • Approve All • Resource DTLOMS
Other Army Commands w/ CBTDEV, TNGDEV, & DOCDEV	• Produce Subordinate Concepts • Lead ICT	• Produce FOCs	• Evaluate S&T Products	• Plan, Conduct, & Report • Support AWEs	• Support DA • Advise Field Commanders	• Integrate & Analyze • Lead ICT • Conduct Studies & Analyses	• Define, Document, & Defend • Lead ICT
School Comdts and CASCOM (w/Battle Labs)	• Produce Subordinate Concepts • Lead ICT	• Produce FOCs	• Evaluate S&T Products	• Plan, Conduct, & Report	• Support HQ TRADOC • Deliver D, T, L, O, & S • Advise Field Commanders	• Integrate & Analyze • Lead ICT • Conduct Studies & Analyses	• Define, Document, & Defend • Lead ICT
TRAC		• Analysis Support		• Lead Analytic Planning & Analysis for AWE • Support Other		• Provide Analysis Support	• Provide Analysis Support • Conduct Analysis of Alternatives
Field Commanders				• Support	• Define and Document	• Participate in ICT	

Figure 3-1. Organization and functional roles summary

3-2. HQDA, Assistant Secretary of the Army for Acquisition, Logistics and Technology (ASA(ALT))/Army Acquisition Executive (AAE).

a. Exercises the powers and discharges the responsibilities as set in DOD Directive (DODD) 5000.1 for component acquisition executives in administering and managing Army acquisition programs.

b. Designates the Army command or agency responsible for conducting system concept studies and performing trade-off analyses in support of the Analysis of Alternatives (AoA) and provides issues,

alternatives, and guidance to Office of the Deputy Chief of Staff for Operations and Plans (ODCSOPS) for inclusion in the AoA tasking document.

c. Develops guidance in coordination with ODCSOPS, and serves as co-proponent for the research, development, and acquisition (RDA) Plan.

d. Develops and distributes Army-wide S&T base strategy, policy, and guidance.

e. Establishes and validates Army technology base priorities throughout the planning, programming, budgeting, and execution system (PPBES).

f. Approves and resources advanced technology demonstrations (ATDs) and Advanced Concepts and Technology Program II (ACT II) programs.

g. Co-chairs the WRAP Army Systems Acquisition Review Council (ASARC).

h. Appoints and oversees Army program executive offices (PEOs) program/project/product managers (PMs). Ensures PEOs and PMs integrate operational requirements, including embedded training requirements, early in the design of new or improved materiel systems.

i. Establishes and implements Army horizontal technology integration (HTI) policy.

j. Administers the operations and support cost reduction (OSCR) program and provides policy and procedure guidance.

k. Provides S&T members to ICTs.

3-3. HQDA, Assistant Secretary of the Army (Manpower and Reserve Affairs) (ASA(MRA)).

a. HQDA agent for DA organization and/or force structure and military manpower management.

b. Provides direction and policy guidance to the Army Staff and MACOMs during the requirements determination process.

3-4. HQDA, Assistant Secretary of the Army (Financial Management and Comptroller) (ASA(FM&C)).

a. Carries out all financial management responsibilities assigned under 10 USC, Section 3022, as pertains to DA and Section 135(c), as pertains to the DOD comptroller.

b. Manages all budgeting activities in support of the Army materiel requirements and the RDA modernization program, within the framework of the DOD planning, programming, and budgeting system (PPBS) and the DAs (PPBES).

c. Oversees, reviews, and approves all cost and economic analysis efforts, as carried out by the U.S. Army Cost and Economic Analysis Center (CEAC).

(1) Establishes an Army Cost Review Board (CRB) of senior leadership for ACAT I and special interest programs to review life cycle cost estimates (LCCEs); recommends the Army cost position (ACP) to the ASA(FM&C) for approval. CRB membership includes the Principal Deputy ASA(FM&C); Deputy for Cost Analysis (non-voting secretary); Director for Investment; Deputy ASA for Budget; Deputy Director, Program Analysis and Evaluation (PA&E); AMC, Chief, Cost Analysis Division; Director, Assessment & Evaluation; Director, Resource Analysis Division, TRADOC Analysis Center (TRAC) White Sands; and the Deputy Director of Information Systems Command, Control, Communications, and Computers (DISC4).

(2) Ensures that the ACP reflects the costs and risks associated with the program in concurrence with the CAIV process (ASA(FM&C) Deputy for Cost Analysis).

(3) Ensures that the ACP is completed in a timely manner to allow the Milestone Decision Authority (MDA) to make the best decision for a given program.

3-5. HQDA, Deputy Chief of Staff for Intelligence (DCSINT).

a. Reviews and monitors the threat support process to ensure consistent integration of threat analysis in support of ACAT I and II programs, selected Office of the Secretary of Defense (OSD) test and evaluation (T&E) oversight systems, DA-directed studies, and selected combat developer-directed studies.

b. Assists the TRADOC DCSINT in determining threat support requirements during early stages of concept development.

c. Reviews threat statements developed for each MNS and ORD for ACAT I and II and selected OSD T&E oversight systems.

d. Reviews and approves any deviations from standard validated scenarios and threat databases used in computer simulations supporting the combat development process.

e. Participates in ICTs, when appropriate.

3-6. HQDA, Deputy Chief of Staff for Operations and Plans (DCSOPS).

a. Prioritizes and resources Army organizational, materiel, and training requirements through the PPBES.

b. Develops and distributes Army policy guidance for overall requirements determination, materiel requirements, organizational requirements, doctrine development, training, and combat developments in coordination with CG, TRADOC and others.

c. Forwards MNS for potential ACAT I and ACAT (IA) programs to the Joint Requirements Oversight Council (JROC) or OSD as appropriate for validation after approval by CG, TRADOC. Forwards CG, TRADOC approved ACAT I and IA ORDs to JROC for validation of key performance

parameters (KPPs) and for assignment of ORD approval authority for ACAT I defense (ID) ACAT programs.

d. Serves as Army's representative to the Joint and OSD staffs in matters of overall warfighting requirements determination, documentation, prioritization, and resourcing (particularly in the areas of materiel, organizational, doctrine, leader development, and training requirements). Coordinates all non-U.S. Army requirements (Service, Joint Staff, unified commands, and allied) with TRADOC to include final response memorandums to JCS and other Services.

e. Participates in ICTs, when appropriate.

f. Prescribes mid- and long-range mission and operational capability goals in support of force development and requirements determination.

g. Coordinates force modernization activities, develops modernization plans and strategy, and monitors the impact of force modernization planning and execution for the total Army, with the assistance of the ASA(ALT). Serves as the co-proponent with the ASA(ALT) for the Army RDA Plan.

h. Conducts force feasibility reviews (FFRs) to assess supportability and affordability for structure, manpower, equipment, dollars, facilities, and training.

i. Provides, in coordination with ASA(ALT), the AoA tasking document. The document designates the organization to conduct the AoA, provides the Army with specific guidance, includes any OSD program analysis and evaluation (PA&E) guidance, and establishes specific study advisory group (SAG) procedures.

j. Validates and approves field commander's Operational Needs Statement (ONS).

k. Maintains and publishes the Catalog of Approved Requirements Documents (CARDS) database. Assigns CARDS reference numbers to CG, TRADOC-approved materiel requirements documents.

l. Co-chairs the WRAP ASARC.

m. Reviews and evaluates requirements based on issues raised by other Services, the Joint Staff, and OSD and recommends changes to CG, TRADOC.

n. Serves as the Army advocate on JROC issues to unify and focus the Army JROC/Joint Warfighting Capabilities Assessments (JWCA) effort. Provides coordination, liaison, and representatives for the Army JROC effort.

o. Provides Army Staff (ARSTAF) oversight of the development of the operational architecture (OA).

p. Approves basis-of-issue plans (BOIPs) and tables of organization and equipment (TOEs).

q. Serves as the sole approval authority for all waiver requests for nuclear and nuclear, biological, and chemical (NBC) contamination survivability.

3-7. HQDA, Deputy Chief of Staff for Personnel (DCSPER).

a. ARSTAF proponent for leadership and leader development.

b. Approves, prioritizes, and resources leader development and soldier requirements.

c. Ensures that manpower and personnel integration (MANPRINT) is appropriately addressed when requirements are determined and approved.

d. Serves as a member of an ICT, when appropriate.

3-8. HQDA, Deputy Chief of Staff for Logistics (DCSLOG).

a. Ensures that integrated logistics support (ILS) is appropriately addressed during requirements determination and approval processes.

b. Participates in Integrated Product Teams (IPTs) and ICTs when appropriate.

c. Member of the WRAP ASARC.

d. Is the Army logistician.

e. Functional proponent for logistics policy procedures and processes.

3-9. HQDA, Director of Information Systems for Command, Control, Communications, and Computers (DISC4).

a. Is the Army's Chief Information Officer (CIO), has ARSTAF responsibility, and serves as the Military Deputy (MILDEP) to the AAE for Army information technology (IT) and IT activities. These tasks include establishing and approving policies, procedures, and standards for planning, programming, and life-cycle management; using IT resources; responding to and validating IT for all warfighting requirements during worldwide staffing of MNS and ORDs; and validating IT for ONS during DCSOPS staffing.

b. Validates all IT related to MNS, CRD, ORD, and ONS by ensuring the following:

(1) Determination that nonmateriel alternatives were judged to be inadequate. (A process analysis [or DTLOMS assessment] will be completed to make this determination.)

(2) Inclusion of a statement that any materiel solution must be Joint Technical Architecture-Army (JTA-A) compliant and have the ability to be interoperable.

(3) Evaluation of emerging command, control, communications, computers and intelligence (C4I) technologies.

(4) Inclusion of outcome-oriented performance measurements.

(5) Compliance with information security requirements.

(6) Inclusion of spectrum management criteria.

(7) Evaluation of a new or modified requirement against existing systems.

(8) Other criteria as appropriate.

c. Provides Army software policy for both automated information systems (AIS) and weapon systems.

d. Oversees the activities of PEOs or PMs managing Command, Control, Communications, and Computer (C4) and IT acquisition programs.

e. Provides technical oversight for IT during the acquisition approval process.

f. Directs and approves standards for data and interoperability of products including joint and combined programs.

g. Provides software research and development (R&D) oversight for all systems during the ASARC process.

h. Reviews materiel system programs and WRAP candidate systems for compliance with HQDA policy for software reuse, Information Assurance (IA), technical and systems architecture, data element standardization, spectrum management, and Air Defense Artillery (ADA) initiatives.

i. Ensures proper implementation of the ILS and MANPRINT programs in IT.

j. Is the senior official for information resources management.

k. Is the senior Army policy official for automated data processing equipment, visual information, compatibility, and interoperability of tactical C4 systems, the Army Standards Program, and the Army Data Management Program.

l. Serves as the HQDA staff agency proponent for information systems.

m. Participates in ICTs, when appropriate.

3-10. Assistant Chief of Staff for Installation Management (ACSIM).

a. Develops criteria and procedures or the mitigation of environmental impacts.

b. Reviews emerging Army systems for environmental effects.

c. Participates in ICTs and IPTs, when appropriate.

3-11. Office of the Chief, Army Reserve (OCAR)

a. Provides full-time support soldiers to TRADOC proponent schools to support combat and training development initiatives.

b. Supports Battle Labs by providing USAR insights from the combat support/combat Service support (CS/CSS) perspective.

c. Participates in AWEs to yield insights to CS/CSS requirements provided to the warfight by Component (COMPO) 3 force structure.

d. Participates in HQ TRADOC ICTs, when appropriate.

e. Provides instructor personnel from division institutional training (DIVIT) school brigades to TRADOC proponent schools.

f. Supports training base activities at Mobilization Stations.

g. Conducts common task test (CTT) training for Individual Ready Reserve (IRR) personnel battle rostered to COMPO 1 and COMPO 3 units.

h. Supports MOS-specific refresher training at TRADOC proponent schools.

3-12. Commanding General, U.S. Army Training and Doctrine Command (CG, TRADOC).

a. Produces the Army's warfighting vision.

b. Approves the Army's concepts.

c. Approves Army's warfighting requirements for all DTLOMS domains.

d. Provides the Army procedural guidance for determining and approving all requirements.

e. Approves, prioritizes, and recommends AWEs to HQDA for resourcing.

f. Reviews, approves, and forwards WRAP projects to HQDA for consideration, approval, and execution.

g. Charters TRADOC system managers (TSMs) and TRADOC program integration officers (TPIOs).

h. Approves Army non-warfighting requirements documents for ACAT I – IV IT programs for base operations with total program costs greater than $10 million.

i. Assigns proponency to TRADOC organizations, including branch, functional, and specified proponents; combat developer (CBTDEV); training developer (TNGDEV); and doctrine developer (DOCDEV).

j. Charters Battle Labs.

k. Is the Army's principal combat, training, and doctrine developer and trainer.

l. Develops leader development concepts, doctrine, and programs in concert with HQDA.

3-13. TRADOC Deputy Chief of Staff for Combat Developments (DCSCD).

a. Provides staff oversight and management of all concepts.

b. Provides policy and procedures for development and approval of concepts.

c. Develops and maintains the capstone concept (TRADOC Pam 525-5).

d. Conducts force assessments and provides prioritization consideration and advice on materiel and organizational requirements determination, S&T programs, and materiel acquisition.

e. Staffs materiel requirements documents for CG, TRADOC approval.

f. Responsible for FOC program.

g. Conducts force design updates (FDUs) to obtain CG, TRADOC approval of new and revised organizational requirements for HQDA for prioritization and resourcing.

h. Provides staff oversight and management of ICTs. Provides policies and procedures to conduct ICTs. Maintains the ICT database.

i. Ensures HRI across the force.

j. Is a member on concept, FOC solution determination, materiel, and organization ICTs and participates in IPTs.

k. Distributes resources for combat developments within TRADOC. Allocates and administers Concept Experimentation Program (CEP) funds in the Army for approved and prioritized projects.

l. Integrates near/far term force designs and force structure.

m. Provides policy and procedures guidance for warfighting requirements determination.

n. Is M&S Advanced Concepts and Requirements (ACR) domain agent for review and approval of M&S ACR requirements. Provides M&S ACR domain policy for the submission of M&S requirements for domain and DCG, TRADOC approval.

o. Manages the WRAP program.

p. Integrates all concepts and requirements. Conducts formal TRADOC review, when necessary. Develops force design and structure requirements in support of new concepts.

q. Executes Warfighting Lens Analysis (WFLA).

r. Reviews draft warfighting requirements for the doctrine, training, leader developments, organization, and soldier domains.

s. Coordinates materiel warfighting requirements with the Joint Staff and other Services.

t. Ensures requirements are specified using market research, in a manner designed to fulfill the requirements of FAR, Part II.

u. Identifies and integrates environmental and safety requirements in the combat developments process.

v. Provides staff supervision for development, approval, and use of TRADOC standard scenarios.

w. Serves as the principal TRADOC interface to HQDA on all requirements documentation, monitoring the status of non-U.S. Army requirements (Service, Joint Staff, unified commands, and allied), and ensuring the necessary and sufficient staffing with the TRADOC community of non-U.S. Army requirements.

x. Approves the results of the crosswalk of the ORD to the request for proposal (RFP), and other system solicitation documents.

3-14. TRADOC Deputy Chief of Staff for Doctrine (DCSDOC).

a. Integrates and recommends Army doctrine requirements.

b. Implements doctrine development policy.

c. Participates in ICT to develop the capstone concepts.

d. Analyzes, evaluates, and develops future doctrine strategies, plans, and documents to support capabilities in approved concepts.

e. Manages Armywide Doctrine and Training Literature Program (ADTLP).

f. Reviews draft warfighting requirements DTLOMS.

g. Participates in the Joint Doctrine Working Party (JDWP) in approving requirements that support joint doctrine.

h. Identifies and integrates environmental and safety requirements in the doctrinal developments process.

3-15. TRADOC Deputy Chief of Staff for Training (DCST).

a. Develops and implements training, leader, and soldier development policies.

b. Participates in ICTs.

c. M&S training, exercise, and military operations (TEMO) domain agent for review and approval of TEMO M&S requirements. Provides TEMO M&S domain policy for the submission of M&S requirements for domain and DCG, TRADOC approval.

d. Analyzes, evaluates, and develops future training strategies and plans to support capabilities described in approved concepts.

e. Reviews draft warfighting requirements documents for domains of doctrine, organization, and materiel.

f. Integrates Army training, leader development, and soldier requirements.

g. Identifies and integrates environmental and safety requirements in the training development, leader development, and soldier development processes.

3-16. TRADOC, Deputy Chief of Staff for Intelligence (DCSINT)/Senior Intelligence Officer (SIO) for other major Army commands (MACOMs).

a. Threat approval authority for TRADOC.

b. Provides command interface with staff, other MACOMs, and national intelligence agencies to ensure timely and effective intelligence and threat support across DTLOMS.

c. Establishes and promulgates command policy and guidance for intelligence and threat support.

d. Participates in ICTs, IPTs, and AoAs.

e. Reviews and provides TRADOC approval of system threat assessment reports (STAR) for materiel acquisition programs.

f. Provides guidance and assistance to subordinates as required.

g. Provides threat support to TRAC, National Simulation Center (NSC), and Simulation, Training, and Instrumentation Command (STRICOM) for the development of TRADOC scenarios, models, and simulations.

h. Provides threat support to the Warfighting Lens Analysis (WFLA) process.

3-17. TRADOC Deputy Chief of Staff for Simulations and Analysis (DCSSA).

a. Develops and implements policy for M&S (including requirements integration and approval), studies, and analyses. Coordinates all models and simulation efforts for space and the integration of theater missile defense with the Space and Missile Defense Battle Lab (SMDBL) as M&S lead for the Space and Missile Defense Command (SMDC). SMDC has the lead for space and the integration of theater missile defense studies, analysis, and models and simulations efforts within the TEMO, ACR, and RDA domains.

b. Coordinates, integrates, prioritizes, and recommends input to the AR 5-5 study program.

c. Supports DCG, TRADOC in integration and approval of M&S requirements for the Army.

d. Supports TRADOC with studies and analyses, as required.

3-18. TRADOC Deputy Chief of Staff for Base Operating Systems (DCSBOS).

a. Integrates and recommends environmental and safety requirements.

b. Participates in ICTs and IPTs.

c. Reviews draft warfighting requirements documents for environmental integration across DTLOMS.

3-19. Director, TRADOC Analysis Center (TRAC).

a. Supports the CBTDEV, TNGDEV, and Battle Labs with constructive and virtual simulations and analyses as tasked through the AR 5-5 study program, the TRADOC study program, or DCSSA. TRAC shall also draw on the capabilities within the SMDBL to obtain studies, analyze, models and simulations support within the ACR domain for efforts specific to space and the integration of theater missile defense.

b. Supports TRADOC activities in planning the analysis and data collection management.

c. Conducts AoA for ACAT I, IA, II, and IIA programs when tasked by HQ TRADOC.

d. Provides constructive and virtual simulations and analyses to the materiel developer (MATDEV), U.S. Army Test and Experimentation Command (ATEC), and others outside TRADOC, as resources are available, on a cost reimbursable basis.

e. Identifies and submits TRAC M&S requirements in accordance with M&S domain agent procedures.

f. Participates in ICTs and IPTs.

3-20. Director, U.S. Army Nuclear and Chemical Agency (USANCA).

a. Establishes preliminary nuclear effects and NBC contamination survivability criteria for requirements contained in the MNS that specify nuclear and NBC contamination survivability.

b. Establishes final nuclear effects and NBC contamination survivability criteria for requirements contained in ORDs that specify nuclear and NBC contamination survivability.

c. Assists CBTDEVs with the application of nuclear effects and NBC contamination survivability criteria for systems and assists in the evaluation of system survivability shortfalls.

d. Monitors the Army's nuclear and NBC contamination survivability programs.

3-21. Director, TRADOC Tactical Wheeled Vehicle Requirements Management Office (TWVRMO).

a. Serves with full line authority of the CG, TRADOC to act as the single manager for tactical wheeled vehicle (TWV) qualitative and quantitative requirements for the DA-established force.

b. Ensures that TWV requirements are correctly stated, justified, and documented in concept papers, MRDs, and TOEs.

c. Serves as the DA DCSOPS action officer for investigating, assessing, and recommending Army-wide positions on issues affecting TWV requirements.

d. Evaluates combat developer initiatives in all proponent mission areas for impact on Army-wide TWV requirements.

3-22. TRADOC System Manager (TSM). (For their assigned program(s).)

a. Serves as the user representative. Provides intensive, centralized, total system management of the integration and development of DTLOMS products.

b. Refines and defends system requirements in the ORD.

c. Recommends to the branch commandant or proponent commander the establishment of an ICT for developing, documenting, and coordinating materiel requirements, if applicable.

d. Participates in AoAs, ICTs, and IPTs.

e. Participates in MATDEV system concept analyses and cost performance trade-off analyses.

f. Conducts, with the MATDEV, a crosswalk of the ORD and RFP.

g. Prepares TRADOC position for materiel acquisition reviews.

h. Reviews requirement documents related to assigned systems operations or organizations.

i. Participates in warfighting assessments (e.g., force assessment, WFLA).

j. Participates in identification of FOCs and annual S&T, science and technology objective (STO), ATD, and ACTD reviews.

3-23. TRADOC Program Integration Officer (TPIO). (For their assigned program(s).)

a. Serves as the user representative for a systems-of-systems or family of materiel. Intensively manages and integrates DTLOMS and the migration of components into a fully integrated system.

b. Defines, documents, modifies, coordinates, and defends sets of common standards and requirements across a function or mission area in the CRD, if applicable.

c. Recommends to the proponent commander the establishment of an ICT for developing, documenting, and coordinating common standards and requirements, if applicable.

d. Monitors and reviews appropriate DTLOMS documents and procedures to ensure issues are properly addressed.

e. Participates in AoAs, ICTs, and IPTs.

3-24. Directors of Battlefield Laboratories (Battle Labs).

a. Supports DTLOMS requirements determination by providing insights, impacts, and recommendations based on experiments.

b. Provides opportunities to streamline and improve requirements determination by teaming with proponents to identify compelling success from experimentation for WRAP application and by teaming with ATEC to maximize the use of experimentation data during acquisition evaluations.

c. Coordinates sponsorship or sponsors, plans, conducts, and reports the results of warfighting experimentation (e.g., advanced warfighting experiment (AWE), ACTD, CEP, limited objective experiment (LOE), ACT II). Coordinates experiment proposals and approvals IAW Chapter 8 of this pamphlet.

d. Provides the TRADOC lead, with the S&T and acquisition communities, on experiments and demonstrations for ACT II.

e. Provides the TRADOC link, with the Army S&T and acquisition communities and the assigned CINC, on experiments and demonstrations for ACTDs and ATDs.

f. Participates in S&T, STO, ATD, and ACT II reviews and the Army Science and Technology Working Group (ASTWG) to link S&T efforts with planning for experimentation, studies/analyses, and requirements for model and simulation tool development.

g. Participates in ICTs and IPTs.

h. Identifies and submits Battle Lab M&S requirements in accordance with appropriate M&S domain agent action officer and in accordance with domain agent procedures.

i. Participates in ICT for concepts development, warfighting DTLOMS requirements determination, and developing, documenting, and coordinating materiel and organizational requirements.

j. Assists the sponsor (CBTDEV, TNGDEV, and DOCDEV) to develop CEP candidates resume sheets.

k. Teams with CBTDEV, TNGDEV, MATDEV, sponsor, industry, and the other Battle Labs, to conduct warfighting experiments.

l. Prepares and submits proposed AWE projects to CBTDEV.

m. Provides experiment insights for concepts and requirements across DTLOMS.

n. Has tasking authority to execute approved experiments.

o. Provides sponsorship to Advanced Technology Demonstrations (ATDs).

3-25. Commanders, commandants, and directors of combat developments activities (CBTDEV).

a. Produces subordinate concepts.

b. Identifies FOCs.

c. Participates in warfighting assessments (e.g., force assessments and WFLA).

d. Leads annual S&T, STO, ATD, and ACTD reviews to identify S&T significance and priorities within their proponency. Identifies the topics for the ACT II Broad Agency Announcement (BAA).

e. Sponsors warfighting experiments. Within their command/center/school, collects, prioritizes, and forwards CEP resume sheets and AWE project priorities to HQ TRADOC for approval processing.

f. Determines, documents, modifies, coordinates, and defends materiel and organizational requirements by leading the ICT.

g. Leads or participates in ICT for concepts development, warfighting DTLOMS requirements determination, and developing, documenting, and coordinating materiel and organizational requirements.

h. Participates in the AoA for ACAT I, IA, II, and IIA programs within their proponency.

i. Conducts or secures an analysis organization to conduct AoA for proponent ACAT III, IIIA, and IV programs when required by the MDA or by centers/schools to provide analytical underpinnings.

j. Leads the ICT in conducting the requirements analyses for materiel requirements documents. Conducts or serves as an analysis organization to conduct operational analyses, as required. Uses market research results to help determine warfighting requirements.

k. Conducts, with the MATDEV and TNGDEV, a crosswalk of the ORD and RFP.

l. Participates in IPTs for proponent programs.

m. Represents the user for all DTLOMS requirements, and ensures development of DTLOMS products for proponent materiel programs when a TRADOC system manager (TSM) is not assigned.

n. Establishes TRADOC project officers (TPOs) to manage command actions/center/school and products for proponent materiel systems during acquisition or modification.

o. Projects and submits AR 5-5 study requirements to HQ TRADOC DCSSA.

p. Identifies and submits CBTDEV M&S requirements in accordance with the appropriate M&S domain agent procedures.

q. Assesses and develops IT requirements for sustaining base and fixed station portion of strategic information systems.

r. Identifies and integrates environmental and safety requirements.

s. Develops MS III focused critical operational issues and criteria (COIC) for T&E.

t. Provides a statement of continuing need for reprocurement items.

u. Approves and prioritizes modifications for TRADOC in direct coordination with the materiel developer for inclusion into the acquisition strategy.

v. Serves as the focal point for force structuring and integration through the Total Army Analysis (TAA)/Functional Area Assessments (FAA)/Force Design Updates (FDU) process. Develops unit organizational designs to include unit reference sheets (URS) data.

w. Establishes user position on acceptability of safety and health hazard risks at MDRs.

x. Participates with the MATDEV in cost, schedule, and performance trade-off analysis.

y. Establishes user constraints, objectives, and requirements for supportability, including TADSS.

z. Participates in design reviews, program reviews, in-process reviews, MDRs, ASARC or Defense Acquisition Board (DAB), and other forums.

aa. Provides representation at DA and OSD overarching and MATDEV/PM integrating and working IPTs (WIPTs).

3-26. Commanders, commandants, and directors of training developments activities (TNGDEV).

a. Determines, documents, modifies, coordinates, and defends TADSS and leader development requirement documents.

b. Participates in ICTs and IPTs and utilizes the results of market research to determine requirements.

c. Determines, documents, modifies, coordinates, and defends requirements for system and non-system TADSS.

d. Identifies and submits TNGDEV M&S requirements in accordance with the appropriate M&S domain agent procedures.

e. Establishes TPOs when needed to manage command/center/school actions and products for proponent TADDS during acquisition or modification.

f. Projects and submits AR 5-5 study requirements to HQ TRADOC, DCSSA.

g. Sponsors warfighting experiments.

h. Identifies and integrates environmental and safety requirements.

i. Conducts with the TSM (when assigned), CBTDEV, MATDEV, and logistician, a crosswalk of the ORD to the RFP, and other system solicitation documents.

j. Serves, jointly with the Combat and Materiel Developer Directors, as a key player in the system acquisition process for all matters pertaining to Doctrine and Training Development/Training issues.

k. Supports the T&E program through the development and subsequent evaluation of new training systems for effectiveness, efficiency, and ORD requirement fulfillment.

3-27. Commanders, commandants, and directors of doctrine developments activities (DOCDEV).

a. Determines, documents, modifies, and defines Army doctrine requirement documents (program directives).

b. Participates in the development of joint doctrine.

c. Participates in ICTs and IPTs.

d. Sponsors warfighting experiments.

e. Identifies and integrates environmental and safety requirements.

f. Prepares Tactics, Techniques, and Procedures (TTPs) to support test and evaluation programs.

g. Implement doctrine revisions consistent with TRADOC Pam 25-36 (Draft), the TRADOC Doctrinal Literature Program (DLP).

3-28. Branch Proponency Officers.

a. Determines, documents, modifies, coordinates, and defines soldier personnel requirements documentation.

b. Participates in ICTs and IPTs.

3-29. Proponent (center/school) Threat Support Officers (TSOs).

a. Serves as local threat support point of contact (POC) for combat development.

b. Develops and produces:

(1) Threat sections of MNS and ORDs.

(2) System threat assessment reports (STARs).

(3) Threat support to resident combat developers, training developers, doctrine developers, and Battle Labs.

c. Provides interface between MACOM, HQ DCSINT/SIO, and combat developers.

d. Ensures the threat is based on Defense Intelligence Agency (DIA) approved threats.

e. Maintains intelligence and threat database.

f. Develops and submits production requirements (PRs) to TRADOC DCSINT.

g. Participates in ICTs.

3-30. Commanders of materiel development activities, Program Managers, Project Managers, and Program Executive Officers (MATDEV).

a. Participates in ICTs.

b. Conducts market research and challenges, as appropriate, requirements which preclude satisfying a need with a commercial or nondevelopmental item.

c. Establishes IPTs.

d. Conducts ORD to RFP crosswalk with CBTDEV and TNGDEV to ensure that the RFP accurately reflects the ORD prior to Milestone Decision Reviews (MDRs).

e. Resources the program, including the training support package (TSP).

f. Provides initial and updated cost and system performance estimates for battlefield and peacetime operations as inputs to supporting analyses and program decisions.

g. Updates STAR after Milestone (MS) I via TSOs.

3-31. Commander, U.S. Army Materiel Command (AMC).

a. As the Army's principal MATDEV, is responsible for Research, Development, Test and Evaluation (RDTE), acquisition, and logistics support of assigned materiel in response to approved materiel requirements. Is responsible for the ACAT III and IV systems.

b. Assists the CBTDEV and TNGDEV in the requirements determination process.

c. Provides overall management of the Army's technology base including identification of maturing technologies necessary to support acquisition of warfighting materiel systems.

(1) Conducts S&T research through the Army Research Lab (ARL) and the Research, Development, and Engineering Centers (RDECs).

(2) Provides S&T representation to ICTs through ARL and RDECs. Provides MATDEV representation to ICTs through major subordinate command (MSC) and PM offices. Leads/participates in IPTs. As an IPT member, conducts market research and challenges, as appropriate, requirements which preclude satisfying a need with a commercial or developmental item.

(3) The AMC MATDEVs (especially ARL and RDECs) develop S&T programs and strategies, STOs, and technology demonstrations (TDs)/ATDs in response to FOCs and other user requirements. AMC (ARL and RDEC) participates in S&T, STO, and ATD reviews.

d. Subsequent to MS I, identifies system-specific intelligence and counter-intelligence support requirements and critical intelligence categories (CICs) in coordination with CBTDEV/TNGDEV.

e. Conducts or assists in the development of system concept studies and cost-performance trade-off analyses. Assists in the development of requirements trade-off analyses.

f. Provides RDA science and infrastructure input to HQDA for the Army RDA Plan.

g. Conducts a crosswalk, with the CBTDEV (TNGDEV for nonsystem training device (NSTD)), of the ORD to the RFP to verify that the RFP, including system specification or purchase description and the statement of work (SOW), accurately reflects the operational requirements stated in the ORD for all programs. The MATDEV and CBTDEV (MATDEV and TNGDEV for NSTD) will formally certify that the RFP has been crosswalked with the ORD and is in agreement prior to the ASARC or program review.

h. Provides initial and updated cost and system performances estimates for battlefield and peacetime operations as inputs to supporting analysis and program decisions.

i. Provides systems, logistics force projection, and sustainment analyses, through the Army Materiel Systems Analysis Activity (AMSAA).

j. Operates the Army's wholesale logistics system and as such determines, develops, documents, coordinates, and obtains TRADOC approval of its nondeployable IT warfighting requirements and base operations IT requirements with estimated single year total program costs greater than $10 million.

k. Is the Army's principal developmental tester (DT) and system safety verifier, integrates Army testing and supports Army experimentation.

l. Is M&S RDA domain agent for review and approval of M&S RDA requirements. Provides M&S RDA domain policy for the submission of M&S requirements for domain and DCG, TRADOC approval.

m. Subsequent to MS I, prepares, reviews, and coordinates with CBTDEV, and forwards to DA DCSINT STARs for designated ACAT I and II and selected OSD T&E oversight systems. Subsequent to MS I, prepares, coordinates with CBTDEV, and approves system threat assessments (STAs) for ACAT III and IV systems, unless specifically waived. Updates STARs every two years, or when significant changes in either the threat or U.S. system specifications and characteristics occur. Provides information copies to DA DCSINT.

n. Participates in AoAs.

3-32. Commander, U.S. Army Test and Evaluation Command (ATEC).

a. Supports warfighting experimentation. Provides planning as well as experiment controller and data collection expertise and management support.

b. Participates in ICTs and IPTs.

c. Participates in AoAs.

d. Is the Army's materiel system independent evaluator for systems during acquisition, including both developmental and operational aspects.

e. Identifies and submits ATEC M&S requirements in accordance with appropriate M&S domain agent procedures.

f. Is the Army's Operational Tester (OT).

g. Provides integrated logistics support (ILS) assessments and ILS program surveillance, monitors supportability testing, and maintains ILS database.

3-33. Army Surgeon General/CG, Medical Command (MEDCOM).

a. Participates in ICTs and IPTs, when appropriate.

b. Is the functional proponent for combat health support processes and procedures.

c. Is responsible for medical materiel research, development, and acquisition processes and procedures.

d. Is responsible for testing and experimentation for medical requirements determination.

e. Supports and participates in TRADOC-conducted AWEs.

3-34. CG, Army Space and Missile Defense Command (SMDC)

a. Serves as the specified proponent for space and national missile defense (NMD).

b. Leads the Army theater missile defense (TMD) issues in joint forums and integrates TMD operational efforts within the Army.

c. Is responsible for the development of DTLOMS solutions for space and NMD, and submission of DTLOMS requirements to CG, TRADOC for review/approval.

d. Develops the TMD concept for CG, TRADOC approval and ensures integration of the four operational elements/pillars of TMD (i.e., active defense, attack operation, passive defense, and BM/C4I) that are the responsibilities of TRADOC centers and schools.

e. Participates in and/or leads the ICT and IPT, when appropriate.

f. Supports and participates in TRADOC-conducted AWEs.

g. Identifies and submits SMDC M&S requirements IAW appropriate M&S domain agent procedures.

h. Participates in AoA processes, when appropriate.

i. Coordinates the development of space and NMD-related STARs/STAs and threat statements found in MNS, ORDs and CRDs. Forwards statements through TRADOC DCSINT for approval.

3-35. CGs of MACOMs and separate Army commands.

a. Serve as the DOCDEV, TNGDEV, and CBTDEV for branch and/or specified proponency assigned to them in accordance with AR 5-22. Determine, document, and submit concepts, FOCs, and requirements for CG, TRADOC approval IAW this pamphlet.

b. Determine, document, and submit base operations (nonwarfighting) IT requirements with projected total program costs greater than $10 million to CG, TRADOC for approval (see para 13-2).

c. Determine, document, and approve nondeployable warfighting and base operations (nonwarfighting) IT requirements with projected total program costs greater than $10 million. Establish the following in support of this role in these commands:

(1) MRD format.

(2) Procedures for validating compliance with applicable Army and joint technical architectures during approval of the requirement (see para 13-2).

Chapter 4
Integrated Concept Teams (ICTs)

4-1. Introduction. The ICT management philosophy employs the team approach to requirements determination actions. ICTs maximize the efforts of reduced resources by early resolution of issues through timely involvement of appropriate agencies/expertise as a team with a commitment to aggressively identify and work issues. In its role as Architect of the Future, TRADOC employs multi-disciplinary ICTs that represent appropriate MACOMs and staffs, appropriate DOD organizations, and other federal agencies. Industry and academia may participate on a limited basis (see para B-3). ICTs are the primary means for horizontal integration in the DTLOMS requirements determination process. A single ICT may identify the need for several different DTLOMS requirements to support a warfighting capability that crosses multiple branches or battlefield functions. A primary goal of the ICT process is to shorten the requirements determination event of the acquisition process.

4-2. Fundamental characteristics.

a. The following elements are essential to an ICT:

(1) Are multi-disciplinary.

(2) Have members who are empowered to make decisions.

(3) Have a holistic, total force perspective.

(4) Seek DTLOMS solution sets.

(5) Consider both conventional and innovative concepts and solutions.

(6) Consider near-, mid-, and long-term capabilities and opportunities.

(7) Can be Tier 1 or Tier 2. Tier 1 ICTs are chartered by HQ TRADOC.

(8) Promote HRI/HTI.

b. ICTs are formed to accomplish the following:

(1) Develop capstone and subordinate TRADOC Pam 525-series concepts and associated FOCs.

(2) Develop new and validate current FOCs published in TRADOC Pam 525-66.

(3) Determine and document warfighting mission needs analysis across all DTLOMS domains (i.e., ICT (DTLOMS Determination)).

(4) Prepare or direct the preparation of the DTLOMS requirements document to attain required future capabilities.

(5) Develop a simulation support plan envisioned for use throughout the concept exploration and acquisition phases.

c. See appendix B for ways to organize and conduct ICTs.

4-3. Integrated Concept Team (ICT) establishment and general guidelines.

a. Initiation. ICTs are initiated by the CG TRADOC, DCGs, DCSs, or school commandants/center commanders. The individual initiating the ICT determines whether to establish a Tier 1 or Tier 2 ICT.

b. Tier 1.

(1) Scope. Tier 1 ICTs are established to develop concepts, and requirements documentation when there are multiple proponents and proponency has yet to be determined. The CG, TRADOC may designate the Tier 1 lead when proponency hasn't been determined. Tier 1 ICTs have high management interest and visibility (HQDA, OSD, or Congress); major joint Service impact; or require HQ TRADOC delegated authority or command level resources to conduct. These ICTs are approved and chartered by HQ TRADOC.

(2) Proposal. Tier 1 ICTs are initiated by submitting an ICT proposal (see app B) to the appropriate HQ TRADOC functional directorate. This allows for expeditious coordination of the emerging ICT at the idea stage before major command resources are expended. An e-mail submission is acceptable. The appropriate HQ TRADOC functional directorate (CAD, C4I, or CSSD) reviews the proposal for potential integration with other ICTs and with other TRADOC requirements determination

efforts. A proposal response, with a suggested core membership list and appropriate directions, is usually provided back to the originator within 15 working days. (The response normally requires that the originator develop and submit a charter to the HQ TRADOC functional directorate for CofS, TRADOC approval). However, if other factors are involved (e.g., redundancy, change of scope, joint Service implications, major command resource commitments), the HQ TRADOC functional directorate conducts the necessary coordination (internal and external) prior to a final decision on the ICT's scope and lead. Following this coordination, appropriate instructions, including a designation of the ICT lead, are forwarded back to the originator and other impacted organizations. Under these circumstances, the lead for the ICT may be an organization other than the originator of the proposal.

c. Tier 2. These ICTs are used to develop or refine a concept unique to a single proponent or to determine and document branch or function unique mission needs and requirements. Tier 2 ICTs are usually established and conducted under the guidance of school commandants or center commanders. They designate the ICT lead and charter the ICT. The ICT lead notifies the appropriate HQ TRADOC functional directorate via e-mail and provides at least the following information: ICT name, originator, deliverables and/or products, estimated completion date, participating organizations, and POC name and contact information. HQ TRADOC (ATCD-RP) posts this information on the DCSCD Homepage.

d. ICT membership. There are two groups of ICT membership - the Core membership and the Staffing membership. The Core membership has the primary responsibility for developing and coordinating the product, working the resolution of issues, and submission of the product for approval. Dedicated Core ICT members serve as the ICT's nucleus, accomplishing most of the planning and work. On-call Core ICT members provide input to the product and assist in resolution of issues within their specialized expertise or provide experimental, analytical, operational, and technological advice and support to the dedicated Core team. Staffing ICT members review the draft product and submit their issues and comments. Resolution of issues to the satisfaction of the Staffing ICT member constitutes concurrence by that member's organization. Unresolved issues from either the Core or Staffing ICT members constitute a nonconcurrence by that member's organization and are addressed and resolved during the approval process. ICT membership and participants vary, depending on the specific product being produced (see appendix B). The ICT charter identifies membership and participating organizations. While industry and academia are not members of the ICT, their input is a key ingredient to the process. Techniques to obtain industry and academia input must be executed properly to avoid significant consequences for government, academia, and industry participants. ICT leaders must seek advice and assistance from their legal and contracting offices during the early ICT strategy planning stage and continually during the ICT process (see app B, para B-3).

e. ICT process.

(1) Charter. The ICT lead drafts and coordinates the charter with all Core ICT member organizations. The ICT charter addresses, with sufficient detail for ICT planning and resource decisions, the same areas included in the ICT proposal. For Tier 1 ICTs, a copy of the draft charter is provided to the HQ TRADOC functional directorate for review and approval by the TRADOC Chief of Staff. The ICT charter must have enough detail to allow HQ TRADOC to prioritize ICT support resources (e.g., analysis and Battle Lab experimentation) and coordinate with other requirements determination efforts. For Tier 2 ICTs, a copy of the commandant/ commander approved charter is forwarded to the HQ TRADOC functional directorate. Resourcing for Tier 2 ICTs is the responsibility

of the proponent and membership. Concepts and DTLOMS Mission Needs Reports from Tier 2 ICTs are approved by the chartering commander. An example of an ICT charter is in app R, figure R-1.

(2) Read-ahead for Core ICT. The ICT lead develops and provides a read-ahead package to the Core ICT member organizations. Packages include background information; strawman ICT Action Plan with milestone schedule, issues and opportunities, and emerging taskings and support responsibilities. When applicable, the strawman materiel requirements documents with initial drafts of the operational mode summary/mission profile (OMS/MP) and the system training plan (STRAP) are included. These strawman documents are not expected to be complete, ready-to-coordinate documents, but rather are first-cut documents that require input from Core ICT members. The forwarding memorandum for the read-ahead includes a request for the designation of an individual to serve as an ICT Core member. The individual is empowered to actively participate in the ICT, provide advice and input to the product, identify issues, and represent their organization on any issues, opportunities, or taskings identified in the Action Plan. The Action Plan must address how to obtain an assessment of industry and academia technology capabilities. Specific guidance on industry and academia participation is included in app B.

(3) Convene the Core ICT. The Core ICT can be convened by any appropriate mechanism (e.g., exchange of papers/electronic media, video teleconference, telephonic conference(s), or meeting). The Core ICT includes both dedicated and on-call members (see para 4-3d above and app B). On-call members submit their input to the product but are not required for full participation (e.g., a Battle Lab may be required early on to identify the need for experimentation and later on to explain the experiment results). The mission of the Core ICT is to prepare the ICT product for coordination and to assist the ICT Chair in resolution of comments and issues received during staffing. The first order of business is to finalize the ICT action plan, including supporting analysis, experimentation, resources, and taskings/responsibilities essential to develop ICT products and deliverables. A critical element of ICT planning and operations is establishing appropriate linkages between related ongoing ICTs and other affected or supporting organizations. The second order of business is to implement and execute the action plan.

(4) ICT products. The full ICT membership produces the following products:

(a) Concepts. A Tier 1 ICT produces both the draft concept (capstone or subordinate) for coordination and the final concept for submission to HQ TRADOC for approval. The ICT also publishes minutes that describe the resolution and disposition of each issue, identify supporting information that cannot be provided in the product, and convey any issue for further study.

(b) DTLOMS determination. The ICT produces a DTLOMS determination analysis report (see app B-7e) for approval by the authority that chartered the ICT. The report identifies specific DTLOMS needs to solve a concept-identified future operational capability. The ICT also publishes minutes that describe the resolution and disposition of each issue, identifies supporting information that cannot be provided in the product, and conveys any issues for further study.

(c) Materiel requirements documents (MRDs). The ICT produces the MNS, capstone requirements document (CRD), and ORD. The ICT develops the coordination draft and final draft MRDs. It also publishes minutes that provide an audit trail describing the resolution and disposition of

each issue and identifying any areas needing further study for resolution and/or attention of MATDEV IPT(s) (e.g., MANPRINT issues).

(d) Simulation support plan (SSP). The ICT produces the initial plan for management of simulations in support of simulation and modeling for acquisition, requirements, and training (SMART) goals. The plan addresses M&S use for assessment of sustainment issues, testing, and training, in addition to combat and materiel development purposes. The SSP is a dynamic plan, which will change as the concept matures. The intent of an SSP is to facilitate the use of M&S standards, to promote the reuse of software when feasible, and to provide a collaborative environment to reduce the time and cost of system development through efficient and effective use of M&S.

(5) Full review of the ICT product. Key to the success of the ICT process is the early identification and resolution of issues. While the Core ICT members work numerous issues during preparation of the draft, staffing responses that specifically identify issues and provide comments are critical to quickly producing an adequate and supported document. Issues reflect an area of nonconcurrence if not resolved to the mutual satisfaction of affected ICT members. Unresolved issues become decision issues for the document approval authority. Comments reflect suggestions for consideration by responsible ICT members. Staffing ICT member organizations identify the individual empowered to represent their organization during issue resolution.

(6) Resolution of issues identified. Issues are resolved within the ICT, when possible. Core ICT members review the issues identified from staffing. An issue that cannot be resolved in the ICT will be presented immediately to director or to general officer levels within the affected member organization for resolution. Any issues not resolved are submitted with the ICT product to HQ TRADOC (or, when applicable, to the chartering commandant/commander) for decision during the final approval. Senior leadership will be briefed, as necessary, to build support for results and products.

(7) Forward ICT product to HQ TRADOC, ATTN: appropriate DCS(s) (i.e., DCSDOC for doctrine products/actions; DSCT for training, leader development, and soldier products/actions; or DCSCD for concepts, organization, and materiel products/actions, as applicable) for action or decision.

(8) Publish and forward to ICT members and HQ TRADOC functional directorate(s) final ICT minutes that show the status, resolution, and disposition of each issue raised during the ICT. Specifically identify any issues beyond the scope of the ICT requiring work of the combat developer, training developer, doctrine developer, force developer, and/or materiel developer.

(9) Transition any follow-on ICT-related efforts to responsible organizations for execution.

(10) Dissolve ICT or transition to an appropriate follow-on ICT or AMC/PEO IPT.

f. Coordination. HQ TRADOC functional directorates coordinate individual ICTs with other ongoing TRADOC ICTs. When an ICT is completed, these directorates coordinate the results with other requirements determination and concept development efforts.

g. DCSCD Internet Homepage (http://www.tradoc.army.mil). A listing of all ongoing ICTs is maintained on the DCSCD Homepage. DCSCD directorates are responsible for reporting ICT information updates to the DCSCD Homepage POC.

Chapter 5
Developing and Managing the Capstone and Subordinate Concepts

5-1. Introduction. The CG, TRADOC approves all concepts. Concepts are the centerpiece of the requirements determination process. Joint publication 1-02, defines a concept as follows:

> "A notion or statement of an idea expressing how some thing might be done or accomplished, that may lead to an accepted procedure."

TRADOC concepts, published as TRADOC pams in the 525-series, are the initial documents that drive the requirements determination process. Future operational capabilities (FOCs) are derived from and are an integral part of approved 525-series concepts.

5-2. Terms of reference. Terms used in the development of concepts are often misunderstood or used incorrectly. The military community often uses the terms "vision" "concept" and "doctrine" interchangeably, but they are not synonymous. Visions and concepts generate questions and hypotheses about the future for exploration, while doctrine provides answers about today. The term "concept" used in this chapter refers to a "subordinate concept," which can be either an integrating or a supporting concept. The TRADOC Pam 525-series concepts enables the capstone concept (TRADOC Pam 525-5).

a. Vision. A vision is a description of the commander's thoughts on how military operations will take place in the future that provides a holistic view of Army capabilities leading toward a desired end state. The Army Future Warfighting Vision is normally a 15 - 20 year projection. Its genesis is long-term research, operational experience, analysis, and wargaming. The warfighting vision addresses change; it focuses on future accomplishments. To be useful, it must be believable and achievable with current methodology, technology, and resources; or it must be a roadmap stating the status of projected advances and changes in these areas, even if explained in the abstract. From this vision emanates the TRADOC capstone warfighting concept (TRADOC Pam 525-5) that provides direct linkages to national and defense level planning documents. The capstone concept drives the development of subordinate concepts (integrating and supporting).

b. Subordinate concepts. These concepts enable the capstone concept of future operations described in TRADOC Pam 525-5 into a more detailed, but still abstract, description of some future (normally 3 - 15 years) activity or end state. Concepts describe future capabilities within a proposed structure of future military operations. There are two types of subordinate concepts: integrating and supporting. Integrating concepts can address requirements in multiple operational environments. Examples of this are Light, Medium and Heavy Forces. Supporting concepts amplify a specific function (e.g., Theater Missile Defense and Homeland Defense) or describe how to employ a system or conduct a task. These concepts are the basis for assessment which includes studies, experimentation, analyses, testing, and simulations leading to the determination of DTLOMS solutions to achieve those capabilities. Subordinate concepts focus on force modernization and guide science and technology development. Concepts are dynamic. They change as perceptions and circumstances vary. Concepts are an ICT

product. Subordinate concepts are further evaluated using exercises, actual operations, and senior military judgment.

c. Doctrine. Doctrine is the body of thought on how the military fights in the present to near-term with the current force structure and materiel. Doctrine reflects the fundamental principles that the Army uses to guide its actions in support of national objectives. Army doctrine is authoritative, must be synchronized with joint doctrine, and requires judgment in application. Doctrine is generated as questions about concepts are answered or as concepts are validated through analyses, simulations, experiments, exercises, tests, actual operations, and/or senior leader judgments. Doctrine based on the keystone manual, FM 100-5, is normally relevant for a 5 - 7 year period.

5-3. TRADOC Pamphlet (Pam) 525-series publications. The CG, TRADOC is the approving authority for all concepts submitted for consideration for publication in the TRADOC Pam 525-series. TRADOC Pam 525-5 describes the capstone concept. The capstone concept provides a holistic, macro-level description of the future Army and how it will conduct operations on the battlefield. It is augmented by more detailed 525-series concepts, which describe the full range of interdependent operations and functions and related future Army capabilities from a variety of perspectives and levels. HQ TRADOC, school commandants, and selected non-TRADOC leaders form ICTs to produce these concepts. All concepts begin as intellectual products that are further developed through constructive analysis and experiments. This allows them to be defined in greater detail, refined, and substantiated as a relevant framework for requirements determination.

a. The capstone concept is developed at HQ TRADOC by the DCSCD. This concept reflects a direct linkage to national security and national military strategies, the Defense Planning Guidance, Joint Vision, the Army Plan, the CSA's Army Vision, and other relevant input. The capstone concept is the primary reference for subordinate concepts. The capstone concept describes future Army capabilities and the impact these capabilities have on the entire force. The capstone concept describes capabilities for global power projection and the employment of U.S. Army forces across the full spectrum of military operations conducted at strategic, operational, and tactical levels in joint, multinational, and interagency activities.

b. To enable the capstone concept, the CG, TRADOC may direct the development of subordinate concepts. This occurs when the process has multiple proponents, high management interest and visibility (HQDA, OSD, or Congress), major Joint Service impact or requires HQ TRADOC authorization to use command level resources.

c. Subordinate concepts. All other 525-series concepts describe operations necessary to enable military operations described in the capstone concept or expand upon how to deploy, fight, and sustain ideas in sufficient detail to drive experimentation and the rest of the requirements determination process. These concepts augment the capstone concept by providing more details. They describe fully integrated, detailed capabilities to focus efforts on future military operations. Subordinate concepts are a description of military operations and enabling capabilities necessary to achieve a desired battlefield effect. Subordinate concepts are written using the ICT process as an integrated effort among several concept developers because all approved concepts will impact upon the full joint and combined arms team. These concepts identify the capabilities that are required to conduct combat, combat support, or

combat Service support functions on the battlefield of the future by describing them as future operational capabilities (FOCs).

(1) Integrating Concepts. Integrating concepts address requirements in multiple operational environments. Examples are Light, Medium and Heavy Forces.

(2) Supporting Concepts. Supporting Concepts are lower level concepts that amplify a specific function (e.g., Theater Missile Defense, Unmanned Systems for Land Warfare and Homeland Defense) or describe how to employ a system or conduct a task.

5-4. Concept relationships.

a. All concepts describe capabilities that are needed to promulgate the ideas and warfighting descriptions contained in the capstone concept. The requirements determination process remains concept-based. The process requires all warfighting requirements to have a lineage through concepts back to the Army's capstone concept. Together, these concepts determine DTLOMS requirements and focus the Army's modernization efforts. The control mechanism for the requirements determination process is the FOCs that emanate from subordinate concepts. FOC content and structure is specifically addressed in chapter 6. All DTLOMS warfighting requirements must relate to the achievement of an approved FOC, all of which emanate from a CG, TRADOC-approved TRADOC Pam 525-series concept (see fig 5-1).

b. As the Army transitions to meet future requirements it recognizes that systems and organizations must be integrated and provide improved operational effects as part of the system-of-systems approach to capability solutions. They must link to specific FOCs and through subordinate concepts to the Army capstone concept.

5-5. Concept development.

a. General. Because innovative ideas are the foundation of all concepts, writers should be visionary and uninhibited by fiscal and technological constraints. However, to be relevant and of value to the requirements determination process, concepts must take into account and be informed by projected developments in the national security and national military strategies, technology, other Service concepts and force development plans, and reasonable expectations in resource availability.

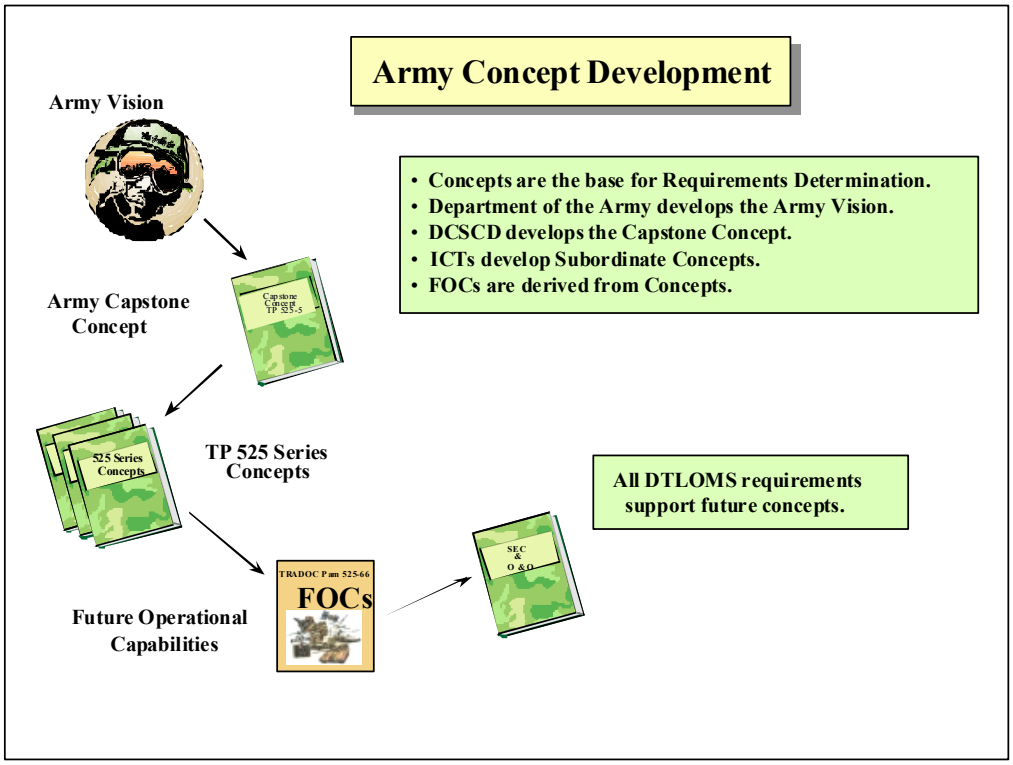


Figure 5-1. Concept Development

b. TRADOC Pam 525-5 series. Concept development is initiated by:

(1) Direction of CG, TRADOC

(2) Tier 1 ICT deliverable

(3) DCSCD-approved concept statement. Concept proposals may be submitted either as a recommendation from a Tier1 ICT or a proponent/agency submission of a draft concept statement.

5-6. Concept documentation.

a. Concept statement. A concept statement is the first step in determining if there is a requirement to develop a 525-series Subordinate concept to support/enable the Army capstone concept TRADOC Pam 525-5. Concept statements are required to validate the need for the concept and to foster horizontal integration early in the process. Concept statements must be reviewed and approved by HQ TRADOC, DCSCD before continuing the development process. The DCSCD staffs draft concept statements to the core distribution list, shown in paragraph C-11, for review. Comments from worldwide staffing are reviewed and approval disposition is forwarded to the proponent. The concept statement provides the general thrust of the proposed concept without going into the details required of the coordinating draft and final concept. Approval of a concept statement is the charter for a concept developer to obtain and expend resources necessary to establish an ICT, as described in chapter 4, and to develop a coordinating draft of the concept. Concept statements are very brief in length (not to exceed two pages) and should address subject, reference to other concepts, general description, and reason for need.

b. Concept coordinating draft. A TRADOC Pam 525-series subordinate concept coordinating draft is the product of the concept ICT chair/proponent. This document is the first attempt to capture the details of what is to be accomplished in the concept. The coordinating draft follows the format outlined in app C. The draft is reviewed by the DCSCD, who then passes release authority to the proponent for worldwide staffing.

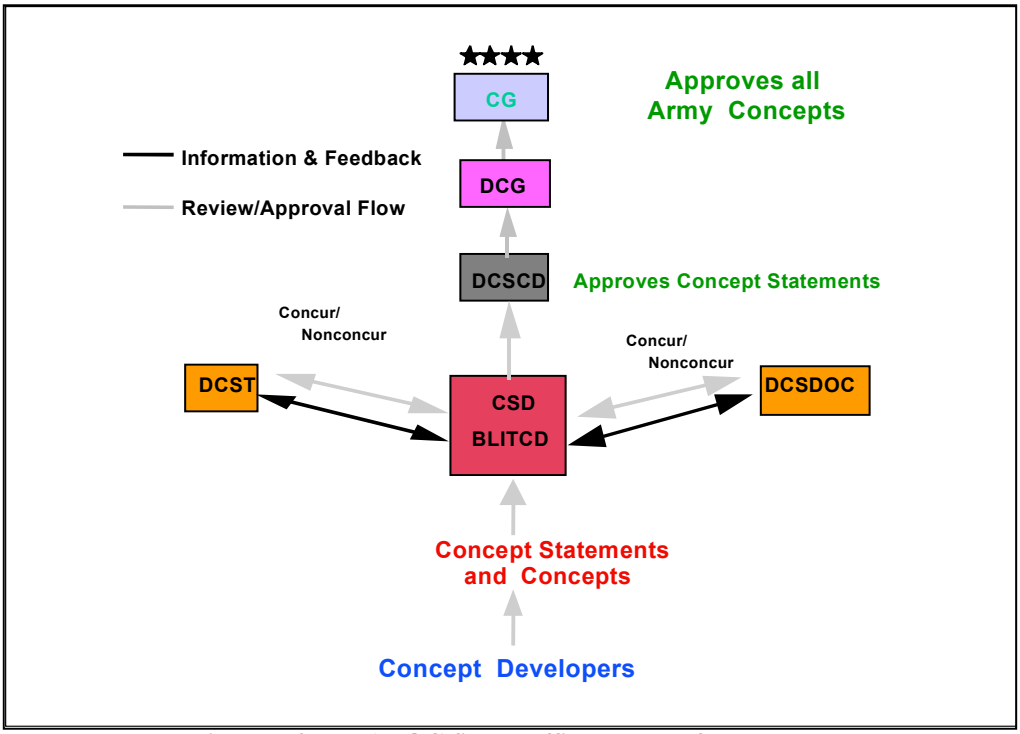


Figure 5-2. TRADOC final staffing process for concepts

c. Concept final draft. The subordinate concept coordinating draft is reviewed and revised by the ICT chair/proponent to include comments from the worldwide staffing. This revised coordinating draft forms the concept document that is forwarded to the DCSCD for TRADOC review. The final draft concept review at HQ TRADOC will be accomplished as depicted in figure 5-2. The ICT chair/proponent forwards the final drafts of new or revised concepts to HQ TRADOC, ATTN: ATCD-B.

d. Appendix D - Future Operational Capabilities. The principle objective of each FOC, required to support the concept and developed by the ICT chair/proponent, is listed in paragraph b of app D. Appendix D contains the detailed description of each individual capability as outlined in chapter 6.

e. Review and updates. Published concepts are reviewed every two years for relevancy. Concept ICT chair/proponent review may determine that no changes are needed, that the concept should be eliminated altogether, that a revision or change of specific paragraphs is needed, or that a complete new concept should be written. Complete rewrites may be required when significant changes are made to TRADOC Pam 525-5. Developing and coordinating revisions, updates, and changes to current approved published concepts is the same as for developing, coordinating, and approving new concepts. Published concepts that are out-of-date (older than the current TRADOC Pam 525-5) and do not reflect current operational warfighting focus will be referred to the appropriate proponent for updating.

f. Coordination annex. The ICT chair/proponent develops a coordination annex that indicates coordination outside the ICT and ensures coordination with appropriate interested parties. This coordination annex is done in columnar format listing organizations reviewing the concept, concurrence/nonconcurrence, number of comments received from each organization, number of comments accepted from each organization, and number of comments rejected from each organization. A narrative section accompanies the coordination annex and discusses the rationale for comments rejected or accepted in part. ICT unresolved issues are addressed in this annex.

5-7. Concept staffing and approval. All concept staffing with HQ TRADOC is accomplished through electronic transfer methods. As a general guide, staffing time with HQ TRADOC is 30 calendar days, centers/schools and Battle Labs 45 days, and MACOMs 60 days (per TRADOC Reg 25-35). Electronic notification of the document's arrival will coincide with the "clock-starting" for suspense dates. If an extension of suspense is required, the request should be addressed to the TRADOC POC. Failure to respond does not constitute "silence is consent." The HQ TRADOC e-mail address for electronic transfer to DCSCD is atcdbp@monroe.army.mil.

a. Concept statement. Concept statements from a concept developer are forwarded to HQ TRADOC (atcdbp@monroe.army.mil) for review and approval. Concept statements are reviewed by HQ TRADOC, DCSCD and sent out through worldwide staffing to schools, Battle Labs, and MACOMs for validation of need and comments identified by the level of significance. The DCSCD forwards a Go/No Go response for developing a concept coordinating draft. A revised DCSCD approval concept statement and comments from this staffing are returned to the proponent. Staffing comments should be used by the ICT chair/proponents to aid in the development of the coordinating draft.

b. Concept coordinating draft. The concept ICT chair/proponent will forward the concept coordinating draft to HQ TRADOC (atcdb@monroe.army.mil) for review and approval by the DCSCD for release to worldwide staffing by the proponent.

c. Worldwide staffing.

(1) The concept proponent or lead developer staffs the TRADOC-released coordinating draft concept worldwide for review and comments. A suggested electronic address list for worldwide staffing is available from atcdbp@monroe.army.mil in addition to the core membership list in app C.

(2) Worldwide staffing should include, but is not limited to, TRADOC centers and schools, appropriate MACOMs, appropriate unified and specified commands, other Services, and affected agencies (HQ AMC, HQDA). Appendix C contains a core distribution list for staffing of draft concepts (other addresses may be added as deemed appropriate). As a result of staffing, the concept developer reviews/revises the coordinating draft based on comments and resolves any comments deemed inappropriate for inclusion.

d. Final draft concept.

(1) The ICT chair/proponent prepares a final draft with appropriate appendices and attachments as outlined in appendix C, and forwards it with a recommendation for approval.

(2) Concepts and Scenarios Division, Battle Laboratory Integration, Technology, and Concepts Directorate (BLITCD) forwards the final draft concept, with the coordination annex, to the designated TRADOC staff for final review and then to CG, TRADOC.

e. Concept approval. When approved by the CG, TRADOC, the Concepts and Scenarios Division notifies the concept proponent and prepares the concept for editing. When concept editing is completed, the approved concept is published on the TRADOC Internet Website.

f. Resolution of Issues. Satisfactory resolution of concept issues between all parties, HQ TRADOC staff sections and the proponent ICT representative member, constitutes concurrence by that member's organization. Unresolved issues from either the coordination draft core staffing or HQ TRADOC staffing constitute a nonconcurrence of the concept document, and will be resolved during the final approval process.

Chapter 6
Future Operational Capabilities (FOCs)

6-1. Introduction. This chapter provides policy and procedures for the development of FOCs within the requirements determination process. It sets forth definitions and identifies key responsibilities for developing, coordinating, and managing FOCs. FOCs are the control mechanism for requirements determination activities. They provide focus to the Army's warfighting experimentation program and the science and technology program. Army FOCs are aligned with the six major task areas of the Army universal task list (AUTL), thus establishing linkage with the universal joint task list (UJTL), the joint desired operational capabilities (DOCs), and joint future operational capabilities (JFOCs).

6-2. Overview.

a. FOCs are structured statements of desired operational capability that establish the foundation upon which Army requirements are based to achieve the progressive ideas articulated in HQ TRADOC-approved concepts. They are intended to apply to tomorrow's Army on the ever-changing battlefield, and should be expressed as objectives with clear, quantifiable and measurable goals. The two types of FOCs are integrated and proponent/branch. They are crafted by future capability teams (FCTs) discussed in chapter 7. Integrated FOCs apply to several proponent branches that share operational interest in the desired capability. Individual proponent/branch FOC objectives are identified in paragraph 3-4 of all TRADOC-approved concepts. FOCs are listed in an appendix of the approved TRADOC Pam 525-series concept. TRADOC Pam 525-66 lists all approved FOCs. Analyses of FOCs, integrated within concepts, are used to stimulate changes in the various DTLOMS domains as the Army seeks to sustain or improve its warfighting advantage over current and developing world military forces. However, FOCs are not DTLOMS specific; i.e., there are not doctrine FOCs or materiel FOCs. Examination of potential solutions to support an FOC must span all DTLOMS domains, and should be considered in order, D-T-L-O-S-M. Collectively, the results of these examinations define the strategy for how the proponent envisions achieving the capability over time. All warfighting requirements have a linkage to the capstone concept through one or more FOCs, and to the CG, TRADOC-approved subordinate concept from which the FOC is derived.

b. FOCs should be sufficiently specific to allow Army leaders and proponents to measure success and to prioritize funding, thus chartering materiel developers to pursue only relevant technology applications and changes to DTLOMS domains.

c. FOCs are employed in the TRADOC S&T reviews and the STO reviews as the yardstick for assessing the relevance of individual S&T efforts. FOCs guide the Army's S&T investment. Materiel developers and industry use FOCs as a reference to guide independent research and development and to facilitate horizontal technology integration (HTI). FOCs are used within the Army Science and Technology Master Plan (ASTMP) process to provide a warfighting focus to technology-based funding. To this end, FOCs should be projected out to the mid- to far-term (10-25 years).

d. TRADOC Pam 525-66 organizes and compiles the FOCs described in TRADOC-approved proponent concepts. The development of this publication is a key means to promote an across-the-force look at warfighting capabilities. The integration of FOCs is the primary function of the FOC Integration Workshop lead by HQ TRADOC (DCSCD, BLITCD). Many of the integrated FOCs will inherently cross different proponent concepts of operation, and highlight opportunities for horizontal solutions to future warfighting requirements. Both concepts and their associated FOCs provide the basis for DTLOMS determination activities.

e. FOCs should answer the following questions:

(1) What – Express the desired capability in measurable goals. Goals may be expressed parametrically, (e.g., engage targets at 10–15 km).

(2) When – When does a proponent need/expect to achieve the capability?

(3) Why – A short reference to the concept-based rationale for pursuing the capability.

f. For an example of an FOC, see app D, figure D-1.

6-3. Future Operational Capabilities (FOCs) format. Appendix D provides the format and an example for submitting candidate FOCs to HQ TRADOC, DCSCD.

6-4. Review of FOCs and update of TRADOC Pam 525-66.

a. As new concepts are developed and approved, new FOCs to execute the concepts are generated. TRADOC Pam 525-66, updated and published biennially, is organized in accordance with the AUTL, and includes newly generated FOCs as well as changes to existing FOCs.

b. FOC review cycle. Combat developers review their FOCs as required to ensure they are properly maintained (updated or deleted). FOCs may be updated internally any time a new capability is desired or opportunity is identified, but will only be included, modified, or deleted in the FOC compendium on a biennial basis. HQ TRADOC, DCSCD provides substantive page updates as required during alternate years. Inputs for FOC updates are continuously accumulated from a wide variety of sources (e.g., insights from S&T reviews, AWEs, commanders in the field, and concept rewrites). FOCs are then created or revised within the context of new or existing concepts. The following are update milestones:

(1) November. HQ TRADOC, DCSCD, BLITCD initiates the update cycle by publishing and disseminating a memorandum of instruction (MOI) with specific guidance, format and milestone schedule. All combat developers initiate review to update and/or generate new FOCs as required.

(2) December – February. Proponent review and FCT meeting period.

(3) February. Combat developers submit draft new and updated FOCs, which are contained within concepts, to HQ TRADOC, DCSCD. HQ TRADOC, DCSCD disseminates draft FOCs to other concept and materiel developers to solicit comments. Combat developers review other proponent FOCs for context as well as potential overlap, redundancy, omissions, and impact on others. Comments and recommendations should be sent directly to the originator with a copy provided to HQ TRADOC, DCSCD.

(4) March.

(a) Combat developers forward revised and new FOCs, with incorporated comments, to HQ TRADOC DCSCD.

(b) HQ TRADOC, DCSCD conducts FOC Integration Workshop to consolidate similar FOCs, as appropriate, and to identify branch/functional area unique FOCs for inclusion in TRADOC Pam 525-66. Specific instructions for the conduct of the workshop are published in a separate MOI prior to the event.

(5) April. HQ TRADOC, DCSCD incorporates any new and/or changed FOCs and tasks combat developers to review modifications occurring in the workshop for director-level concurrence/comments prior to initial drafting of TRADOC Pam 525-66.

(6) May - July. HQ TRADOC, DCSCD consolidates input from the combat developers and conducts staffing at commandant and HQ TRADOC levels.

(7) July. HQ TRADOC, DCSCD submits final draft TRADOC Pam 525-66 to CG, TRADOC for approval.

(8) 1 August. TRADOC Pam 525-66 is approved and submitted as input to the ASTMP.

Chapter 7
Science and Technology (S&T)

7-1. Introduction.

a. TRADOC conducts an annual series of four reviews to provide a warfighting focus to the Army's S&T investment: The S&T review, the Joint User/Developer STO review, the ATD review and the Special Access Program (SAP) Review (see fig 7-1).

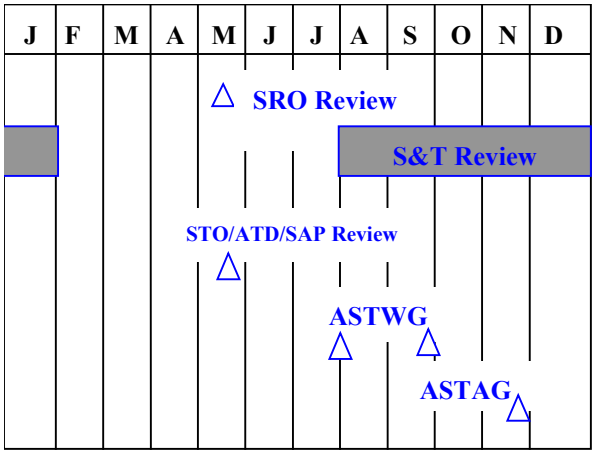


Figure 7-1. Army S&T Reviews

b. In the strategic research objectives (SRO) Review, TRADOC reviews and assesses, through formal presentations by the research community, portions of the Basic Research (subsequently referred to as 6.1) program of the MATDEV, specifically the currently approved and emerging Army SROs.

c. In the S&T Review, TRADOC reviews and assesses the Exploratory Development (subsequently referred to as 6.2) and Advanced Development (subsequently referred to as 6.3) programs of the MATDEV to determine the warfighting value of the individual work packages relative to the FOCs. Important inputs to the S&T Review process are insights from Army After Next investigations into future operational requirements and the identification of capability shortcomings that result from the Warfighting Lens Analysis (WFLA) Force Assessment and the just-completed program objective memorandum (POM) cycle. WFLA is discussed in chapter 13.

d. Army STOs are the top 200 S&T efforts within the Army. A STO states a specific, measurable, major technology advancement to be achieved by specific fiscal year(s), normally with a 3-5 year period. An STO can be a single work package or a grouping of several work packages in a particular technology area. HQ TRADOC, DCSCD conducts an annual joint user/developer STO review as the Executive Agent for the Deputy Assistant Secretary of the Army for Research and Technology (DAS(R&T)). Prior to the STO review, the MATDEV obtains an O-6 level CBTDEV (TRADOC DCD or Battle Lab Deputy Director) endorsement of their new STO. At the STO review, the CBTDEV community (DCDs, Battle Lab deputy directors, and other non-TRADOC CBTDEVs) and the MATDEV community (AMC RDECs, Corps of Engineers (COE), Medical Research and Materiel Command (MRMC), Space and Missile Defense Command (SMDC)) review and assess the proposed STO programs of the MATDEV to determine the relevance to the CBTDEV FOCs, technological merit, and to establish the relative priority of the individual STO proposals. The result of the STO review is an order of merit list that is used by TRADOC, DCSCD, in conjunction with the WFLA Force Assessment results, Army After Next insights, and other programmatic priorities, to produce a recommendation to the ASTWG Technical Council. STOs approved by the ASTWG receive priority for funding, are reviewed annually, and are summarized in the ASTMP.

e. ATDs demonstrate the potential of mature technology from STOs and/or other work packages to provide enhanced military operational capability and/or greater cost effectiveness. At the ATD review, a HQ TRADOC/MATDEV Council of Colonels reviews the ATD candidates and generates an order of merit list that is used to develop a coordinated HQ TRADOC recommendation for the ASTWG Technical Council for submission to the ASTWG. In the SAP review, TRADOC reviews and assesses acquisition SAP's to determine their relevance to the CBTDEV FOCs, their technical merit and to establish a relative priority for each SAP program.

7-2. Strategic Research Objectives (SRO) Review. Under the DOD Basic Research Plan, the Services have identified six SROs. These are high-profile, long-range, scientific areas of strong military relevance and high potential payoff. TRADOC participates in the Triennial Basic Research review that assesses the current set of DOD SROs. The HQDA Labs revise these SROs as recommended by the Triennial Review. On an annual basis, HQ TRADOC, DCSCD and DCSDOC reviews, evaluates, and prioritizes the emerging Army SROs for consideration by the ASTWG.

7-3. Science and Technology (S&T) Review.

a. TRADOC conducts an annual review (May-December) of all 6.2 and 6.3 S&T work packages contained in the Army Science and Technology Management Information System (ASTMIS) database. The S&T review helps create an environment that encourages interaction between the CBTDEV and the MATDEV. The results of the S&T review are used by the combat and materiel developers to:

(1) Assess the warfighting relevance of all Army S&T work packages relative to the FOCs.

(2) Provide feedback to the directors of the S&T agencies on the relative merits of each work package.

(3) Identify redundancies and shortfalls in the Army S&T program.

(4) Identify potential STO and ATD candidates.

(5) Provide input to industry on areas of capability shortfalls and opportunities for investment.

(6) Serve as a catalyst for interaction between the TRADOC schools, Battle Labs, selected non-TRADOC agencies, and MATDEV communities.

b. The WFLA Force Assessment process produces several outputs that will ensure a better focus of the S&T review process. It determines how well battlefield tasks are done in three separate timeframes for a given deployment scenario. The Force Assessment Document highlights specific capability shortfalls for specific tasks in each of those timeframes. It also assists in determining whether the shortfall is due to a shortage of currently available systems, a technology that is available but not affordable, or a technology that is not yet available. The S&T review process should ensure that those technologies that are required to fulfill a critical capability shortfall receive adequate focus. The WFLA process determines how important each task is, assists in prioritizing the critical technology efforts assessed during the S&T review, and possibly identifies new technology focus areas not previously recognized.

c. Required scope of the TRADOC S&T review. Assess all Army 6.2 - 6.3 S&T work packages from the following organizations:

(1) AMC.

(2) United States Army Chief of Engineers (USACE).

(3) MRMC.

(4) Army Research Institute (ARI).

(5) SMDC.

(6) PEO-managed work packages.

d. Procedures. In general, the S&T review follows the process outlined below. HQ TRADOC, DCSCD publishes an MOI with specific dates of events and additional administrative details (normally in May).

(1) May-June. The MATDEVs review the latest update to TRADOC Pam 525-66 and update their S&T work packages in the ASTMIS.

(2) July. HQ TRADOC, DCSCD downloads the summaries of the S&T work packages from the ASTMIS database to create the S&T review database. The S&T review database includes fields to enter the FOCs to which a particular work package is applicable and to enter the rating score. The S&T review database is sent out electronically to all CBTDEVs to conduct the S&T review.

(3) July-September. The CBTDEVs:

(a) Review each work package for applicability to their FOCs.

(b) Identify all of the FOCs to which each work package applies.

(c) Assign a score to each work package that supports one or more of their FOCs, based on the criteria published in the MOI.

(d) Develop a word-processed narrative that identifies:

- Specific comments on individual work packages.
- Redundancy.
- Shortfalls.
- Potential STO candidates for the following year.
- Potential ATD candidates for the following year.

(4) September. CBTDEVs (DCDs, Battle Lab Deputy Directors, and other non-TRADOC CBTDEVs) complete their assessment, and return the completed S&T review database and a word-processed narrative assessment to HQ TRADOC, DCSCD for consolidation. HQ TRADOC, DCSCD collects the individual assessments, and generates and staffs a consolidated report for TRADOC and the S&T community.

(5) October. HQ TRADOC, DCSCD conducts a coordination review of the S&T review report.

(6) December. HQ TRADOC, DCSCD publishes the S&T review report.

e. TRADOC consolidated S&T review report. The TRADOC consolidated S&T review report will consist of the following:

(1) DCSCD cover/transmittal memorandum.

(2) Annex A: Methodology. Overview of methodology used by the CBTDEVs during the assessment, and their evaluation criteria.

(3) Annex B: Participants - CBTDEV and MATDEV.

(4) Annex C: Overview of 6.2 and 6.3 S&T work packages reviewed. Summary of the S&T review results (i.e., spreadsheet or charts).

(a) Number of work packages reviewed by agency by funding category.

(b) 6.2 rating summary (ratings given) by CBTDEV.

(c) 6.2 rating summary (ratings received) by MATDEV.

(d) 6.3 rating summary (ratings given) by CBTDEV.

(e) 6.3 rating summary (ratings received) by MATDEV.

(f) Spreadsheet with individual CBTDEVs scores for each work package, sorted by S&T agency, program category, and maximum score received.

(5) Annex D: Narrative assessment of S&T program. Each CBTDEV provides a narrative assessment of the S&T work packages in aggregate and their ability to fulfill the FOCs.

(6) Annex E: Recommendations. CBTDEV and MATDEV suggestions for improving the S&T review process and procedures collected at the coordination review.

7-4. Joint User/Developer Science and Technology Objective (STO) Review.

a. General.

(1) Army STOs are the top 200 S&T efforts within the Army. They state measurable technology advancements to be achieved by specific fiscal year(s), typically within a 3-5 year period. STOs receive priority for funding, are reviewed annually, and are summarized in the ASTMP.

(2) In April each year, HQ TRADOC, DCSCD conducts the Joint User/Developer STO review as the executive agent for the DAS(R&T).

b. STO review cycle.

(1) Pre-conference actions.

(a) Identification of completed and revised STOs and proposed STO deletions. MATDEVs conduct internal reviews and identify the number of STOs requiring replacement or revalidation. For each completed STO, a minimum of two STO candidates are required to assure sufficient voice and vote by users. MATDEVs inform the user in mid-January of the above.

(b) Candidate nominations. MATDEVs determine S&T endeavors to be nominated as candidate STOs. CBTDEVs are strongly encouraged to interact with MATDEVs between completion of the TRADOC S&T reviews and the nomination of candidate STOs. Candidate STOs are identified by mid-February.

(c) Candidate STO fact sheets. MATDEVs provide fact sheets IAW AMC prescribed formats to HQ TRADOC, DCSCD by the end of February.

(d) Candidate STO reclamas. CBTDEVs review candidate STO fact sheets and provide comments on preferred, alternative candidates by mid-March. HQ TRADOC coordinates with MATDEV headquarters to resolve reclamas. Unresolved reclamas are referred to the DAS(R&T) for decision.

(2) Joint User/Developer Army STO Review Conference.

(a) HQ TRADOC, DCSCD hosts the Joint User/Developer Army STO Review Conference.

(b) Participants include:

- TRADOC CBTDEVs, TRADOC Battle Labs, and non-TRADOC CBTDEVs.
- HQ TRADOC: DCSCD (BLITCD) and DCST Training Development and Analysis Directorate (TDAD).
- AMC: HQs, AMC; RDECs; ARL; AMSAA; ARO.
- Army Corps of Engineers.
- ARI.
- SMDC.
- MRMC.

(c) Process.

- MATDEVs submit a minimum of two candidates per available STO slot to be filled.
- MATDEVs conduct a peer assessment of the STO candidates to be voted on prior to the TRADOC STO Review. STO candidates are assessed based on their technology importance, relative uniqueness, contribution to advancing the state of the art,

achievement of a technological breakthrough, risk, and potential return on investment. Peer assessment is forwarded to the TRADOC STO Review for voting consideration.

- CBTDEVs rate each STO based on its relevance to the FOCs using the same criteria used in the S&T Review.

- MATDEVs rate each STO based on its technical merit.

- CBTDEV and MATDEV votes are combined to develop an order of merit list. HQ TRADOC, DCSCD uses this information to develop a HQ TRADOC recommended list of STOs for the ASTWG Technical Council.

7-5. Advanced Technology Demonstration (ATD) Review.

a. General. ATDs are groupings of STOs and/or work packages that seek to demonstrate the potential for enhanced military operational capability and/or cost effectiveness. ATDs are a category of technology demonstration characterized by the following: large scale, both in resources and complexity; operator/user involvement from planning to final documentation; testing in a real and/or synthetic environment; finite schedule, typically five years or less; cost, schedule, and objective performance baselines in an Army Technology Demonstration Plan approved by the DAS(R&T). To execute the ATD, TRADOC and the MATDEV jointly develop a demonstration plan with agreed upon exit criteria.

b. After the STO review in April, a Joint Council of Colonels ATD review is conducted. Each ATD nomination is briefed to a TRADOC/MATDEV Council of Colonels. The result of the ATD review is an order of merit list that is submitted to the ASTWG.

7-6. Army Science and Technology Master Plan (ASTMP). The ASTMP is published annually by the ASA(ALT). The ASTMP captures how the Army will maintain a technological edge and ensure continuous modernization of Army systems. TRADOC is responsible for chapter 2, Science and Technology Integration and annex C, Future Operational Capabilities. Chapter 2 captures how TRADOC interacts with the S&T community to ensure alignment of TRADOC requirements and MATDEV solutions. Annex C is a listing of TRADOC future operational capabilities.

7-7. Army Science and Technology Working Group (ASTWG).

a. General. A two-star body that oversees the Army S&T program and planning. Co-chaired by the DAS(R&T) and the ADCSOPS(FD). The ASTWG provides input to the Army Science and Technology Advisory Group (ASTAG). The ASTWG meets in July to review new STOs and ATDs and the initial draft of the ASTMP. The group meets again in September to review the ASTMP briefing for the ASTAG.

b. DCSCD is the ASTWG representative for HQ TRADOC.

c. The ASTWG technical council representative for TRADOC is the Assistant DCSCD.

7-8. Special Access Program (SAP) Review. In April, TRADOC hosts the SAP review for the Special Access Program Oversight Committee (SAPOC) Council of Colonels (COC). Existing SAP programs and prospective SAPs are reviewed. To provide for continuity between the S&T reviews, the same COC at HQ TRADOC conducts both reviews and the timing is synchronized to permit comparison and application of the same measures of merit. The COC consists of directors from each hardware directorate in DCSCD, BLITCD and representatives from AMC and HQDA.

a. CBTDEV's will:

(1) Conduct a review of each SAP, assessing the warfighting relevance to FOCs/AUTLs.

(2) Assign a score to each SAP that supports one or more of their FOCs/AUTLs.

b. Program Managers provide program briefings to the SAPOC on how their program is supporting applicable FOCs/AUTLs and how the Army's future vision is validated by their customer/proponent.

c. The TRADOC COC:

(1) Validates CBTDEV's assessment of FOCs and their score.

(2) Compares special access technology with STO technology for overlap and ranks them with STOs.

(3) Generates a prioritized list of SAPs.

d. DCSCD approves a prioritized list of SAPs and provides it to the ASA (ALT), DCOPS (Force Development), appropriate Program Executive Offices and AMC.

7-9. Army Science and Technology Advisory Group (ASTAG).

a. General. A four-star body that approves the S&T program. Co-chaired by the ASA(ALT) and the Vice Chief of Staff of the Army (VCSA). The ASTAG meets in November.

b. CG, TRADOC is a member.

Chapter 8
Conduct Warfighting Experiments and Technology Demonstrations

8-1. Introduction—Battle Labs' role in experimentation.

a. Experimentation is the primary focus of the Battle Laboratories. Insights, impacts, and recommended changes to DTLOMS, based on inputs from soldiers and their leaders, as well as emerging technologies and materiel initiatives to support FOCs, are the products generated by the Battle Labs. Experiments are discrete, single events or progressive, iterative simulations (constructive, virtual, or live) that assess the military utility/potential for a new or revised DTLOMS concept or new technology to satisfy user needs. Data is gathered through a designed event(s), or through a data

collection effort subordinate to a field/training exercise involving field units and soldiers. Experiments are conducted using a team approach. The focus is on a specific capability or technology opportunity. The experimentation process consists of conceptualization, planning and reviews, approval, execution, decision, and possibly exploitation. Whether conducting experiments or designing experiments to be done elsewhere, Battle Labs are the central focus for all experiments leading to requirements within their battlefield dynamic area (see fig 8-1). Experimentation:

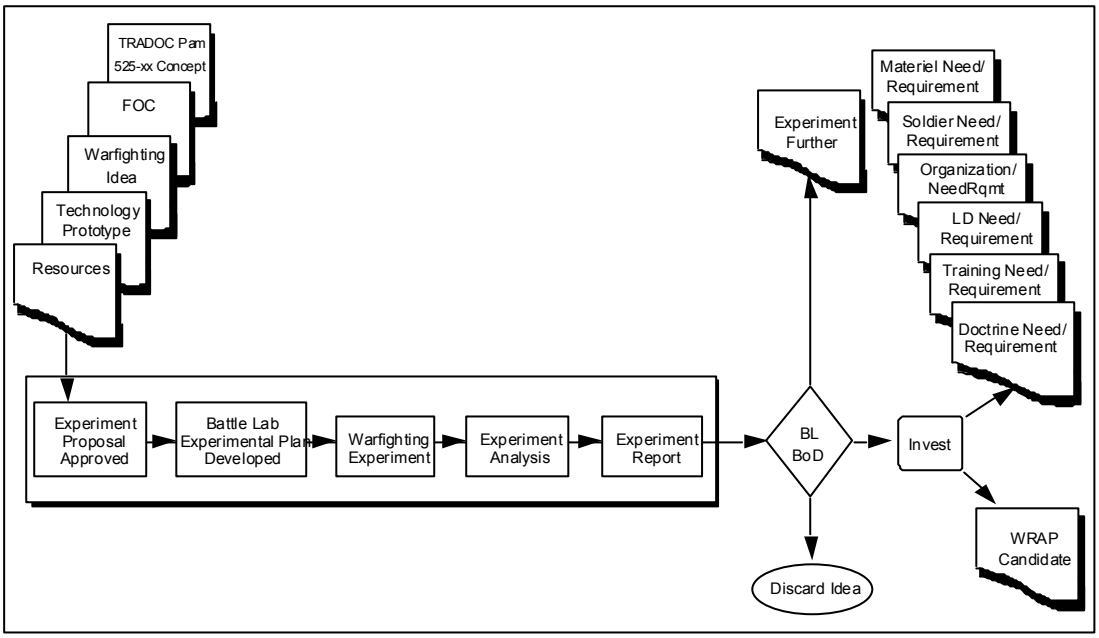


Figure 8-1. Experimentation process

(1) Supports DTLOMS requirement determination.

(2) Supports materiel requirement development.

(3) Provides opportunities to streamline testing during the acquisition process.

(4) Provides insights to FOC solutions.

b. Experiments are planned, conducted, and reported by Battle Lab-led teams. Representation on the team varies depending on the specific nature of the experiment. All experiments include information assurance related "Red Teaming." Advanced Warfighting Experiments (AWEs) have large teams, consisting of elements from the other Services and several Army MACOMs. The Joint Venture (JV) Directorate is the executive and coordination element for AWEs; other participants may be USAF and USMC experimental teams, a digital force coordination cell (DFCC), an Experimental Force (EXFOR), multiple Battle Labs, CBTDEVs, TNGDEVs, DOCDEVs, MATDEVs, S&T, TRAC, ATEC, industry, and academia. Smaller experiments can have personnel from a single Battle Lab, the school sponsor, the ATEC TECO, and, for a technology item, MATDEV/S&T representatives. Each member brings expertise to assist in the experiment, as well as an interest in the item under experiment. This is particularly true of ATEC. They provide a bridge between experiments and a system's evaluation for acquisition decision. This reduces the likelihood of duplicate testing and provides for streamlining

acquisition. ATEC's TECOs, located with TRADOC schools and Battle Labs, provide quick response support and access to all of ATEC. ATEC, as the Army's evaluator, is key in determining the data, testing, and simulation effort needed to support acquisition decision making. The experimentation team is an essential ingredient to maximum return on investment of experimentation dollars and efficient acquisition.

c. Battle Lab Board of Directors (Battle Lab BoD) (see fig 8-2). The Battle Lab BoD serves as the decision body for the CG, TRADOC and is responsible for determining the disposition of experiment initiatives and selecting WRAP candidates (see para 13-10). The Battle Lab BoD meets at the discretion of CG/DCG, TRADOC, normally annually in the May-June timeframe, to review the results of experimentation and determine the disposition of each initiative. Approximately 45 days prior to convening the Battle Lab BoD, HQ TRADOC, DCSCD publishes and disseminates an MOI with specific guidance and administrative instructions. The Battle Lab BOD places each initiative into one of four categories.

(1) WRAP - Mature technology that fulfills an urgent need and has demonstrated compelling success in experimentation.

(2) Invest (non-WRAP) - This is a decision to formally document a requirement.

(3) Experiment further - Initiative appears to have merit but further experimentation is required to refine the requirement.

(4) Discard - Initiative does not meet the needs of the Army and merits no further investigation.

Battle Lab Board of Directors

- Chairperson: CG or DCG, TRADOC
- Core Members:
  - DCSCD, TRADOC
  - DCSDOC, TRADOC
  - DCST, TRADOC
  - Director, Air Maneuver Battle Lab
  - Director, Force Protection Battle Lab (Provisional)
  - Director, Battle Command Battle Lab (Leavenworth)
  - Vice-director, Battle Command Battle Lab (Gordon)
  - Vice-director, Battle Command Battle Lab (Huachuca)
  - Director, Combat Service Support Battle Lab
  - Director, Dismounted Battlespace Battle Lab
  - Director, Depth and Simultaneous Attack Battle Lab
  - Director, Maneuver Support Battle Lab
  - Director, Mounted Maneuver Battle Lab
  - Director, Space and Missile Defense Battle Lab
- Associate Members:
  - DA, Deputy Chief of Staff for Plans and Operations (Force Development)
  - Commander, Operational Test and Evaluation Command
  - AMC Deputy Chief of Staff for Research, Development and Acquisition
  - Director, Army Research Office

Figure 8-2. Battle Lab BoD

8-2. Experimentation resource management.

a. Experimentation efforts are prioritized and approved for resourcing by a senior steering group. The senior steering group is chaired by the DCG, TRADOC and consists of general officers and a Council of Colonels from HQ, TRADOC, applicable MACOMs, and other government agencies. The senior steering group functions similarly to the Force XXI Funding IPT, but considers all types of resources (e.g., funding, personnel, and facilities).

b. The senior steering group designates and charters IPTs composed of action officers from HQ, TRADOC, applicable MACOMs, and other government agencies, to manage specific experimentation activities required by the experimentation campaign plan. The IPTs will be responsible for identifying their experimentation resource requirements and forwarding them to the senior steering group for funding consideration.

c. The senior steering group meets at the discretion of the DCG, TRADOC, normally twice yearly. These events are planned and executed in a timeframe that accommodates PPBES actions.

8-3. Simulations.

a. Simulations are analytical tools used to support warfighting experiments that assess new warfighting ideas and technology. Warfighting experiments are designed to examine new technologies and warfighting ideas to discover emerging battlefield opportunities. Each type of simulation has its characteristic strengths and weaknesses. Simulations are classified into three categories: live, virtual, and constructive. The optimal solution to experimental analysis is probably a combination of the three types of simulation. Live simulations offer the most realistic environment for analysis, but the expense may be prohibitive. Warfighting experiments should maximize the use of available live and virtual simulations augmented by constructive simulations. The current ability to link live and virtual simulations to constructive simulations, through distributed interactive simulation high level architecture (HLA) links, permits optimizing the contribution of each type of simulation.

b. Modern simulations allow the Army to look at current and future force capabilities, determine requirements, and compare the contributions of alternative solutions.

(1) Constructive simulations replicate warfare in the form of computer modeled war games. In some constructive simulations, the computer presents the participants with a graphical portrayal of the operational situation and allows them to make decisions to influence the situation. The most commonly used simulations employ models that wargame against a competent and active opponent. Other simulations run independently of human interaction once initial parameters and data are established. The advantage of constructive simulations is the ability to: replicate live exercises; simulate technologies that are not currently available as prototypes; vary the mission, threat, terrain, and weather; and repeat events a sufficient number of times to gain statistical confidence in the outcomes.

(2) Virtual simulations are conducted with electronic mock-ups of real weapons systems. These mock-ups use computers to replicate on-board systems and the external combat environment. Flight and tank gunnery simulators are representative of these kinds of simulations. Virtual simulation allows man-in-the-loop assessment of new doctrine, training, soldiers, organizations, and materiel. Simulators at

various locations can be netted to offer a common warfighting scenario for multiple elements of the force. Insights are derived at an operational level as well as system level. The advantage of virtual simulations is the ability to put real soldiers making warfighting decisions into the loop and using the simulations to do analysis.

(3) Live simulations are exercises conducted by TOE units in field environments, preferably against a tactically competitive opposing force (OPFOR). Live simulations are useful to experiment with new doctrine, training, organizations, and materiel. They offer the unique advantage of using real soldiers and real equipment in an actual training environment. The advantage of realism in live simulations must be balanced by the expense and the inability to repeat the live exercise.

c. Core distributed interactive simulations (DIS) facilities (CDFs). The CDFs are a set of facilities that provide state-of-the-art simulation for experiments and exercises in a synthetic environment using distributed interactive simulation technologies. These facilities are physically and electronically secure with fully integrated, verified, validated, and accredited simulators, models, and tools. HQ TRADOC, DCSCD has a program to acquire reconfigurable virtual simulators which will represent the full functionality and capability of a battalion task force, including a designated battlefield operating system (BOS). These facilities provide realistic C4I, including propagation effects. Current and planned equipment within the facilities is DIS and HLA compliant. Users have access to repositories of standard databases, representations, algorithms, symbols, scenarios, other standard data, and realistic, variable resolution terrain databases with a wide variety of terrain types, conditions, and climates capable of representing dynamic terrain. These facilities can support concept evaluations, requirements determination, individual, crew, unit, command, and battle staff training and training development, technology development and evaluation, system development, test and evaluation training, tactics and doctrine development, and force modernization. Currently, the Army centrally funds four CDFs, each of which has a skilled/technical workforce. Central funding ceases in FY01 and TRADOC will be responsible for supporting the sites at Forts Knox, Benning, and Rucker.

8-4. Concept Experimentation Program (CEP).

a. General. The CEP is a separately funded TRADOC program providing sponsors (TRADOC schools) the ability to evaluate and capitalize on emerging technology, materiel initiatives, and warfighting ideas. It facilitates experimentation (conducted primarily by TRADOC Battle Labs) to determine the military utility or potential of an idea to become a DTLOMS solution to FOCs. The CEP provides funding and other resource support to conduct concept exploration and experimentation as a means to resolve DTLOMS issues and should be focused on developing ideas in support of FOCs.

b. Project development and approval. The CEP is a one-year program that consists of one submission cycle augmented by a quick reaction CEP identification and execution capability.

(1) This annual submission cycle begins in the Spring (see fig 8-3). Sponsors select a particular Battle Laboratory or other agency to conduct their experiment. With the support of this executor, the sponsor prepares a draft resume sheet (RS), IAW app E, paragraph E-1 (instructions include the CEP numbering process). Once the RS is prepared, the sponsor submits this draft to HQ TRADOC (ATCD-RP) for review and copy furnish (ATCD-B) and all Battle Labs. Various HQ TRADOC elements review the RS for correct format, correct source of money (Operation and Maintenance, Army (OMA)

or research, development, test, and evaluation (RDTE) funds), executability, relevancy, redundancy, criticality, return on investment, and a general validity check. HQ TRADOC (ATCD-RP) then consolidates and forwards suggestions for improvement to the sponsor for correction and resubmission. Sponsors, along with the executing Battle Lab or other agency, consider the suggested modifications and make corrections. Sponsors forward all RSs in one packet to HQ TRADOC (ATCD-RP) for final

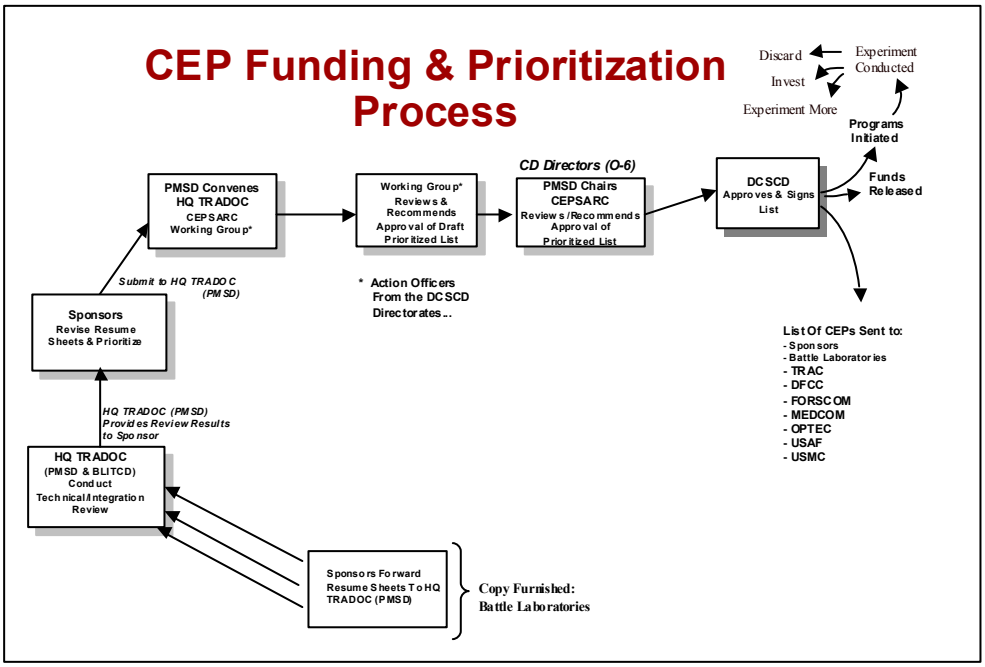


Figure 8-3. CEP funding and prioritization process

review and copy furnish (ATCD-B) and all Battle Labs. This packet must include a listing of the CEP RSs in priority order (1-N list). HQ TRADOC (ATCD-RP) conducts the final review, prioritization, and approval process with participation of other HQ TRADOC elements. The RSs are redistributed, reviewed, and then evaluated by the appropriate DCSCD directorate. In the case of non-materiel CEP experiments, the DCSCD directorates coordinate with the appropriate DCS for review and comment. (The criteria used to evaluate each CEP may change slightly each year. The POC for additional guidance on the criteria applied is ATCD-RP.) Evaluation input collected from the directors is then entered into a multi-criteria decision matrix. This prioritization model is used to generate the initial strawman priority list. An action officer working group reviews the strawman priority list, makes any changes, and develops a revised strawman. This revised strawman is presented to the CEP Schedule and Review Committee (CEPSARC) for a final review prior to TRADOC DCSCD approval. An Order of Merit List (OML) for those CEPs below the funding line is established and is funded by dollars returned from canceled CEPs and CEPs that come in under budget. Should the priorities change, the CEPSARC chair can convene the CEPSARC to revalidate the OML. The CEPSARC membership consists of directors from the majority of HQ TRADOC's combat development directorates.

(2) The quick reaction CEP process and OML replace the out-of-cycle CEP submission process. The objectives of the process are to facilitate experimentation on rapidly maturing technologies that appear during the fiscal year and to fund worthwhile excursions to CEPs that are underway. The quick reaction CEP process is initiated by each Battle Lab with the submission of a funding request IAW app

E, paragraph E-2. Requests are approved and held until DCSCD approves the annual CEP submission. After CEP approval, money for the annual program and quick reaction initiatives is distributed.

c. Executor planning. The organization conducting the experiment (e.g., Battle Lab, Combat Developments) develops the limited objective experiment plan (LOEP) with assistance from other activities (e.g., Battle Labs, TECOs). The LOEP includes: troops, terrain, equipment, and facilities required, a timeline, a funding profile, and a SOW if contractor support is required. A LOEP format is in app F. Figure 8-4 describes experiment plan development. CEP executors outside TRADOC may use either the LOEP or their own planning document.

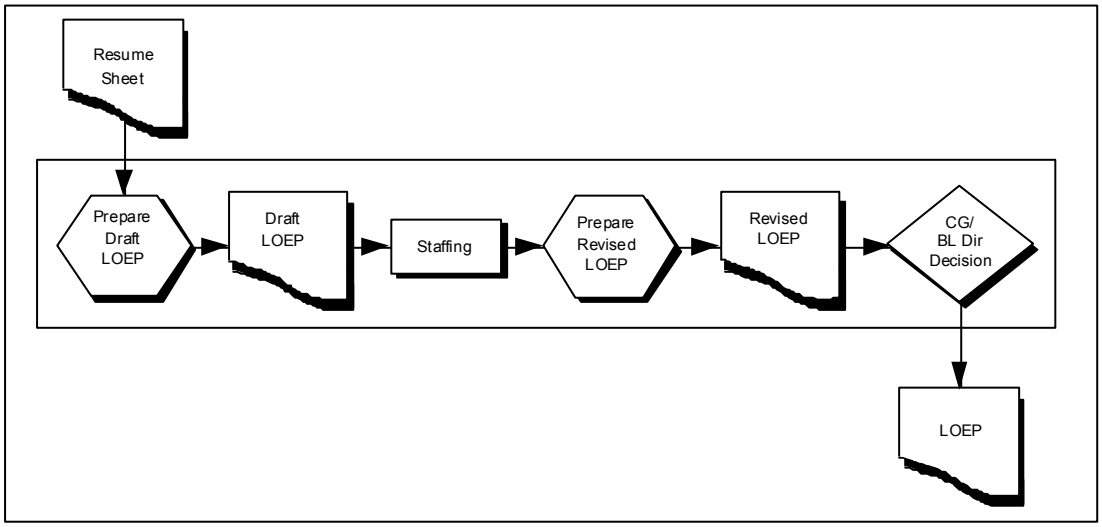


Figure 8-4. LOEP development

d. Resourcing. HQ TRADOC (ATCD-RP) issues dollars in support of CEP execution after approval of the final funded CEP list. A list of CEPs approved for funding support is distributed to each sponsor sometime in early October of each year. DA issues an initial dollar allocation for the CEP and TRADOC begins distributing the dollars to the agencies responsible for executing it. DCSSA is given a list of approved CEPs so they can coordinate simulation and analysis support. Experiment executors then execute CEPs per their experimentation plans and schedules.

e. Management. Concept experimentation program reviews (CEPRs) are scheduled every other month and held via video teleconferencing (VTC) capability. The purpose of these program reviews is twofold. First, they allow TRADOC's management team to ensure sponsors are provided required information and the experiment executor is provided dollars to conduct the experiment. Second, and equally as important, the reviews provide a forum to review dollar execution against the obligation plans and explore the need for and potential benefits of moving dollars amongst programs. Departure from obligation plans can and has resulted in DA withdrawing delayed obligation. CEPR information requirements include the following: CEP number, title, dollar amount funded, dollar amount received, cumulative dollar amount obligated, percent of dollars obligated, experiment start/end dates and due date of CEP report. As a reminder, an obligation is defined as any action that legally binds the U.S. Government to make a payment. A format for reporting the information is shown in figure 8-5.

AS OF: DATE

PROJECT TITLE	AMT FUNDED	AMT RECD	CUMULATIVE OBLIGATED	% OBLIGATED	DATE OF EXPERIMENT	DUE DATE OF CEP REPORT
CEP 429 PASS SENSOR	100000	90000	20000	20%	12-20 Apr97	20 Jun97
CEP 433 AID TGT REC	100000	93000	10000	10%	3QFY97	4QFY97
CEP 436 CBT ID PH III	150000	125000	100000	67%	4QFY97	1QFY98
CEP 438 GEN II SOLD	120000	107000	30000	25%	4 Jan-3 Feb 97	COMPLETE
TOTAL	**470000**	**415000**	**160000**	**34%**		

Obligation - Any action that legally binds U.S. Gov't. to make a payment. EXAMPLE - Signed contract, signed TDY orders, etc. (Obligations must be recorded in DFAS official documentation for tracking and audit.)

Figure 8-5. Status of CEP projects (example)

f. CEP reports. Once a CEP is completed, the Battle Lab that performed the CEP and the ICT analyze the results of each experiment. This analysis forms the basis for the final experiment report. The executing Battle Lab or other agency with the CEP sponsor completes and forwards a CEP Report to HQ TRADOC within 90 days (see app G for report format and guidance). Tardiness of reports can result in withdrawal of funding for future CEPs. The CEP report must be a combined sponsor and Battle Lab effort. The CEP report identifies the CEP organization, sponsor, project number, dates conducted, amount of plan accomplished, experimental conditions, data and results obtained, insights gained, and recommendations. CEP reports are:

(1) The main auditing measure to show that work was done.

(2) A springboard for additional experimentation.

(3) A record of experimentation not supporting further analysis.

(4) The primary source for data supporting initiation of WRAP.

g. CEP support of ACT II experimentation (see para 8-9). CEPs may be utilized to continue experimentation on ACT II projects. However, two conditions must be met for a CEP of this nature to be considered. First, the initial ACT II demonstration must be complete. It is not the intent of CEP to support experimentation concurrent with the contractor's initial effort. The second condition is that the Board of Directors or sponsor CDR/Comdt (with HQ TRADOC concurrence) must approve further ACT II experimentation. Any ACT II CEPs meeting these two conditions will ordinarily be favorably considered.

8-5. Advanced Warfighting Experiments (AWEs).

a. AWEs are the culminating efforts in evaluating major increases to warfighting capability. They cross TRADOC DTLOMS domains. They synergistically combine new force structure, doctrine, and materiel to counter a tactically competent opposing force. Moreover, they impact most, if not all, of the battlefield dynamics and battlefield operating systems. AWEs are sponsored by the CG, TRADOC and approved and resourced by the CSA. They have extensive involvement by HQDA, Forces Command (FORSCOM), AMC, TRAC, and ATEC.

b. These experiments, using progressive and iterative mixes of high-fidelity constructive, virtual, and live simulations, provide Army leaders with future operational capability insights. Analytic insights from AWEs focus the requirements determination process by highlighting key performers and providing measures of value added where possible. The AWE results help direct efforts to further refine requirements and document feasible solutions and their contributions to force effectiveness and efficiency.

c. AWE concept. The nature of the AWE places primary responsibility for experiment concept development with BLITCD. As the HQ TRADOC executive agent for all Battle Lab issues, BLITCD uses top-down guidance from the CSA, CINCs, and CG, TRADOC to form the initial experiment concept for all AWEs. In addition, BLITCD will consider operational or training needs identified from lessons learned during real world contingency operations, CINC exercises, or Combat Training Center (CTC) rotations, as well as CINC integrated priority list (IPLs). The AWE concept should be based upon achieving FOC, and therefore, the execution should produce insights that directly support requirements determination linked to FOC. Once an AWE concept has been determined and approved, proponency is assigned to the Joint Venture (JV) Directorate with support from the appropriate Battle Lab and/or the digital force coordination cell (DFCC) to complete the detailed planning and execution.

d. AWE planning. The actual planning of the AWE will be a joint effort of BLITCD (AWE concept), JV (AWE planning and execution), the proponent Battle Lab, the DFCC (on-site execution), ATEC (data collection and live experimentation) and TRAC (constructive simulations and overall analytic responsibility), the Experimental Force (EXFOR), and other supporting agencies. Planning the AWE is the most important step to ensure that the experiment will allow sufficient opportunity to evaluate the new concepts and technologies and provide collectable data, either quantitative or qualitative. A full spectrum of analytic tools must be considered to maximize the output of the experiment. For areas appropriate for live simulation, the EXFOR is asked for support with TOE units. For areas where virtual simulations are convenient and an expansion of the experiment's bounds is economically sound, virtual simulation is a major portion of the experiment. Once the live and virtual simulations have supplied their assets, the remainder of the analysis is conducted constructively where possible. All AWEs include planning for information assurance related "Red Teaming". This design provides realism, economy of resources, and full experimental design. Careful planning that focuses the experiment and allows rigorous analytic design will produce the most valid insights for requirements determination.

e. AWE execution. AWE execution is performed in a training environment where both training and analysis occur. The expense and opportunities involved warrant maximum emphasis on both areas and involve multiple agencies. The EXFOR provides the soldier and equipment interface. The JV, DFCC,

ATEC, and TRAC work hand-in-hand to provide execution guidelines, data collection, and analysis. ATEC collects data and evaluates the performance of the EXFOR. TRAC provides parallel efforts in constructive simulations where additional analysis can occur. The constructive element is calibrated to reflect the outcomes observed in the live event. The focus of the constructive simulation is: an analysis of areas not available in the live or virtual environment (e.g., future technology); an analysis of warfighting capabilities in other environments, missions and threats; and repetitive simulation runs to gain the statistical confidence needed to support requirements determination.

f. AWE reporting.

(1) DCG, TRADOC is delegated the authority to:

(a) Approve findings and recommendations of AWEs and the "Final Report."

(b) Approve release of the findings and recommendations of the AWEs and disseminate instructions for the "Final Report."

(2) This authority for approval will not be delegated further without an exception to policy signed by the CG, TRADOC.

(3) Director, Joint Venture is the TRADOC executive and coordinating agent for the preparation and staffing of the findings and recommendations of the AWE and the "Final Report."

(4) Findings and recommendations of the Initial Insights Memorandum and the Final AWE Report, to include a recommendation for dissemination, are staffed with all Battle Lab directors that participated in the AWE and with the Director, TRAC and Commander, ATEC prior to submission to the DCG, TRADOC for approval.

(5) After completion of the staffing process, the final version of the Initial Insights Memorandum or AWE Report, along with recommended dissemination instructions, is prepared by the AWE proponent, certified by the Director, TRAC, and approved by the DCG, TRADOC. All three individuals sign the document. Issues not resolved during the staffing process are addressed by the AWE proponent to the DCG, TRADOC.

(6) The dissemination decision includes any restrictions and/or prohibitions concerning release (e.g., "restricted to Army," "release unrestricted").

(7) Approved findings and recommendations do not constitute approved requirements. Requirements identified through experimentation must still be formally generated IAW this pamphlet and approved by the CG, TRADOC. Identification of a requirement by experimentation does not ensure funding of that requirement. After approval, requirements are submitted to DA by HQ TRADOC, along with recommendations for the level of funding and relative priority among competing requirements.

8-6. Limited Objective Experiments (LOEs). LOEs are designed around single events or progressive, iterative simulations with primary relevance to a single issue. LOEs allow the proponent and Battle Lab to conduct a low-cost, quick analysis of an issue or to a limited set of issues. LOEs are normally

sponsored by one Battle Lab, but there may be several Battle Labs participating in the planning and execution phases of an experiment.

a. LOEs are funded by sources other than the CEP (e.g., within the experimentation campaign plan, school discretionary funds, or by funding from another government agency).

b. LOEs follow the same requirements for experimentation planning and reporting as CEPs (see para 8-4).

8-7. Technology Demonstrations (TDs) and Advanced Technology Demonstrations (ATDs).

a. Technology demonstrations (TDs). The primary focus of TDs is to showcase the feasibility and practicability of a technology for solving specific military deficiencies. They are incorporated during the various stages of the Exploratory Development (6.2) and Advanced Development (6.3) process and encourage technical competition. They are most often conducted in a non-operational (lab or field) environment. These demonstrations provide information that reduces uncertainties and subsequent engineering costs, while simultaneously providing valuable development and requirements data.

b. Advanced technology demonstrations (ATDs).

(1) ATDs are a category of technology demonstrations. They are risk-reducing, integrated, "proof of principle" demonstrations designed to assist near-term system developments in satisfying specific operational capability needs. The ATD approach has been promoted by the Defense Science Board and the Army Science Board as a means of accelerating the introduction of new technologies into the operational systems. They are principally funded with 6.3 funds. ATDs facilitate the integration of proposed technologies into full system Demonstration and Validation (6.4) or Engineering and Manufacture Development (6.5) prototype systems. As such, they provide the link between the technology developer, PM, PEO, CBTDEV, and the Army user. The criteria for establishing an ATD are:

(a) Execution at the system or major subsystem level in an operational or simulated operational environment, rather than in a laboratory environment.

(b) Potential for new or enhanced military operational capability or cost effectiveness.

(c) Duration of 3 - 5 years.

(d) Transition plan in place for known and/or potential applications.

(e) Sponsorship by a combat developer/user organization.

(f) Active participation by TRADOC Battle Lab and user sponsors.

(g) Participation by developer (project manager).

(h) Use of simulation to assess doctrine/tactical payoffs.

(i) Exit criteria established with user interaction/concurrence.

(2) Each ATD must meet or exceed exit criteria agreed upon by the warfighter and ATD manager at program inception (well before the tests begin) and before the technology in question transitions to development. The ATDs seek to demonstrate the potential for enhanced military operational capability and/or cost effectiveness. Logistics supportability is a consideration during evaluation of ATDs. Active participation by the user and combat developer, as well as by the developer of the technology, is required throughout the demonstration. An ATD consists of: multiple (sub)demonstrations of the item or technology at various locations or as part of various exercises over the 3 - 5 year duration of the ATD; at least one (sub)demonstration at a TRADOC Battle Lab; and an advanced demonstration simulation. Combat developers identify measures of effectiveness/performance applicable to ATD evaluation for applicability and sufficiency for their FOC and warfighting concepts.

8-8. Advanced Concept Technology Demonstrations (ACTD) program.

a. ACTDs information sources. Key sources of annual or more current information for TRADOC personnel to identify ACTD projects and organizations involved are:

(1) Advanced Concept Technology Demonstrations (ACTD) Master Plan. Provides overview of the OSD-level process, background information on the ACTD program, and summary descriptions of approved ACTDs. It is published yearly.

(2) Defense Technology Objectives of the Joint Warfighting Science and Technology and Defense Technology Area Plan. Provides "quad chart" descriptions of approved and proposed ACTDs. Describes approved ACTDs with objectives, justification, schedule, funding, technical approach, and potential applications. It is published yearly.

(3) Internet Website http://www.acq.osd.mil/at provides generalized, current information on ACTDs which may include ACTD guidance and status of currently approved ACTDs.

b. Purpose of ACTDs. They accelerate the application of mature technologies in a way that is useful to the warfighter and is in response to a critical military operational need. ACTDs provide an evaluation of the military utility of proposed solutions, and are jointly planned by users and technology developers to enable operational forces to experiment in the field with new technologies. This experimentation evaluates potential changes to doctrine, warfighting concepts, tactics, modernization plans, and training. ACTDs are used to develop appropriate concepts of operation for the capability. ACTDs provide insights for the generation or refinement of requirements and provide residual operational capabilities to the sponsoring user for an Extended User Evaluation and/or contingency operational deployments. Other major goals of ACTDs include: promote operational jointness, facilitate senior leadership acquisition decisions, and posture ACTD systems for accelerated acquisition, given success and decision to procure.

c. Principal participants of ACTDs.

(1) Sponsoring user (sponsor). Sponsoring users are frequently Unified Commanders (CINCs). TRADOC takes the lead in the search for an ACTD CINC sponsor. In partnership with the operational manager, the sponsor provides and coordinates the context/scenario(s) for the demonstration, active force element participants and equipment, and post-demonstration analyses and reports. The CINC defines the critical military operational need.

(2) Lead Service. This is the Service designated as lead by JROC for the conduct of an ACTD. The DAS(R&T) is the Army acquisition executing agency for ACTDs. Since ACTDs are part of the Army S&T program, the DAS(R&T) serves as the representative of the executing agent and provides executive oversight of ACTDs and coordination with OSD. For Army ACTDs, the DAS(R&T) has authority to prioritize participating technologies, direct distribution of funds, and designate the lead ACTD materiel development agency and demonstration manager.

(3) Demonstration Manager (DM). The DM is responsible for planning, coordination, and direction of all materiel development community activities and is the principal POC for technology development and funding issues. The DM also ensures availability of system training and logistics support for ACTDs. DMs, with the sponsoring user, plan the conduct of the ACTD in a manner which facilitates progression of the technologies from ACTD to an appropriate phase of the formal acquisition process without loss of momentum, given ACTD success and decision to procure.

(4) Operational Manager (OM). The OM is responsible for development, modeling, and coordination of operations concepts; coordination of TTP development and excursions; and mission planning and scenarios for the demonstration. Normally, the OM will be a TRADOC element and will be responsible for the military utility assessment. OMs and DMs work in close concert to ensure operational sense within the structuring of demonstrations/experiments. The DMs and OMs are jointly responsible for ensuring the ACTD is conducted according to the approved ACTD Management Plan. The OM is appointed by the ACTD school/center or Battle Lab.

(5) Requirements Integration Manager (RIM). For ACTDs in which another Service is the lead Service, TRADOC appoints an appropriate agency to interact with the ACTD's managers to ensure appropriate Army interaction. Responsibilities of the RIM include:

(a) Participation with ACTD managers in preparing and/or reviewing ACTD Implementation Directive and Management Plan to include Army interests.

(b) Assessment and recommendation of Army agencies appropriate for participation in planning, execution, observation/assessment of demonstrations.

(c) Collection and routing of assessments, results, and insights, to appropriate Army agencies for consideration in the generation or refinement of Army requirements across the DTLOMS.

(d) Appraisal of appropriate Army leadership on matters of relevance to Army issues in time to permit Army leadership interaction/involvement.

d. The TRADOC participants in ACTDs are:

(1) CG, TRADOC.

(a) Approves all Army warfighting requirements prior to their submission to DA.

(b) Is the user representative for ACTDs.

(2) DCG, Futures normally acts as the approval authority for CG, TRADOC.

(3) DCSCD.

(a) Is primary staff agency within HQ TRADOC for ACTD process, TRADOC reviews, interaction with HQDA DCSOPS and ASA(ALT), and generation of TRADOC recommendations. For Army lead/generated ACTDs, conducts oversight of the process. For non-Army lead/generated ACTDs, maintains close coordination with HQDA DCSOPS and JFCOM for early reaction. Actions include rapid assessment of military utility, Army relevance, and uniqueness; and conducting DCG briefing and generation of TRADOC recommendations to HQDA. (BLITCD is primary DCSCD action agent.)

(b) Assists and as required, leads ACTD issue staffing and resolution for ACTD components within functional purview. Primary staff agency to monitor, coordinate, and process materiel requirements generated or refined by ACTDs as stated in the ACTD Management Plan. (Functional Directorate (ATCD-G, -M, and -S) is primary DCSCD action agent.)

(c) Assists ACTD OM in the development of organizational issues for experimentation within the ACTD. Assists in generation of Experimental TOE for unique organizations required to conduct the ACTD. Primary staff agency to monitor, coordinate, and process organizational requirements (TOE) generated or refined by ACTDs as stated in the ACTD Management Plan. (Force Design Directorate (FDD) is primary DCSCD action agent.)

(4) DCST.

(a) Staff oversight and resource provider for ACTD training development planning and execution.

(b) Primary staff agency for the generation of TADSS requirements generated or refined by ACTDs as stated in the ACTD Management Plan.

(5) DCSDOC.

(a) Staff oversight of ACTD concept of operations and ACTD tactics, techniques, and procedures to be assessed within the ACTD.

(b) Primary staff agency and resource provider for the generation of or modifications to Field Manuals (FM) resulting from findings of the ACTD.

(6) DCSSA/TRAC. Assist and provide analytical support to the ACTD OM or RIM, as required in the generation of ACTD assessment planning, development of measures of effectiveness (MOEs), and measures of performance (MOPs) as stated in the ACTD Management Plan.

(7) TRADOC proponents.

(a) TRADOC school/center or Battle Lab assigned by HQ TRADOC as the lead agency.

(b) Appoint OM.

(c) Appoint RIM for non-Army lead ACTDs.

(d) Assist ACTD OM/RIM as required by Management Plan. Assist in the development and review of the ACTD Concept Document. Assign personnel to the ACTD Candidate Team to assist in generation of the Management Plan, Implementation Directive, and In-Depth Review. Participate in ACTD execution and assessment as required by the Management Plan. Develop or assist in the development/refinement of requirements, training aids, devices, simulations, simulators, TTP, and revision/generation of FMs based upon the Management Plan or results of the ACTD.

e. Generation of ACTDs. Army interaction with ACTDs occurs in two ways:

(1) Generation of ACTD candidates in the Army can occur top-down by direction of senior Army leadership or bottom-up by partnership between a materiel developer and a Battle Lab. In either case, the proposed funding source for the ACTD candidate needs to be identified as part of the proposal. Because of constrained resources, it is imperative that ACTD proposal development, approval process, and execution of the demonstration be conducted as a team effort between the sponsoring user, materiel development, and TRADOC communities. Except for minimal funds available from OSD to support ACTD Leave-Behind capabilities for two years, Army ACTDs are funded from existing 6.3 S&T funding lines. ACTD proposals often involve the conversion of equipment that is already being demonstrated in an ATD into a configuration that is robust enough to leave with the sponsoring user for a two year period. Because of the limitation of available 6.3 funds, selection of new ACTDs must be based on meeting critical Army operational needs and deficiencies. ACTDs generated within the Army will follow the ACTD process described in paragraph 8-8f, below.

(2) ACTDs generated external to the Army which use other agencies as executive agents are frequently assigned from OSD/Joint Staff level directly to a CINC. HQDA DCSOPS and ASA(ALT) maintain close coordination with OSD and the Joint Staff to monitor externally generated ACTDs for Army relevance and impacts. HQ TRADOC is notified as expeditiously as possible to permit HQ TRADOC to conduct all assessments and recommendations. Assessments will be an abbreviated form to fulfill the purposes of the In-Depth Review and will culminate in a decision briefing to the DCG, TRADOC for recommendations to HQDA DCSOPS and ASA(ALT). As required, HQ TRADOC may assign a TRADOC proponent to appoint a RIM to assure appropriate interaction with the ACTD's OM. Guidance will be provided by HQ TRADOC to the RIM on the scope of Army interaction.

f. ACTD process.

(1) ACTD management oversight. The ACTD process is executed through several offices of the DOD. The Deputy Under Secretary of Defense (DUSD(AT)) provides overall ACTD policy; defines guidelines; provides management oversight and support through an oversight committee; and approves projects for the DOD ACTD program. The JROC prioritizes and recommends ACTD candidates for approval to the DUSD(AT) and appoints the lead Service and principal sponsor user. The DAS(R&T) and the Assistant Deputy Chief of Staff for Operations-Force Developments (ADCSOPS-FD) participate as members of OSD's Breakfast Club for ACTD nomination decisions. The VCSA is a member of the JROC and provides Army ACTD recommendations. The DAS(R&T) and ADCSOPS work in close coordination to maintain oversight of ACTD developments within OSD and the Joint Staff as they pertain to Army issues and priorities within the OSD and Joint Staff. For Army generated ACTDs, HQ TRADOC oversees the process stated below. For ACTDs generated external to the Army, and announced through OSD/Joint Staff, HQ TRADOC conducts a requirements review and provides recommendations to HQDA for Army support and/or participation.

(2) Army ACTD nomination process.

(a) ACTD nomination timelines (see fig 8-6). TRADOC proponent and materiel developer teams submit the ACTD concept documents to HQ TRADOC, DCSCD and the appropriate corresponding materiel developer leadership in August. For ACTDs in which AMC provides the DM, the review and approval authority is the Deputy Chief of Staff for Research, Development, and Acquisition within Headquarters AMC. For ACTDs in which a PM is the DM, the review and approval authority is the PEO. ACTD Candidate Development Teams develop the draft Implementation Directive and draft Management Plan. They conduct initial coordinations or endorsements, and prepare In-Depth Review briefings from September through October. During this time period, DAS(R&T) is continually appraised/briefed of the progress of ACTD candidate development. DCG, TRADOC and DAS(R&T) In-Depth Review briefings occur in October. CG, TRADOC decision briefings occur in November. TRADOC submits approved ACTD candidates with CG/DCG, Futures, TRADOC recommendations to HQDA DCSOPS and ASA(ALT) in October.

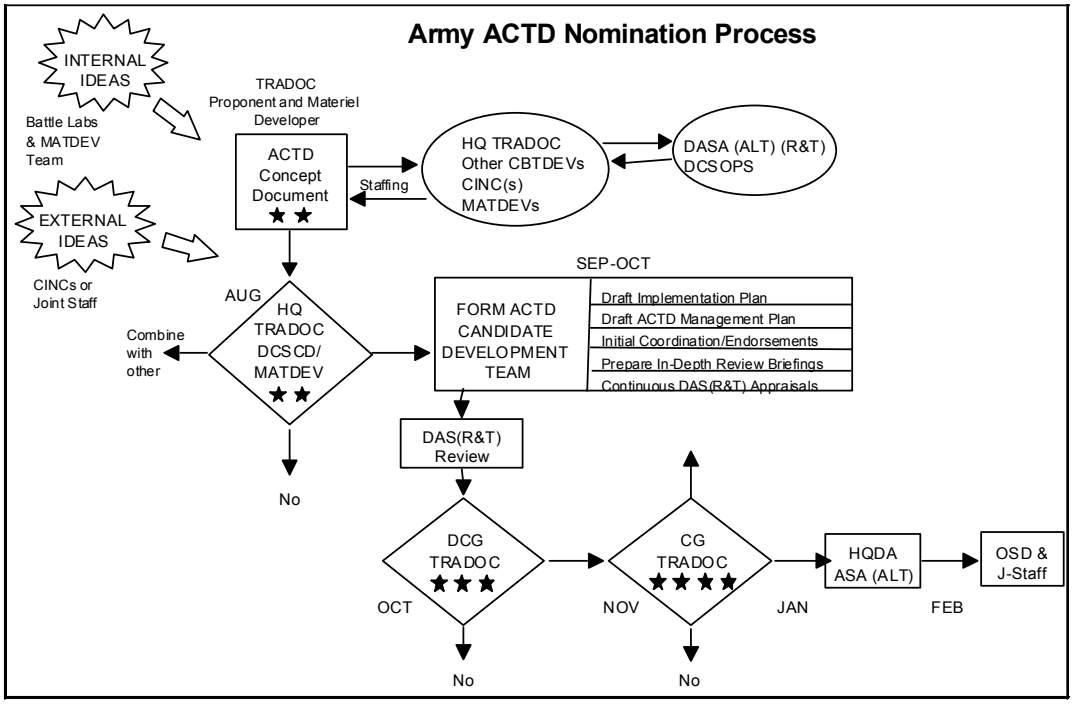


Figure 8-6. ACTD nomination process

(b) FOC basis for ACTD conceptualization. FOCs provide justification for consideration of ACTD nominations. Consideration must be given to the relative extent to which the demonstration fulfills the FOC. Consideration must also be given to the level of effort already committed to the FOC in terms of other ACTDs, AWEs, ATDs, Battle Lab Warfighting Experiments, and Science and Technology Objectives.

(c) Sources for ACTD conceptualization. ACTDs may be generated by operational needs or technology opportunities. In either case, an affordable technical solution must be available that is mature enough to be left with the troops in the timeframe of the ACTD as a residual capability. Operational needs may be identified by warfighting CINCs or TRADOC proponents. ACTD concepts generated by CINC Operational Need Statements should be coordinated with TRADOC for requirements review and consultation for assignment to an appropriate OM. They may be generated from lessons learned in operational employment of the force, experiences in CTCs, or insights from other experimentation. Technology opportunities are compelling enhancements to critical operational needs and cost effectiveness which emerge from the technology base.

(d) ACTD concept document. This is the initial articulation of the proposed ACTD and is prepared by a TRADOC and materiel developer team. The ACTD concept document should be approximately 2 - 4 pages in length and provide information shown in figure 8-7.

ACTD Concept Document Content

Critical operational need met by the ACTD
State in terms of the sponsoring user's critical operational need and state relevance to FOCs. Reference any relevant existing MNS and/or ORD.

Overview of proposed ACTD
Objective and overall approach of the ACTD; technology description; concept of demonstration; proposed location; potential sponsor user; OM, DM, Executive Agent, RIM, and other potential key participants; draft operational parameters by which military effectiveness is to be evaluated; time scale for the ACTD and follow-on operational capability; numbers and types of exercise forces, proposed OPFOR, participating agencies, envisioned residual capabilities.

Statement of operational merits/alignment to Army Vision and Joint Vision 2010
Reference any relevant results of analytical studies that provide insights to the potential operational value. Statement of how proposed ACTD aligns to Army visions and concepts. Statement of potential Joint relevance and interoperability.

Estimates of funding required and funding sources
Include estimate for conduct of ACTD and transition/residual capability costs.

Figure 8-7. ACTD concept document content

(e) ACTD concept document staffing. The purposes of the initial ACTD concept staffing are to provide an initial assessment of military worth, to determine the level of support from relevant proponents, and to conduct an initial assessment of uniqueness. This initial staffing should occur rapidly with feedback from solicited agencies within 1 - 2 weeks. Originators of the ACTD concept are encouraged to use e-mail/VTC to facilitate speed of staffing. The ACTD concept document will be staffed with organizations shown in figure 8-8.

ACTD Concept Document Staffing

HQ TRADOC, ATCD-B
Conducts initial staffing in HQ TRADOC and to all relevant proponents. Begins dialogue with proposing agency to validate proposal and to identify relevant participants, including potential sponsoring user, OM or RIM, DM. Briefs HQ TRADOC, DCSCD for approval to advance ACTD concept to HQDA DCSOPS and ASA(ALT) for dialogue and generation of In-Depth Review. With DCSCD approval, initiates dialogue with HQDA (DAMO-FD and SARD-ZT) concerning the appropriateness of the proposal as an ACTD candidate and funding sources.

Relevant TRADOC proponents
As applicable, provide initial assessment of impact, military worth, and FOCs/MNS/ORDs which are potentially enabled or fulfilled by the proposed ACTD.

Materiel developers
Provide initial assessment of technology merits, logistics impact, maturity, and risks. Assess appropriateness of the technology(ies) relative to other technology(ies) for the objective capability. If the specified technology is not the optimum approach, provides alternative recommendations.

Potential sponsoring user
To determine the Unified Command's level of interest to sponsor the proposed ACTD.

TRADOC DCSSA/TRAC
Provide analytical support during the ACTD.

Human Systems Integration (HSI)/MANPRINT
Provide MANPRINT integration and individual domain considerations.

Figure 8-8. ACTD concept document staffing

(3) Appointment of principal participants. Given HQ TRADOC, DCSCD approval to proceed with the ACTD nomination, HQ TRADOC (BLITCD) initiates dialogue with HQDA DCSOPS (DAMO-FDT), ASA(ALT) (SARD-ZT), and the appropriate MATDEV command to designate assignment of a provisional OM or RM, and a provisional DM.

(4) ACTD Candidate Development Team. The purpose of the ACTD Candidate Development Team is to continue development of the ACTD concept, assign responsibilities, and initiate development of the draft Implementation Directive and the draft ACTD Management Plan. These efforts are done in parallel with preparations to conduct the ACTD In-Depth Review. The OM and DM, in conjunction with HQ TRADOC, the Technology Directorate of ASA(ALT) (SARD-TT), and the MATDEV command, determine the appropriate agencies needed to participate in the development and execution of the ACTD. Although the degree of active participation in the planning stages of an ACTD will vary greatly, the following should be contacted for the opportunity to participate in requisite planning.

(a) Sponsoring User (Unified Commander).

(b) Army Component Command within that Unified Command.

(c) TRAC.

(d) ATEC.

(e) HQ TRADOC DCST, DCSDOC, and DCSCD (BLITCD Scenarios Division).

(f) HQDA DCSOPS (DAMO-FD).

(g) HQDA DCSPER for MANPRINT

(h) Relevant MATDEV agencies providing technologies to ACTD.

(i) Relevant PEO.

(j) Relevant TSM.

(k) Relevant TRADOC Proponents.

(l) Relevant Battle Labs.

(m) Relevant sister Services' CBTDEVs.

(n) Relevant sister Services' MATDEVs.

(5) Draft Implementation Directive development. In preparation for CG/DCG Futures, TRADOC and HQDA/ASA(ALT) reviews and decisions, the ACTD Candidate Development Team initiates development of the draft Implementation Directive and the draft Management Plan. Appendix 2 of the Advanced Concept Technology Demonstration Master Plan provides guidelines for the Implementation Directive.

(a) Purpose of the draft ACTD Implementation Directive is to clarify the roles and responsibilities of the various parties executing the ACTD and to become the basis for unambiguous top-level guidance. The document defines the operational capability to be demonstrated, the general approach, the agencies responsible for planning and conducting the demonstration, and the approximate funding and schedule.

(b) Coordination and preliminary endorsement of participating agencies. The OM and DM coordinate with agencies envisioned to participate in the ACTD execution. This includes coordination with a CINC, the Army Component Command within that Unified Command, other relevant Services and agencies (e.g., the Defense Advanced Research Projects Agency (DARPA)), and other appropriate agencies.

(6) Draft management plan development. Appendix 3 of the Advanced Concept Technology Demonstration Master Plan provides detailed guidelines for the ACTD Management Plan. While it is unlikely that the Management Plan can be completed before the conduct of the ACTD In-Depth Review, the ACTD Candidate Development Team should draft as much of the plan as is practical before that review. The OM and DM assign responsibilities and suspenses for the development of each required element of the Management Plan. In addition to the elements specified for the Management Plan by appendix 3 of the ACTD Master Plan, the OM designates agencies responsible for refined requirements as deliverables of the ACTD. Requirements generation responsibilities to be specified are listed in paragraph 8-8f(13).

(7) ACTD Candidate In-Depth Review. This is a decision brief to the DCG, TRADOC.

(a) Purpose of ACTD In-Depth Review. This is the culmination of initial ACTD planning. The purpose of the review is to assure that the proposed ACTD has sufficient potential warfighting value to warrant the investment.

(b) Preparations for In-Depth Review. Preparations for the review include the generation of the draft Implementation Directive and the draft Management Plan. These documents are not required to be completed; however, they should provide sufficient information for decision on the proposed ACTD's operational value. Briefings will include elements described in figure 8-9.

Elements of the ACTD In-Depth Review

Critical operational need met by the ACTD
State in terms of the sponsoring user's critical operational need and relevance to FOCs. Cite any relevant, existing MNS and ORDs.

Overview of proposed ACTD
Objectives and general approach to the ACTD technology(ies) to be demonstrated; concept of demonstration; proposed location; proposed exercise forces; proposed OPFOR; participating agencies; proposed simulations and analytical plan; preliminary costs and schedule; envisioned residual capabilities, logistics considerations, and estimate of funding required.

Assessment of operational merits
Results of relevant analytical studies which provide insights into the potential operational value. Include any preliminary endorsements from sponsoring unit, Army Component Command, and TRADOC proponents. Also address its alignment with the Army's vision and concepts.

Assessment of technology maturity
Include MATDEV's assessments that the technology is sufficiently mature with an acceptable level of risk, is a unique endeavor, and is the appropriate technology as a materiel solution for the objective capability. Also address compatibility of the proposed technology/system(s) to extant/programmed Army programs (i.e., C4I architectures, information management architectures, and/or other matters of interoperability relevance). State any potential for HTI.

Assessment of impacts to POM/existing programs
Provide HQDA DCSOPS and ASA(ALT)'s initial assessments of impacts to the current POM/EPA for the years in which the ACTD is conducted and potential subsequent acquisition. Include initial assessment of relative priority, DCSOPS support, and ASA(ALT) support. Assessment of affordability in terms of O&S costs to residuals and force structure implications given procurement of this capability at end game.

Figure 8-9. Elements of ACTD In-Depth Review

(c) Coordination and endorsements. Prior to presentation to the TRADOC DCG, the OM and DM should coordinate the first draft of the Implementation Directive, Management Plan, and the In-Depth Review briefing with the key agencies participating in the ACTD (e.g., sponsoring user, Army Component Command, relevant TRADOC proponents, TRADOC DCSSA/TRAC, PEO, TSM).

(d) In-Depth Review approval. Upon approval by the DCG Futures, TRADOC, the ACTD In-Depth Review briefing is revised as may be directed and becomes the basis for subsequent briefings to CG, TRADOC (if required), HQDA, ASA(ALT), OSD's Breakfast Club, and the JROC.

(8) CG, TRADOC review. ACTD candidate is briefed to CG, TRADOC (if required) to approve recommendation to HQDA DCSOPS and ASA(ALT).

(9) HQDA/ASA(ALT) decision briefings. OM and DM, with appropriate support from the ACTD Candidate Development Team, will conduct the following briefings:

(a) Preliminary pre-brief. To ASA(ALT), DAS(R&T) with representation from DCSOPS, the Joint Staff (J8), and Office of the Deputy Under Secretary of Defense for Acquisition and Technology (ODUSD(AT)).

(b) Recommendation briefing (to HQDA DCSOPS, DAMO-FD and the ASA(ALT), DAS(R&T)). The purpose of the briefing is to provide CG/DCG Futures, TRADOC recommendations and to obtain DCSOPS approval to proceed with the Army sponsorship of the ACTD candidate and to approve the required funds. This review is used to confirm designation of the OM, DM; or if ACTD does not have an Army lead, the review confirms the designation of the RIM.

(10) OSD/Joint Staff decision reviews. The ACTD Candidate Development Team supports DAS(R&T) with briefings to OSD's Breakfast Club and the JROC. The team continues parallel efforts to complete, coordinate, and seek final endorsements of the Implementation Directive and the Management Plan while preparing to support OSD/JS reviews. Once ACTD is approved for execution, OM and DM should initiate coordination efforts through HQ TRADOC with DCSOPS and ASA(ALT) for planning and programming year funding lines to be included within the next iteration of PPBES development to facilitate transition, given success and acquisition decision.

(11) Execution oversight. The ACTD OM and DM provides the day-to-day direction of the overall demonstration project. The approved ACTD Management Plan is the basis for ACTD preparations, execution, and transition activities. The ACTD managers prepare and deliver periodic reports to the OSD Oversight Panel and other reviewing authorities. The ACTD managers inform HQ TRADOC DCSCD (BLITCD), ASA(ALT), DCSOPS, and the OSD Oversight Panel of any potential deviations from the Management Plan for discussion, resolution, and modifications. Any changes in the managers or management structure are approved by HQ TRADOC, DCSCD, ASA(ALT), DCSOPS, and the OSD Oversight Panel.

(12) ACTD disposition decisions. Results of the ACTD are briefed to CG, TRADOC, HQDA, and the ASA(ALT) to review the operational value, technical maturity, affordability, and priority for acquisition. The senior leadership of the Army decides the disposition of the ACTD. The decision may be to discard the effort, to continue development and/or experimentation, or to proceed into the formal acquisition process. Acquisition decisions specify the appropriate entry milestone, ACAT, and source of funding. A decision may be made to proceed under the WRAP. The senior Army leadership decision to proceed to the formal acquisition process should result in a decision memorandum to establish funding lines.

(13) Documentation of requirements. One of the primary purposes of an ACTD is to provide insights for refined requirements. Agencies responsible to generate requirements deliverables will be specified in the ACTD Management Plan. These include:

(a) Doctrine. FMs and/or changes to FMs and/or warfighting concepts as required to document doctrine and TTP.

(b) Training. Requirements for training plans, training aids, devices, simulations, and/or simulators. For more on requirements for simulations and simulators, see chapter 12.

(c) Leadership development. Program of instruction (POI) or changes to existing POI.

(d) Organizations. Experimental TOEs as required for any new unit types created for the ACTD. Modified TOEs for objective organizations.

(e) Materiel. ORDs for systems approved for normal acquisition. Operational Requirement Statement (ORS) for systems approved for WRAP.

(f) Soldiers. Military occupational specialty (MOS) modifications as required.

(14) Sustainment of residual capabilities. Frequently, ACTDs provide leave behind, residual operational capabilities in the sponsoring user's units. PMs and appropriate TRADOC proponents (CBTDEV, TSM, TPIO) must assure requisite mechanisms and levels of ILS to meet operational tempo demands. Of special concern will be changes in the nature of the extended user evaluation period from continued evaluation to contingency operational deployment. In such cases, materiel fielding plans (MFPs) must be reviewed for sufficiency to support contingency missions.

8-9. Advanced Concepts and Technology program II (ACT II).

a. Intent. The ACT II program provides industry with a vehicle to demonstrate its 6.3 independent research and development products to TRADOC and provides TRADOC a means to examine potential technology solutions to FOCs. This unique program is executed in a partnership between TRADOC and AMC's Army Research Office (ARO). Individual contracts are limited to 12 months or less and have a ceiling of $1.5 million. At the conclusion, the contractor provides a demonstration to the Battle Lab. The goal of the program is to find and acquire new and innovative hardware and software that can satisfy capability requirements. However, success can also be a determination that a particular technology is not the solution to a requirement. Figure 8-10 provides an overview of the ACT II process.

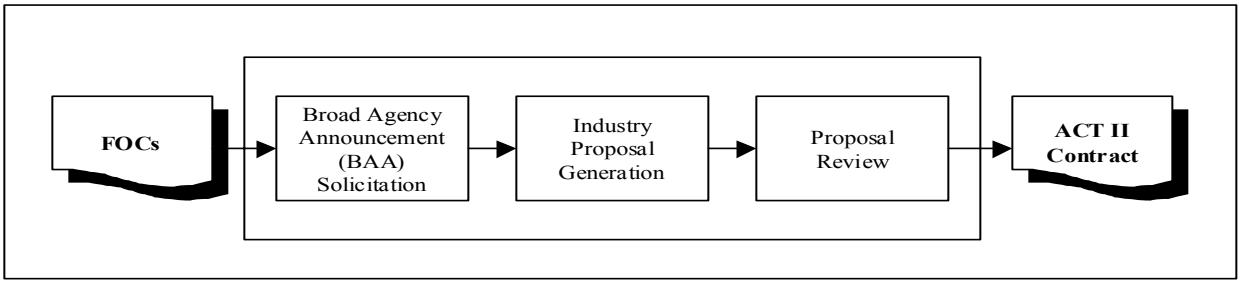


Figure 8-10. Overview of the ACT II process

b. Proposal solicitation.

(1) Topic selection. The solicitation tool ARO uses to attract industry proposals is the Broad Agency Announcement (BAA). Topics for the BAA are submitted by branch CBTDEVs through an appropriate Battle Lab and should be based on Army S&T research shortfalls as detailed in the S&T Review. Areas receiving minimal Army S&T work should become ACT II topics. BLITCD reviews, approves, consolidates, and forwards the topics to ARO. ARO compiles and releases the draft BAA in early February. The BAA process is shown in figure 8-11.

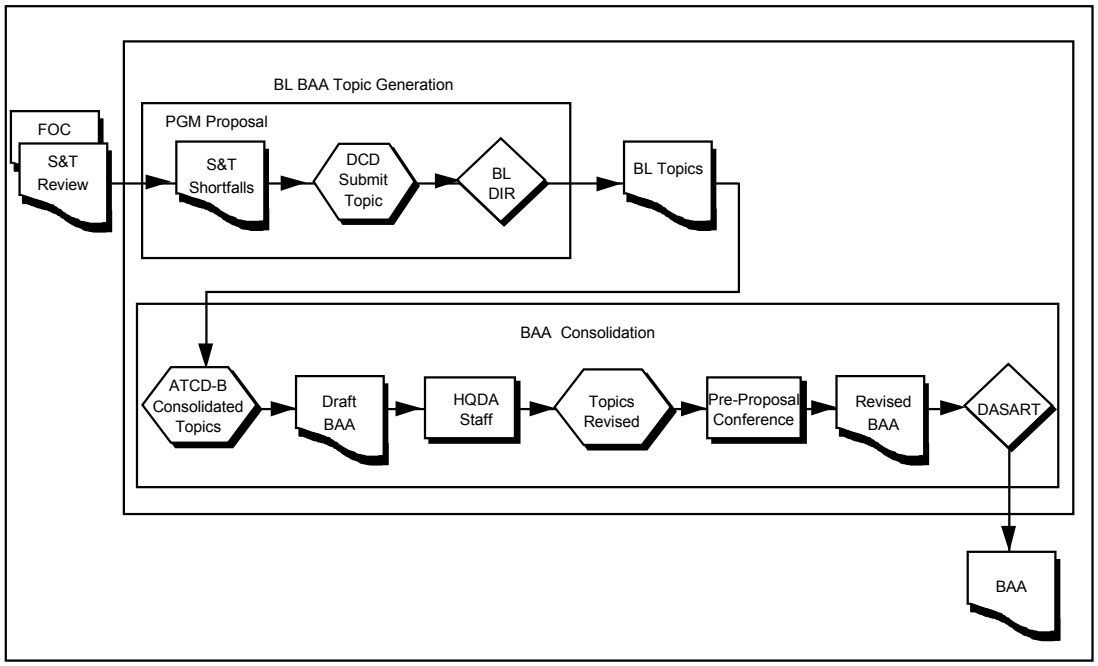


Figure 8-11. ACT II BAA process

(2) In mid-April, BLITCD hosts a pre-proposal conference during which contractors can interact with the Battle Labs and discuss specific topic issues. From this dialogue, the Battle Labs make any final adjustments to the topic descriptions for publication in the final BAA in early May. ARO is responsible for compiling changes, publishing, distributing, and posting the BAA on the Internet at http://www.aro.army.mil.

c. Project selection. Figure 8-12 is a detailed overview of the selection process.

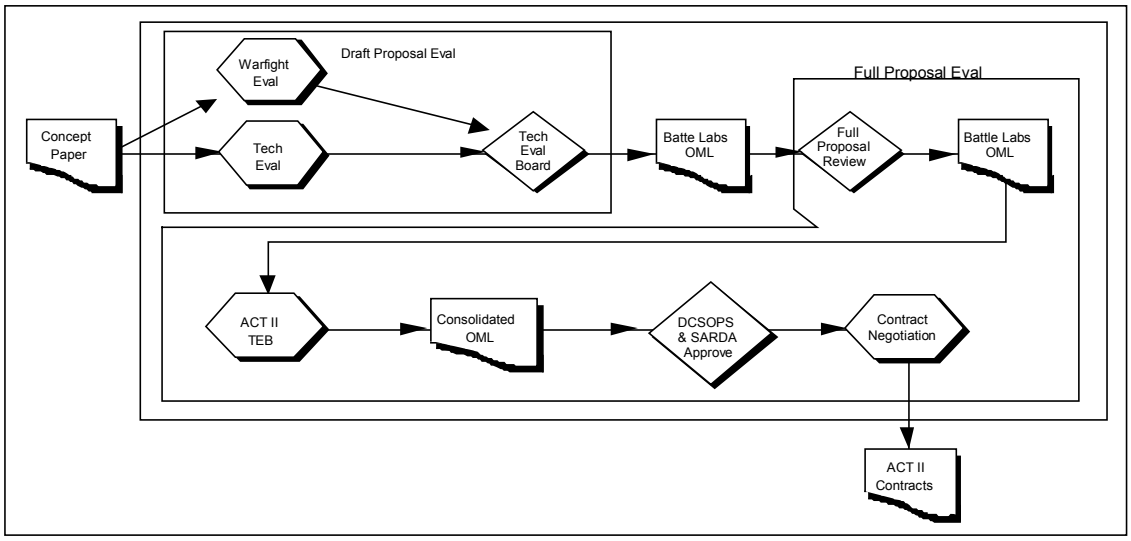


Figure 8-12. ACT II proposal selection process

(1) ACT II concept papers. Industry responds to the BAA by submitting two-page concept papers to ARO. ARO distributes the concept papers to the Battle Labs and to an appropriate RDEC for warfighting and technical evaluations respectively.

(2) ACT II concept paper evaluation.

(a) Warfighting evaluation. These evaluations assess the doctrinal soundness and improvements provided in the topic area. They must also assess the reasonableness and feasibility to demonstrate this ACT II concept. Battle Labs rate ACT II concept papers as excellent, acceptable, or unacceptable. Excellent papers are those creative ideas that, if successful, would provide significant increases in that topic area over what is now the current or expected gain.

(b) Technical evaluation. The RDEC conducts a concurrent evaluation to assess the technical merits of the concept papers. Where ARO deems more than one RDEC should evaluate a paper, overall responsibility for the evaluation is assigned to one RDEC. The technical evaluation assesses the merits of the technology and its ability to make incremental progress toward the topic solution. It also determines the qualifications of the key investigators, staff, and consultants; verifies cost realism; and checks for current or past duplicative efforts within the Army. Technical evaluations are rated either acceptable or unacceptable.

(c) ACT II Concept Paper Technical Evaluation Board. After conducting warfighting evaluations, each Battle Lab establishes an Order of Merit List (OML) for their concept papers. Each concept paper is then verified for its technical feasibility. Once completed, final adjustments are made to the OML and it is submitted to ARO. ARO then requests full proposals (25 pages) on behalf of the Battle Labs.

(3) Proposal evaluation. Full proposals are received, distributed, evaluated, and compiled into an OML in the same manner as the ACT II concept papers. Because the full proposals are much more detailed, the evaluations must be equally detailed. The same evaluation process and scale are used with the full proposals. Two other agencies evaluate the proposals. The Army Digitization Office (ADO) screens them for compliance with the Joint Technical Architecture-Army (JTA-A). DA DCSOPS ensures that there is sufficient difference between proposals and any similar current efforts. While neither has veto authority, their non-concurrence with a proposal requires arbitration at a higher level.

(4) Proposal Technical Evaluation Board (TEB). ARO hosts the proposal TEB with BLITCD, Battle Lab, RDEC, DA DCSOPS, DA DCSPER, and ADO representatives. This meeting ultimately selects projects for funding. A consolidated OML (1-N list) of all the acceptable proposals is developed by the Battle Lab deputy directors. This consolidated OML applies the limited available resources in the best interest of the Army. The Director, BLITCD and the Battle Lab deputy directors validate it by signature.

(5) Selection review. The TEB, specifically the Director, ARO, has decision authority for project selection. BLITCD and ARO outbrief the TRADOC DCSCD and the AMC DCSRDA on the selections. The results of the TEB are presented to the ADCSOPS-FD and the DAS(R&T) for final approval.

d. Project management players.

(1) Battle Lab project officer (BLPO). The TRADOC person responsible for project execution. Must coordinate the efforts of all project players and ensure they conduct their responsible activities. Heads meetings and monitors/reports project technical progress and budget status. Participates in evaluation of deliverable and makes final recommendation report to Battle Lab director. Is the overall manager of the project.

(2) Contracting officer's representative (COR). The AMC person responsible for performing contract quality assurance as authorized by the procuring contracting officer. The technical expert for the Government who inspects technical progress and accepts or rejects the deliverable. A COR has no contracting authority and cannot change the contract.

(3) Contracting officer. The person authorized by the Government to enter into, administer (and modify), and/or terminate contracts. The only person authorized to make changes to price, quality, delivery, or other terms and conditions of the contract. Generates a contract based mostly on offeror's complete proposal, but will use SOW and report requirements detailed by the project officer and COR if provided.

(4) RDEC representative. The AMC representative assigned to the Battle Lab who may have extensive knowledge and/or experience of acquisition/contracting/project management. A valuable advisor and confidant on whom the project officer can rely heavily.

(5) TECO. An ATEC office assigned to selected TRADOC installations to provide liaison, coordination, and support to TRADOC elements. Provides Battle Labs with extensive knowledge and/or experience in evaluation of items. Those Battle Labs that don't have a TECO do have a collocated ATEC Test Directorate.

(6) Offeror. Term used for referring to proposal submitters.

(7) Contractor. Term used for referring to companies that have been awarded contracts.

(8) ARO. Executor of the ACT II program. Has administration and reporting responsibilities to the Office of the ASA(ALT).

(9) Figure 8-13 provides a project management summary for ACT II projects.

Activity	Preparer	Remarks
Statement of Work	PCO	PO lead, COR, RDEC Rep all input
Milestone Schedule	Contractor	PO/COR review
Surveillance Plan	COR	PO/COR monitor
Budget Status Report	Contractor	PO/COR monitor
Evaluation Plan	Contractor	PO/COR/TECO review
Project Meetings	PO	Contractor, COR, RDEC Rep, TECO attend
Performance Reviews	PO	Contractor, COR, RDEC Rep, TECO attend
Project Status Reports	PO	BL DIR, BLITCD, CG, TRADOC, ARO review
Contractor Demonstration Report	Contractor	BL DIR, BLITCD, COR, PO, ARO
Final Project Report	PO	Recommends invest, discard, experiment further

Figure 8-13. Project management summary

e. Pre-contract award meeting. The first duty of the BLPO should be to gather together the RDEC representative (Rep) and TECO (if assigned) within the Battle Lab, and the procuring contracting officer and COR to discuss important project issues for inclusion into the project negotiation process and contract. Negotiation, as a method of contracting, is designed to be flexible. Negotiation is a procedure that permits bargaining and usually affords offerors an opportunity to revise their offer before the contract is awarded. During this meeting, the officials listed in figure 8-13 review the contractor's work proposal as described by the complete proposal and identify areas that require negotiation to ensure the project meets the Battle Lab's (the Government's) needs. The BLPO should request that the procuring contracting officer include a reporting requirement in the contract (as contained in the proposal) to reduce the project administration burden on the project officer. These reports should include: technical progress, schedule (milestone), budget status, evaluation plan, and anything else the BLPO and COR believe should be negotiated into the contract.

(1) Contracts. Cost-reimbursement type contracts provide for payment of allowable incurred costs to the contractor to the extent prescribed in the contract. In essence, the Government is buying the contractor's best effort. Some basic principles of cost-reimbursement type contracts include that negotiation establish an estimate of total cost, and that surveillance by Government personnel during performance can reasonably assure that inefficient or wasteful methods are not being used. The estimated cost for ACT II contracts serve as a budget for the contractor.

(2) Statement of work. The BLPO's first and most significant task is to define the needs of the Government with clear and accurate descriptions of the essential technical requirements. The research/development engineering center representative and COR can help define the SOW, and the procuring contracting officer finalizes it during negotiations. The SOW details the where and how of the contractor's demonstration and the data to be provided in the contractor's final report. In accordance with DOD policy, the SOW is written in terms of performance. This method of writing defines the requirements, but not the characteristics of a presupposed solution. Performance requirements focus on what is to be achieved - the end result. In addition, they define the required performance parameters by identifying details of operating inputs and outputs. They do not state how this performance will be achieved by the contractor.

(3) Milestone schedule. Identification of crucial milestones within the project execution is important for several reasons. Milestones can:

(a) Point out when coordination meetings should be scheduled.

(b) Indicate when performance reviews may occur.

(c) Provide intermediate goals for progress to be measured against.

(d) Identify when corrective action is to be taken.

(4) Surveillance plan. The object of surveillance is to monitor contractor performance to ensure compliance with terms and conditions of the contract. This is the responsibility of the COR, but the project officer should ensure that the plan is developed. Normally, surveillance can be limited to the critical milestones and monitoring of the contractor's progress reports. More technically challenging projects may require additional meetings or inspections of project components to determine if performance/technical specification have been met. Regardless, the BLPO should ask the COR for a copy of the surveillance plan, and ensure the COR is performing the checks.

(5) Budget status reports. The BLPO should have the contractor provide a projected expenditure layout (if not already included in the complete proposal) and report monthly on actual expenditures. The procuring contracting officer can include this requirement in the contract. The contractor cannot overspend on ACT II without the approval of the procuring contracting officer, so close monitoring of expenditures is important. A detailed plan of expenditure describing manpower and equipment costs by task may be included in the offeror's cost proposal or may be submitted during negotiations. Work will stop when the contractor reaches the estimated cost, or the contractor may proceed at their own risk.

(6) Evaluation plan. This is a description of how the Battle Lab assesses the system's future value to the warfighter. The TECO can assist in developing guidelines for this plan (which the contractor should provide). As a minimum, the deliverable must be checked against the performance requirements. In other words, the contractor has agreed to deliver an item (hardware or software) capable of performing to a desired level, and the project officer and COR must evaluate that item and judge it as being acceptable or not. The evaluation plan should consider not only the final project, but also any intermediate milestones from which an evaluation would provide indications that the item is not performing to standard. The contractor staffs the evaluation plan through the project officer before contract start to ensure the methodology, measures of performance and evaluation, and deliverable are acceptable to the Government.

(7) Government furnished equipment (GFE). The BLPO verifies the equipment furnished by the Government to the contractor, and begins coordination for these resources. The contractor will have already provided a list in the complete proposal and conducted some preliminary coordination. The BLPO serves as a focal point for all deliverable demonstrations, especially with regard to coordinating with any field units.

(8) Deliverables. The BLPO ensures before contract award the disposition of the finished item, products to be produced, quantity, place of delivery, and if the government is to retain it, who will maintain it (Battle Lab or RDEC).

f. Project administration.

(1) Project meetings. The actual number of coordination meetings required to sustain progress and meet milestones is a function of the project complexity, number and experience of the people involved, and technical risk. As a minimum, a meeting should be held prior to each milestone. Additional meetings may be required to resolve show-stopping problems, changes within the scope of the SOW, or demonstrations. The proposal may indicate any proposed meetings.

(2) Performance reviews. These should be conducted monthly (informally) to determine if the contractor has stayed on schedule. The COR and research/development engineering center representative should be involved in the review process, and the findings forwarded to the procuring contracting officer.

(3) Project status reports. Any written progress reports to be provided by the contractor that account for expenditure of funds in terms of man-hours and project progress (milestones) must be included in the contract by the procuring contracting officer. These reports serve as the basis for quarterly inputs to the CG, TRADOC's Review and Analysis report, and as feedback to the Battle Lab Director, BLITCD, TRADOC CG, and ARO. The reports should be short and concise. They provide, at a glance, important project status and budget information, as well as a vehicle to surface process problems to the chain-of-command for resolution. The reports should include the following information: title; summary; milestones (past and future); budget status (fiscal year (FY) xx and FY xy projected and actual); progress/issues; recommended solutions; project status (green, yellow, red); and initials of BLPO, Battle Lab Director (or representative), and BLITCD.

(4) Contractor demonstration report and BLPO project recommendation. As project completion approaches the BLPO must recommend to the Battle Lab Deputy Director to either pursue investment, discard the project, or experiment further with other vehicles. This recommendation is based on the contractor's final report submitted at the conclusion of the demonstration. Presentation of a final project report highlighting actual performance versus expected, and the consequences of investment/discard/experiment further must be addressed.

g. Further experimentation. Each promising ACT II project can lead to additional experimentation; either in the CEP, as a stand-alone LOE, or as a part of a larger AWE. The contractor has already provided most of the required information to prepare a LOEP within the project evaluation plan. The BLPO's responsibility is to integrate the contractor's evaluation within the Battle Lab experimentation process by optimizing the use of limited resources and taking advantage of experimentation targets of opportunity (previously planned AWEs).

8-10. Joint Test and Evaluation (JT&E) program.

a. General. The JT&E program may support all aspects of the DTLOMS requirements determination process. It is an OSD funded program that brings together two or more Services to:

(1) Evaluate technology and warfighting ideas.

(2) Provide information on system requirements and improvements.

(3) Examine systems interoperability.

(4) Evaluate technical or operational performance of interrelated or interacting weapon systems under realistic conditions.

(5) Develop and analyze testing methodologies.

b. Program development and approval. The JT&E program is a multiyear program that consists of an annual submission cycle (request for nominations in September/October to OSD, approval of projects in June). For those nominations that are approved, an 8 - 11 month joint feasibility study (JFS) is conducted. If the JFS recommendations are accepted, a 2 - 3 year test phase is executed. DOD 5000.3-M-4 provides procedures guidance. The HQ TRADOC action office is ATCD-RP.

8-11. S&T and experimentation integrated schedule. Figure 8-13 depicts those S&T and experimentation actions that have specific milestones each year. AWEs and LOEs are not shown on the chart because they do not have specific yearly milestones for submission and approval. They are driven by other considerations, such as resourcing decisions. A two-year cycle is depicted because some actions cross years and, in general, actions in one year approve the projects to be accomplished in the next or future years. The TRADOC FOC revision, integration, and approval process provides input to the ASTMP during the current year but also guides TRADOC participation in S&T review and STO/ATD review for the next year. The S&T review results support the S&T agency development of POM input and STO/ATD nominations. This in turn feeds the STO/ATD review process and the ASTWG which advises the ASTAG. S&T review results from the previous year with emerging results from the current year also support determination identification of topics for ACT II BAA. Projects contracted for through the ACT II process culminate in demonstrations in the following year; thus, each year has ongoing demonstrations from the previous year selection process and the current selection process for the coming year's demonstrations. The CEP program operates similarly with selection in one year and experiments in the next. The ATD and ACTD are multiyear programs with demonstrations and other activities occurring across time. The Battle Lab BoD meets as necessary (and normally in May or June) to consider experimentation conducted, to determine future course of action, and as needed to support other WRAP ASARCs. Figure 8-13 reflects the current WRAP ASARC schedule; experience indicates normally one WRAP ASARC is conducted in the September/October timeframe. While the processes need a degree of regiment, they must remain flexible to accommodate the changing situation and satisfy the needs of the warfighter.

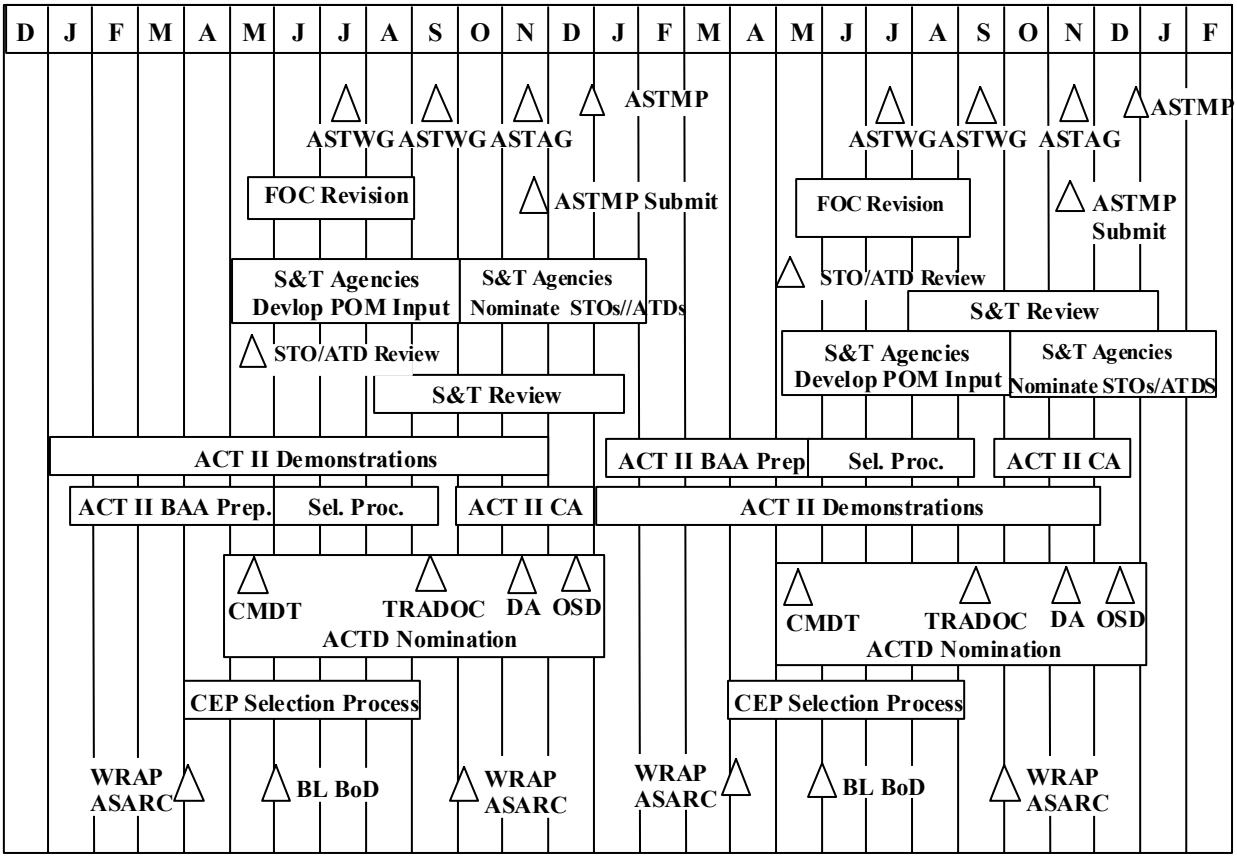


Figure 8-14. S&T and experimentation integrated schedule

Chapter 9
Studies and Analyses

9-1. Introduction. TRADOC conducts studies and analyses to help assess warfighting concepts, determine requirements, and evaluate DTLOMS initiatives.

a. Analysis supports each phase of the requirements determination process and is a continuous and iterative subset of the process. Analysis generally begins with the development and assessment of concepts during experiments, simulations, technology demonstrations, and S&T research. These concepts establish the basis for the FOCs. Figure 9-1 depicts the analysis process leading to the determination of DTLOMS solutions and the development of materiel requirements documents (MRDs).

b. Paragraphs 9-2 to 9-5 specifically discuss the elements of figure 9-1. The figure has three main lines of progression. The top section provides a reference to the acquisition management phases and milestones. The middle section identifies the types of CBTDEV analyses done to provide analytic support to the key product of each phase. The bottom section represents MATDEV and other S&T analyses done in support of the requirements determination process. The analysis processes are iterative and the several analyses may feed information at varying times.

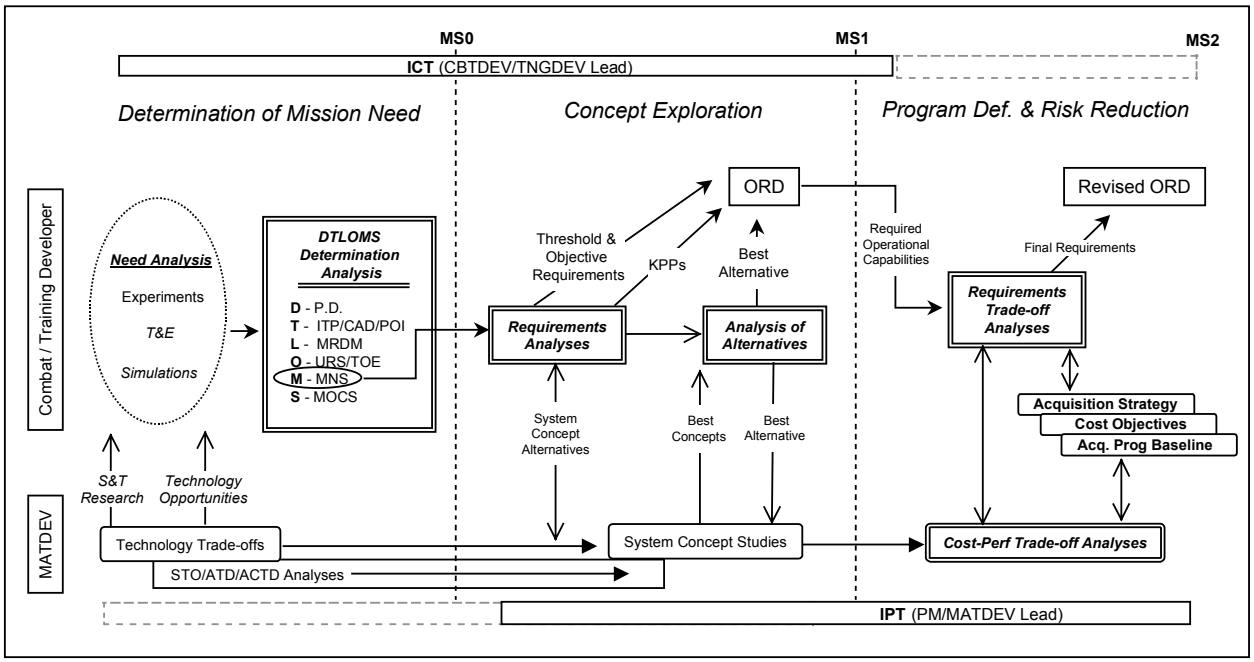


Figure 9-1. Analyses supporting DTLOMS determination and materiel requirements development

c. Modeling and simulation (M&S) planning is an integral part of system development. Each program should develop a simulation support plan (SSP) which details projected use of M&S throughout the system's life cycle. The intent of the SSP is to provide the PM a tool to use in thinking through M&S use and requirements throughout the acquisition life cycle. The SSP briefly describes the M&S programs that will support analyses, testing, training, evaluation, and other functions to be accomplished in the program's evolution. SSPs provide a management strategy for the use and implementation of M&S and should be developed at the start of the analysis process. SSP guidelines are available on the Internet at http://www.sarda.army.mil/zd.

d. TRADOC has three key entry points for coordinating analysis support:

- Counterpart CBTDEV office at HQ TRADOC (DCSCD)
  (for training studies – DCST Training Development and Analysis Directorate)

- TRADOC Study Program (TSP) management office in DCSSA (ATAN-A), and

- TRAC's Operations Directorate (ATRC-TD) at Fort Leavenworth.

ICT and/or IPTs should contact one of these entry points as soon as it is recognized that analytic support may be required. TRADOC programs analysis support through the TSP is discussed in paragraph 9-8.

9-2. Determination of mission need. Concepts, which contain FOCs, guide the way the Army will organize and fight in the future. Analysis must support how DTLOMS requirements are determined. The requirements determination process provides a setting to analyze concepts to decide which combinations of DTLOMS are necessary to attain FOCs.

a. DTLOMS determination analysis.

(1) DTLOMS analysis determines the most effective, timely, and least costly means to achieve the FOC. The ICT, or combat developments representative (school or Battle Lab), is responsible for researching the concepts, S&T research, technology opportunities, and experimentation to identify the possible alternatives that will meet the FOC. The needed changes to DTLOMS support must be clearly identified. If necessary, simulation analysis should support DTLOMS alternatives. The most effective, timely, and least costly means to achieve the FOC should be chosen for further development and analysis. These results must be documented and supported by the TRADOC proponent (ICT or combat development representative). A combination of DTLOMS changes may be appropriate.

(2) DTLOMS changes affect specific plans or programs.

(a) Doctrine changes are documented in HQ TRADOC's Doctrine Literature Master Plan (DLMP).

(b) Training changes impact the Combined Arms Training Strategy (CATS) program.

(c) Significant leader development changes are addressed in the Leadership Development Support System (LDSS).

(d) Organizational changes are documented to HQDA (DCSOPS) through the Structure and Manpower Allocation System (SAMAS) Army Master Force List (MFORCE).

(e) Soldier changes are made to HQDA (DCSPER) through the Military Occupation Classification and Structure (MOCS).

(3) The doctrine, training, leader development, organization and soldier (DTLOS) determination documentation should provide the rationale as to why non-materiel options are inadequate, infeasible, or undesirable, and thereby support the Army's rationale for a materiel requirement and a MS 0 materiel acquisition decision.

(4) A materiel requirements solution is initiated only if the FOC cannot be satisfactorily achieved through the other DTLOS. The materiel requirement is refined and identified through analyses and associated reports such as warfighting experiments, map exercises, STOs, TDs, ATDs, ACTDs, CEPs, ACT II technology demonstrations, threat assessments, and ONSs. These devices are the needs analyses and are further discussed in chapters 7 and 8. These analyses continue into the Concept Exploration Phase of the materiel acquisition life cycle and have residual effects out to the Engineering and Manufacturing Development milestone decision (MS II).

(5) While these materiel analyses are exploratory, they support ICT considerations and culminate in the identification of a potential materiel solution which can satisfy a FOC. It is important for the ICT or combat developments representative to document the analysis that provides analytic underpinning for the materiel requirement. The documented results of these analyses support the MNS. The ICT needs to present the analysis process and study findings (the needs analysis) that resulted in the identification of a need for a materiel development.

b. Technology trade-offs. To support analysis requirements for new materiel, the MATDEV conducts Technology Trade-off Analyses that identify the potential for alternative technologies to meet a need or to develop an opportunity. Early in the development process, the MATDEV investigates a wide range of potential technology solutions from many engineering possibilities. Costs are to be considered throughout this process.

9-3. Concept exploration. After the Mission Needs Determination Phase and a successful MS 0 decision to proceed with Concept Exploration (Phase 0 of the materiel acquisition cycle), analysis efforts focus on comparisons of alternative materiel concepts and their cost implications. The user's representative and MATDEV are both major players in this process. The CBTDEV, TNGDEV, and MATDEV analyses help develop the initial ORD and the Acquisition Program Baseline (APB), and provide advice to the MDA at MS I regarding whether a new program is warranted. These analyses are the CBTDEV and TNGDEV requirements analyses, MATDEV system concept studies, and the AoA. The CBTDEV, TNGDEV, and ICT need to document these analyses to support milestone decisions and resource reviews.

a. Requirements analyses. Requirements analyses provide the analytic rationale that support the operational requirements of the ORD. The CBTDEV and TNGDEV requirements analyses are usually sensitivity, uncertainty, or risk analyses, at either the system level or force level. These are done to determine the impact of the alternative system designs and cost variables. Requirements analyses start with the required capabilities, which are based on mission determination from the previous phase and the MATDEV's identified system concept alternatives. This analysis helps the ICT to further develop or refine the identified required materiel capability. These analyses employ the concept of cost as an independent variable (CAIV), and may include trade-offs when determining requirement objectives and thresholds. Figure 9-2 depicts the cost and performance trade space between the performance thresholds and objectives.

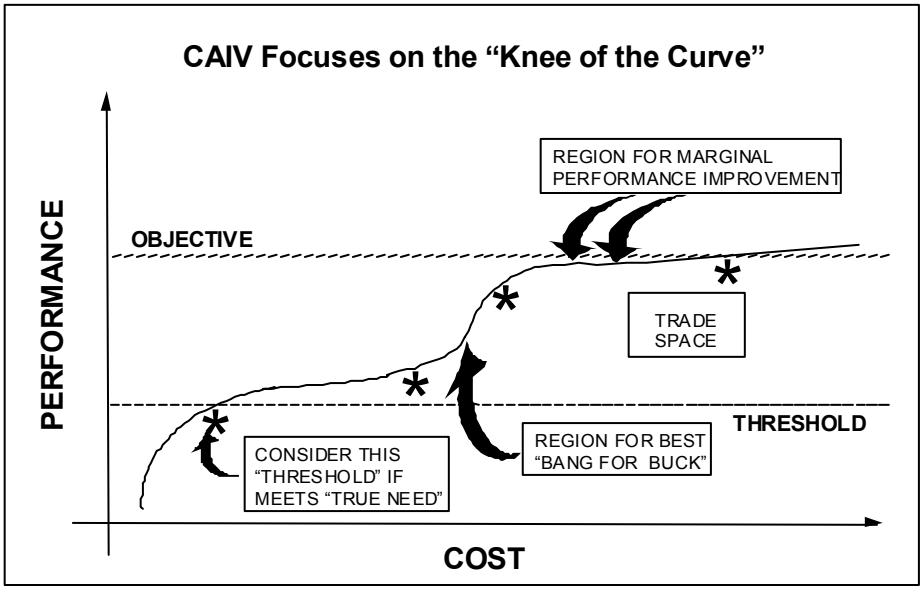


Figure 9-2. Cost as an independent variable

(1) The CBTDEV or TNGDEV conducts requirements analyses as needed to further develop required capabilities and identify KPPs for the ORD. TRAC can support the CBTDEV or TNGDEV with force level analysis, which considers the effectiveness of the system as part of a warfighting team. AMC's AMSAA generally focuses on item- and system-level performance characteristics, assesses training system performance, conducts few-on-few analyses, and provides certified item-level data input to TRAC's force level analysis.

(2) Requirements analyses provide a risk assessment of the uncertainties and sensitivities related to battlefield performance, logistics readiness, critical system characteristics, and manpower, personnel, and training constraints. These analyses help the ICT identify system performance and cost thresholds. The CBTDEV, TNGDEV, and ICT must document the results of these requirements analyses to provide analytic rationale for the ORD and to provide a reference document for later analyses.

(3) Requirements analyses consist of mathematical analyze, simulations, map exercises, AWE/LOE/CEP results, STO/TD/ATD/ACTD/ACT II developments, and other analysis tools. There is no set format or scope for a requirements analysis. The CBTDEV or TNGDEV tailors the analysis to address the issues unique to the system under review. An important aspect of a requirements analysis is the risk assessment (uncertainties and sensitivities) associated with the assumptions used in the materiel program development.

(4) Requirements analyses are conducted by the CBTDEV or TNGDEV for all ACAT I and ACAT II systems. The analysis accompanies the ORD when it is sent to HQ TRADOC for approval. Requirements analyses for ACAT III and ACAT IV systems are tailored as needed. The requirements analyses for ACAT III and ACAT IV systems are not forwarded with the ORD for approval, but are archived by the proponent for future reference.

b. System concept studies. The MATDEV, in coordination with the CBTDEV or TNGDEV, performs system concept studies on the best technological candidates identified by AWE/LOE/CEP results and STO/TD/ATD/ACTD/ACT II developments. These system concept studies develop rough performance estimates and RDA cost estimates with sufficient resolution to permit first-cut, rough trade-offs among system performance, operational capability, requirements, and costs. System concept studies influence the ORD through interaction with the CBTDEV and TNGDEV requirements analysis, provide input for development of the APB, and identify system concept alternatives for the AoA.

(1) System concept studies:

(a) Examine the feasibility of different technology solutions.

(b) Refine technology concepts.

(c) Provide performance data for a given technology.

(d) Identify possible performance trade-offs, performance thresholds, cost drivers, and schedule constraints.

(2) This study identifies the range of materiel possibilities from which to select system characteristics that best solve the operational requirement within given cost and program schedule constraints. It establishes bands of performance (e.g., range, endurance, survivability) that the materiel developer can achieve in the time available. It also provides information on relationships between these factors (e.g., operating range versus survivability factors).

c. AoA. The AoA is an independent analysis which provides information to support the MDA by determining which study alternative is most cost and operationally effective (the preferred alternative). If the CBTDEV, TNGDEV, and MATDEV are on track in developing the correct program to provide the materiel solution, AoA findings will provide analytic underpinning to support a recommendation to continue further development of the programmed system. However, the AoA is not done to specifically support the programmed system described in the ORD. If the results are unfavorable, a decision on whether to proceed will be made at the MS I review. The analysis results assist the MDA in deciding whether the programmed system should continue into the Program Definition and Risk Reduction Phase (Phase I). If conditions warrant, the MDA may direct updates to the AoA for subsequent MS decisions. Usually AoA updates are required only when there are significant developments, such as a changed threat, new technology development, a test issue, or program cutback.

(1) Based on the wording in the MS 0 Acquisition Decision Memorandum (ADM), pertinent congressional language, and HQDA/TRADOC guidance, the independent analysis agency (usually TRAC or a study team at a TRADOC school) works with the MATDEV, CBTDEV, TNGDEV, and AMSAA to develop study issues, alternatives, system performance data, cost data, and measures of performance (MOP) and effectiveness (MOE). The MATDEV is the source of the technical parameters defining the study alternatives.

(2) The AoA primarily determines operational effectiveness and costs for all alternatives. Operational effectiveness analysis looks at the relative contribution each alternative makes to force effectiveness based on the MOPs and MOEs. The cost portion of the analysis generates cost estimates that quantify the resource impacts expected if the alternative materiel systems and forces gamed in the effectiveness analysis are acquired, operated, and maintained for the comparison period (usually 20 years). The cost analyst uses validated life cycle cost estimates (LCCE) from the MATDEV. The analysis also considers logistics, training, and personnel impacts.

(3) A natural by-product of many AoAs is the identification of opportunities for trade-offs among performance, costs, and schedules. The AoA provides input to the Requirements Trade-off Analyses conducted during Program Definition and Risk Reduction and to the MATDEV's System Concept Studies (see fig 9-1). It also provides insights regarding KPPs and indicates how these parameters contribute to increased operational capability. Likewise, the AoA depends on inputs from the CBTDEV and TNGDEV requirements analyses and the MATDEV system concept studies. The conduct and documentation of the requirements analyses are important contributors towards keeping a manageable scope and timeline for the AoA.

(4) AoAs consider a full range of materiel alternatives. These alternatives include the currently fielded system (the base case), a modified version of the current system, the Army's programmed system described in the draft ORD, other Services' systems (existing or programmed), non-developmental items, cooperative (allied) developmental systems, and conceptual systems.

(5) The MOEs link AoAs, the APB, the ORD, the COIC, and T&E Master Plan. The AoA analyst develops MOEs that will quantify how well the alternatives satisfy the operational need described in the MNS and ORD. These MOEs should be consistent with the MOEs planned for use in the T&E process.

(6) HQDA DCSOPS, in coordination with ASA(ALT), usually tasks TRADOC to perform AoAs for ACAT I and II programs. The tasker should be drafted as early as possible and be consistent with developments from previous requirements analyses. HQ TRADOC then tasks an independent analysis team to conduct the AoA, usually TRAC, but possibly a study team in a TRADOC school. The CBTDEV or TNGDEV (TRADOC school) is responsible for conducting the remaining ACAT II, III, and IV program AoAs, if required by the MDA.

(7) The independent analysis team conducting the AoA takes direction from HQ TRADOC and, if formed, guidance from the HQDA Study Advisory Group (SAG); or, for a joint AoA, the Joint Oversight Board (JOB). Specific requests for significant additional or modified analytic requirements must be processed through HQ TRADOC. The ICT should help scope the AoA and expedite analysis coordination efforts.

(8) AoAs for ACAT I and II programs typically take a year to complete, but can be done in 3 - 6 months if issues are few and there is an agreement on a reduced scope. Therefore, analysis requirements must be projected early to ensure analysis resources are available. If the MDA does not require an AoA for an ACAT III or IV program, the CBTDEV or TNGDEV must still maintain an audit trail of the analyses supporting the materiel need determination and providing the analytic underpinning for the ORD.

9-4. Program definition and risk reduction. The primary analysis efforts during Program Definition and Risk Reduction (Phase I of the materiel acquisition life cycle) are CBTDEV or TNGDEV requirements trade-off analyses and MATDEV cost performance trade-off analyses. The key products are the final ORD, its KPPs, the APB, and the refined system performance and cost data. These analyses support the MS II decision of whether or not to proceed with Engineering and Manufacturing Development (EMD). In these studies, the user's representative and the MATDEV look at the same problem from opposite perspectives. One considers the requirements trade-offs to determine what can be negotiated and what is essential for mission success, and the other considers cost and performance capability trade-offs to determine what performance is attainable at what price. These analyses can be done as part of one study effort; they are discussed separately to show what the CBTDEV and the MATDEV bring to the effort.

a. Requirements trade-off analyses. The CBTDEV or TNGDEV may need to conduct further requirements trade-off analyses to finalize the ORD based on results of the AoA, the MATDEV system concept studies and cost performance trade-off analyses, or additional guidance from HQDA. These analyses may show a need to refine the minimum performance thresholds and objectives for the KPPs. These Phase I requirements trade-offs allow for final refinement of the threshold and objective requirements.

b. Cost performance trade-off analyses. The PM-led Cost and Performance Integrated Product Team (CPIPT) conducts cost, performance, and schedule trade-off analyses to explore the relationships between cost and performance, to review potential performance enhancers, to identify cost drivers, and to identify costs and risks of alternative program schedules. These analyses consider what is technologically feasible as a means to meet the user requirements and support the establishment of meaningful, aggressive, and achievable cost, schedule, and performance thresholds and objectives. The PM uses this information to manage the program's acquisition strategy, cost objectives, and APB. The

objective is to ensure an affordable system by the linking of cost and performance as previously depicted in figure 9-2.

9-5. Requirements analysis and Analysis of Alternatives (AoA) reports. Study organizations and agencies tailor each requirements analysis, concept study, and AoA to the issues, objectives, schedule, and MDA need for study insights. Tailoring also applies to the writing of the reports. HQ TRADOC does not prescribe a set report format. Reports usually contain the common elements of a problem statement, study objectives, alternatives, issues, MOE/MOP, cost, conclusions, and recommendations.

a. Reports may also need to detail:

(1) The scope of analysis.

(2) Assumptions.

(3) Constraints.

(4) Limitations.

(5) Essential elements of analysis (EEA).

(6) Threat analysis.

(7) Scenarios.

(8) The study methodology.

(9) Quantitative and non-quantitative analysis of alternatives and data.

(10) Reviews of risk.

(11) Sensitivity, and/or uncertainty.

(12) General study findings.

b. The conclusions and recommendations should follow naturally from, and be supported by, the analysis. If unforeseen acquisition program or streamlining decisions alter the study parameters, additional analysis work may be required to determine the impacts. If required, the additional analysis work may have to compete with other study requirements as a new study effort. TRADOC Pam 11-8 (to be revised as TRADOC Pam 5-5) provides guidance on planning, conducting, and reporting analyses.

9-6. Analytic organizations and tools.

a. Organizations.

(1) Numerous analysis organizations and agencies support the CBTDEV or TNGDEV in the requirements determination process. The Battle Labs, TRADOC schools, DCSCD's Force Design Directorate, and TRAC provide the bulk of the analysis for the non-materiel DTLOMS. TRAC, ATEC, AMSAA, RDECs, ARO, ARI, ARL, industry, and academia all contribute to the development of the materiel requirements solutions. The other Services, STRICOM, and PM Training Aids and Devices (TRADE) also support materiel requirements.

(2) TRAC analysis puts the proposed system in a force level setting to examine how it contributes to force effectiveness. AMSAA provides supporting analyses on system performance, technology, cost, and risk. RDECs provide system concept explorations and are a potential source of in-house or contracted performance trade-off analyses. The ARO identifies new technology advances. The ARI furnishes human use insights. The ARL provides future technology capability and feasibility assessments. Industry furnishes system engineering expertise. Finally, academia provides specialty research.

b. Tools for analysis. Simulations are the analyst's primary tool for conducting requirements analyses, system concept studies, and AoAs. The analyst can use live, virtual, and/or constructive simulations in the analysis. The analyst should use approved Army M&S standards to the maximum extent possible. Approved Army M&S standards can be found in the Army Standards Repository (ASTARS) which can be accessed on the Internet at http://www.msrr/army.mil/astars. More information on Army M&S standards can be found in chapter 12 and app M. The use of M&S standards will reduce resources and facilitate verification, validation, and accreditation of the M&S. Figure 9-3 shows a standard analysis tool hierarchy chart built on a hypothetical M&S standards skeleton.

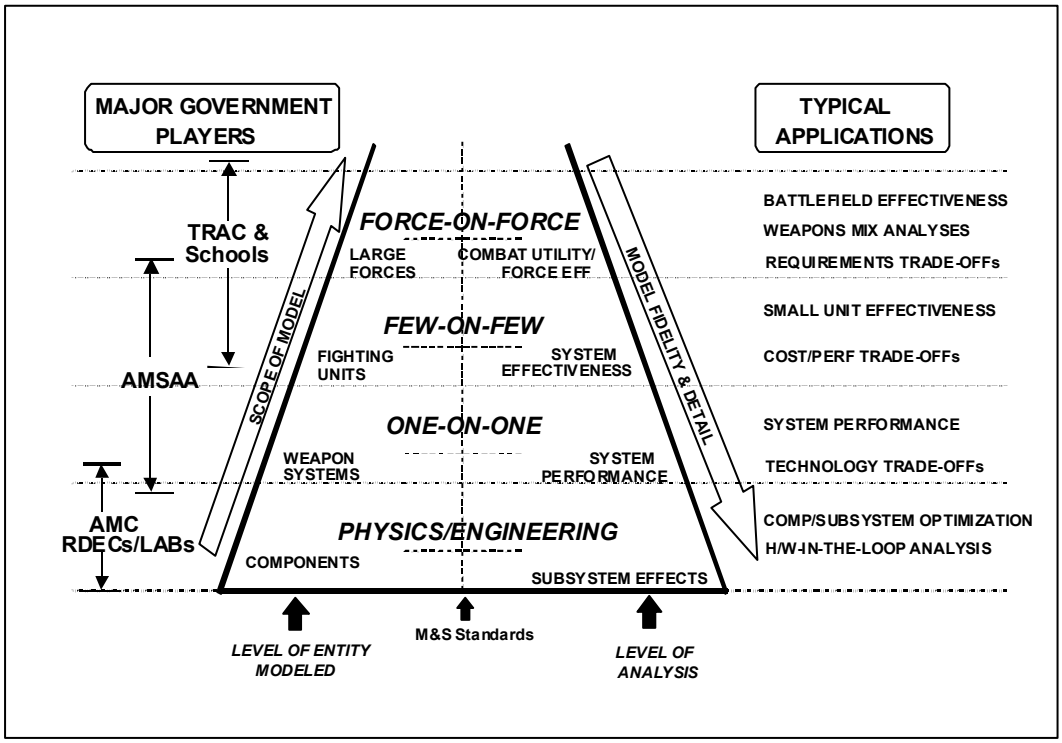


Figure 9-3. A hierarchy of analysis tools and applications

(1) Physics/engineering models include engineering models, hardware-in-the-loop, virtual prototypes, simulators, and "brass" and "bread board" models. These tools provide the base technology analysis and provide inputs for component and subsystem performance estimates. AMC RDECs/laboratories owns these models.

(2) One-on-one models help analysts determine item level performance, system concept performance, accuracies, and margins of error. They can be used to examine numerous item level and system level cost drivers and risk parameters. AMSAA, with some overlap from the RDECs, is the Army's lead for these models.

(3) Few-on-few level performance models are used to examine technology trade-offs, system effectiveness, small unit basis of issue, and the MOPs/MOEs. AMSAA, TRAC, and some TRADOC schools run few-on-few models.

(4) Force-on-force models can be both interactive with and independent from human intervention (man-in-the-loop). The models can be deterministic or stochastic. Deterministic models provide consistent results because they are driven by expected value probabilities that do not change between model runs unless they are modified by analyst intervention. Stochastic models produce a spread of results because they are driven by probability distributions that simulate real world occurrences. Modeling at this level is the main tool for the AoA. As an AoA tool, the constructive model, with input from virtual simulations, and as a benchmark against live simulations and tests, provides a critical combat effectiveness assessment needed to support the determination of the preferred alternative for the ORD requirements.

9-7. TRADOC standard scenarios.

a. Approved TRADOC scenarios provide the operational context for analysis. Standard scenarios contain approved threat and friendly force capabilities that can be used to assess force strengths and weaknesses. TRADOC maintains a library of standard scenarios for use in studies and analyses. TRADOC Reg 71-4 provides policies, procedures, and responsibilities for the management of scenarios used to support TRADOC combat developments. A TRADOC standard scenario is an approved base case scenario that portrays approved doctrinal and emerging concepts.

b. TRADOC holds a scenario planning conference each year to identify and prioritize TRADOC standard scenario production requirements and to build a scenario production plan for the next 12 to 18 months. Attendees include TRADOC commands/centers/schools, Battle Labs, analytic agencies, and other Services.

c. TRAC's Operations Directorate (ATRC-TD) serves as the support and coordination agency for the development of TRADOC standard scenarios. When another Service is the lead for a joint program and using a joint scenario, the Army proponent, to ensure that the Army is properly and adequately represented, should contact TRAC's Operations Directorate. The HQ TRADOC POC for scenarios is ATCD-BP.

9-8. TRADOC Study Program (TSP). TRADOC maintains a listing of the TRADOC portion of the Army Study Program. DCSSA, TRAC, CBTDEV, or TNGDEV identify requirements for unprogrammed

studies throughout the year. Unprogrammed studies compete for limited resources and are not guaranteed to receive in-house analysis support or contract funding.

a. General. The TSP orients the thrust of TRADOC's analytic efforts by issuing HQDA and HQ TRADOC command guidance. The program provides a structure for programming and reporting TRADOC's expenditures on analysis personnel and funding resources. It also provides the status of TRADOC's analysis work and documents accomplishments. Any study projected to use more than 0.5 professional staff years (PSY) of effort should be listed in the TSP. This includes studies that a school commandant may sponsor to consider a requirements issue which is an internal school interest.

b. Project approval. The TSP consists of planned and ongoing studies at the start of the fiscal year. These are the studies that TRADOC agencies plan to execute. Figure 9-4 shows the process by which TRADOC develops the annual TSP.

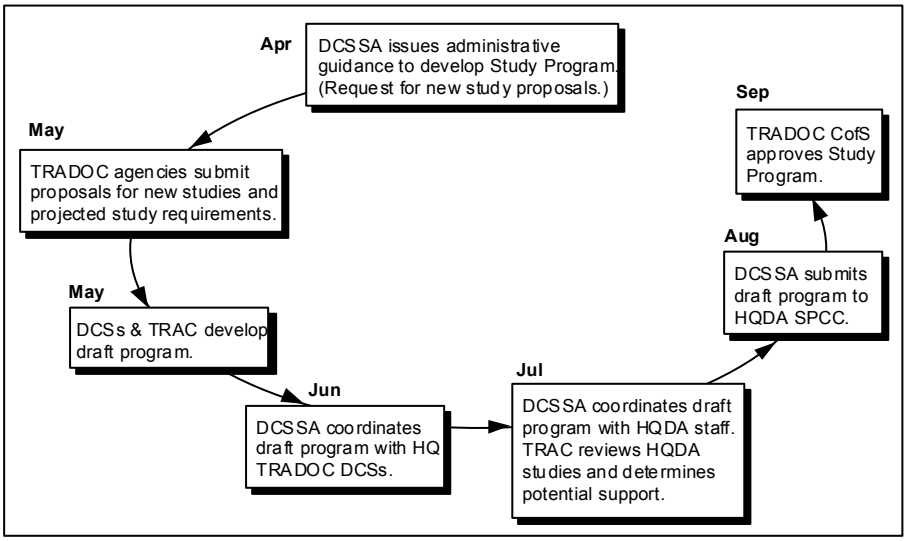


Figure 9-4. TRADOC Study Program development cycle

(1) Planning. Proposals for new studies and study requirements are submitted by Battle Labs, schools, centers, analytic agencies, and HQ TRADOC staff elements. Representatives from HQ TRADOC staff elements and TRAC review all proposals for new studies and build the draft study program. The draft program is coordinated with the HQ TRADOC DCSs for concurrence to release the program for coordination at HQDA and for inclusion in the proposed Army Study Program. In July, the HQ TRADOC DCSSA staff submits the draft program to HQDA. At this time, TRADOC also reviews studies proposed by HQDA for the next FY to identify the HQDA study efforts that TRAC could support on a reimbursable basis. In August, TRADOC submits the draft study program to HQDA's Study Program Coordination Committee (SPCC), chaired by the Deputy Undersecretary of the Army for Operations Research (DUSA(OR)), for inclusion in the Army Study Program. In early September, DCSSA develops the final TSP based on study agency input. By October, DCSSA publishes the TSP.

(2) Categories. Studies are categorized by study type and status. Some study types, for example, are requirements analyses, AoAs, and training analyses. These studies are either in an "ongoing" or a "planned" status. All study agencies review ongoing and planned studies in the current year's study program to identify which should be terminated or deleted because they are no longer required.

(3) Resourcing. The principal resources used to conduct TRADOC studies are personnel organic to TRADOC. They are represented by the PSYs provided by analysts, modelers, support staff, and subject matter experts (SMEs). Studies proposed for contractor support are reviewed by TRADOC

to see if they can be supported by "in-house" resources in lieu of contracts. The decline in resources, however, has forced all contract study funding requirements for DCSCD to be treated as unfinanced and subsequently considered for funding on a case-by-case basis or through support from the PM or MATDEV. DCST continues to fund training studies based on their priority and the available funding levels.

(4) Execution. Each study agency is responsible for conducting their analyses in the TSP. The study agency provides the final study results to the study sponsor and the Defense Technical Information Center (DTIC).

(5) Unprogrammed studies. Studies identified after publication of the TSP are unprogrammed studies. They must be coordinated with TRADOC's DCSSA and TRAC. Early identification of analysis requirements increases the probability that analysis resources could be shifted to support the unprogrammed study.

9-9. Summary. Analysis does not end with an approved requirements document. The requirements determination and development processes are very dynamic. While the materiel (or other DTLOS capability development) is progressing through the life cycle, threats can change, budgets can force newer, tighter cost goals, acquisition strategies can be revised, and test results can demonstrate unachievable performance goals. Consequently, the ORD (or other DTLOS requirement) may have to be updated and its criteria adjusted. These actions should not occur without new analysis. The same philosophy that guides analyses in the early requirement determination cycle, continues throughout the life cycle of the system (or DTLOS requirement) as the technology matures and the system concept gets closer to fielding. The partnership between the user's representative and the MATDEV is critical to getting a successful, cost effective, and supportable system to the soldier.

Chapter 10
Documenting Warfighting DTLOMS Requirements

10-1. Introduction. This chapter provides an overview of how DTLOMS requirements, identified by experiments, studies, and analyses, are documented for subsequent resourcing. Detailed procedures for development and processing of each type of requirements are in the references provided at the beginning of each section. A matrix showing the requirements documents necessary to initiate resourcing for each DTLOMS domain is in figure 10-1.

Domain	Requirements Document(s)	See Para
Doctrine	Program Directive (PD)	10-2
Training	Individual Training Plan (ITP) Course Administrative Data (CAD) Program of Instruction (POI)	10-3
Leader Development	Memorandum	10-4
Organizations	Unit Reference Sheet (URS) Table of Organization & Equipment (TOE)	10-5
Materiel (to include training devices and soldier materiel systems)	Mission Need Statement (MNS) Operational Requirement Document (ORD)	10-7
Soldier	Military Occupational Classification and Structure (MOCS) Memorandum	10-6

Figure 10-1. Requirements documents

10-2. Doctrine requirements overview.

a. The TRADOC POC for doctrine requirements is the Joint/Army Doctrine Directorate (ATDO-A), DCSDOC. TRADOC Reg 25-32 (to be superseded by TRADOC Reg. 25-36, The TRADOC Doctrine Literature Program) describes the doctrine program and provides specific doctrine requirements determination guidance.

b. Doctrine evolves as a body of thought that consolidates the Army's collective wisdom regarding past, present, and future. From Army guidance evolves doctrinal FMs and Army input into joint publications.

c. The Army doctrine requirements process is as follows:

(1) Military guidance. TRADOC uses guidance from the National Military Strategy, the Defense Planning Guidance Joint Warfighting Party, and Joint Vision 2010 in the development of joint doctrine. TRADOC uses Army Long-Range Planning Guidance, the Army Plan, the Army Modernization Plan, and the CSA vision as guidance for the development of Army doctrine.

(2) Doctrine developers. Doctrine developers research, analyze, build consensus, review, and evaluate existing Army and joint doctrine to determine new Army and joint doctrine requirements.

(3) Assess. For Army doctrine, doctrine developers assess FM 100-5, emerging technology, current operations, general officer guidance, new equipment, training exercises, and lessons learned. Doctrine developers also assess approved Army and joint concepts, S&T, and experiments. Once a concept is validated, appropriate doctrine products are developed.

(4) Assign proponent. The appropriate authority assigns a proponent to conduct an analysis when a need or capability is established. Proponency can be assigned by DA, HQ TRADOC, or be identified at the center/school level. The final determination of proponency for Army doctrine publications belongs to the DA, DCSOPS. Within TRADOC, that final authority to determine doctrine proponency is delegated to DCSDOC.

(5) Approve Program Directive (PD). The Army PD is the document to validate Army requirements. The proponent submits a PD to validate the requirement through the appropriate approval channels. Within TRADOC the approval authority can be a TRADOC school, center, or HQ TRADOC.

d. Joint doctrine requirements developed occur as follows:

(1) Joint Doctrine Working Party (JDWP) assesses. Members from the Army, Air Force, Marine Corps, and Navy participate. DA DCSOPS is the Army representative on the JDWP.

(a) Step 1 (Project Proposal). Submitted by Services, CINCs, or Joint Staff to fill extant operational void during the semi-annual meetings. OJCS, Director for Operational Plans and Interoperability (J-7) validates requirement with Services and CINCs and initiates the Joint Program Directive.

(b) Step 2 (Joint Program Directive (JPD)). The J-7 formally staffs the JPD with Services and CINCs. The JPD includes the scope of project, references, milestones, and who will develop drafts. If the JPD is issued, the requirement for joint doctrine publications is established and a lead agent is assigned. The lead agent can be a Service CINC or Joint Staff (JS) Directorate. If the JPD is disapproved, the joint requirements process stops.

(2) Primary review authority (PRA)/technical review authority (TRA) established. PRA and TRA are established to write the manual.

(3) Joint Publication. The joint publication is approved, published, and distributed.

(4) See Joint Pub 1-01, The Joint Doctrine Publication System, for more details on the joint doctrine process.

10-3. Training requirements overview.

a. TRADOC POC for training requirements is Training Operations Management Activity (TOMA), DCST, (ATOM-FA). Specific training requirements determination guidance is in AR 350-10, TRADOC Reg 350-70, and TRADOC Pam 350-70-8.

b. The purpose of the Training Requirements Analysis System (TRAS) is to ensure that students, instructors, facilities, ammunition, equipment, and funds are all at the right place and time to implement directed training, as required by current and future proponent CATS institutional strategies. The TRAS is a management system that provides for the documentation of training and resource requirements in time to include them into resource acquisition systems.

c. The TRAS is a long- and short-range planning and management process for the timely development of peacetime and mobilization individual training. The TRAS integrates the TD process with the PPBES by documenting training strategies, courses, and related resource requirements. The TRAS ties together related acquisition systems for students, instructors, equipment and devices, ammunition, dollars, and facilities.

d. The TRAS process is supported by three documents: the Individual Training Plan (ITP), the Course Administrative Data (CAD), and the Program of Instruction (POI). The ITP for a warfighting requirement will contain a statement citing the applicable FOC. Figure 10-2 shows TRAS document development.

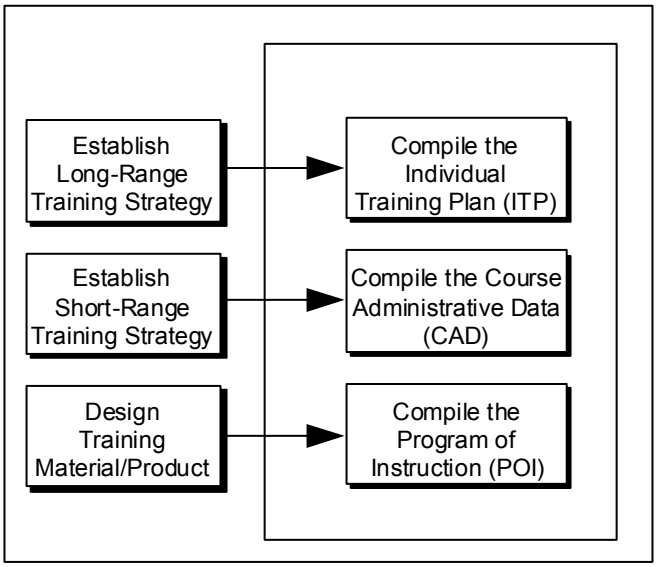


Figure 10-2. TRAS document development

(1) ITP. The ITP is the individual long-range training strategy report for an occupational specialty or separate training program, and prescribes the cradle-to-grave individual training requirements (resident and

nonresident) for that specialty. It helps ensure the systems approach to training (SAT) process is integrated with the sources of training needs, the PPBES, evolving training initiatives, and related resource acquisition systems. The ITP is executed five years out.

(2) CAD. This document, prepared for each course within an ITP, provides critical planning information that enables the recruiting, quota management, and personnel systems to have students and instructors on-station in sufficient time to meet Army requirements. It is the basis for solicitation of individual training requirements (student input) through the Total Army Centralized Individual Training Solicitation (TACITS) for new and revised course versions for use during the Structure and Manning Decision Review (SMDR) and the development of the Army Program for Individual Training (ARPRINT). CAD establishes or revises a course version file in the Army Training Requirements and Resource System (ATRRS) database. CAD is executed 36 months out.

(3) POI. This is a formal course document that contains or updates the previously approved CAD and describes the training content, academic hours, techniques and methods of instruction, and resources required to conduct training. The POI is executed six months out.

e. Throughout the Total Army School System (TASS) transition period, TRAS includes the current library of existing Active Component (AC)/Reserve Component (RC) ITPs, CADs, and POIs; Reserve Component Configured Courseware (RC3) POIs; and developing Total Army Training System (TATS) CADs and POIs (see fig 10-3).

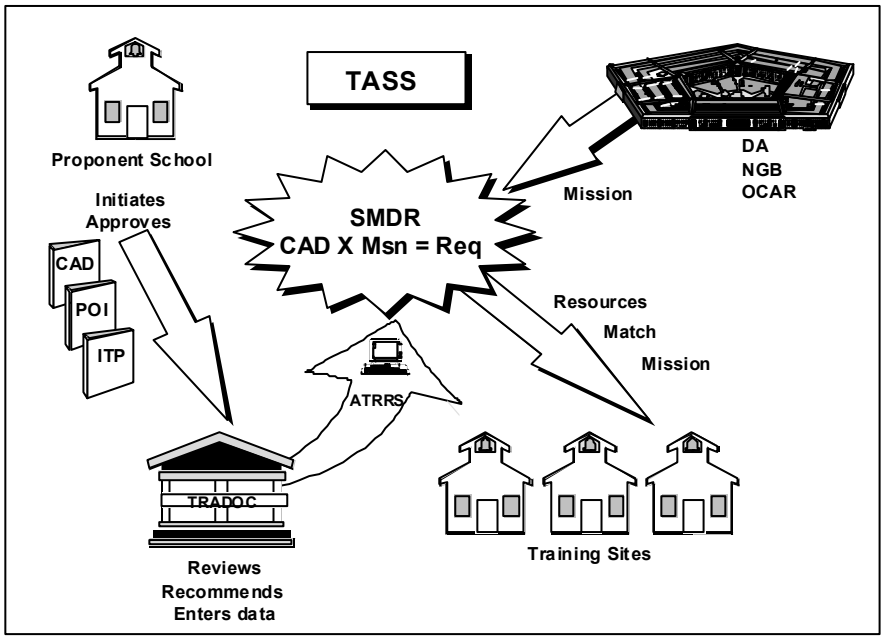


Figure 10-3. TASS/TRASS

f. The requirements determination process generates changes to the DTLOMS domains that ultimately affect training programs.

g. These changes are the result of:

(1) The needs analysis.

(2) The need to eliminate performance deficiencies.

(3) Efforts to improve training efficiency and effectiveness.

(4) The training design process.

h. Proponents prepare TRAS documents for courses developed by TRADOC and conducted by Service schools, training centers, the Noncommissioned Officer Academy (NCOA), the Reserve Component Training Institution (RCTI), the U.S Army Cadet Command, troop schools, and other training activities. Additionally, proponents prepare TRAS documents for InterService Training Review Organization (ITRO) consolidated courses at TRADOC schools and other Service locations.

i. School commandants, acting for CG, TRADOC, have approval authority of training strategy/concepts for which they are proponents. Supporting TRAS documents are submitted to DCST for concurrence/nonconcurrence based on policy/resourcing.

10-4. Leader development requirements overview.

a. The DA DCSPER is the ARSTAF proponent for leadership and leader development. CG CAC/DCG-CA is the TRADOC proponent for executing leader development programs in support of Army policy. The Deputy Commandant, CGSC, is the TRADOC executive agent for implementing leadership and leader development theory, concepts, doctrine, and programs for the total Army. Leader Development Division, Individual Training Directorate, DCST (ATTG-IL) provides staff oversight for leader development policy and program development and execution. DA Pam 350-58 outlines leader development doctrine: what it is and how it is executed for Active and Reserve Component officers, warrant officers, noncommissioned officers and DA civilians.

b. The Leader Development Support System (LDSS) (see fig 10-4) is administered by the Leader Development Office of the Center for Army Leadership. LDSS provides a mechanism to develop new ideas about leader development; build consensus; bring recommendations to the attention of the Army senior leaders; submit, assess, develop, coordinate, and prepare action for decision and implementation; monitor and accommodate the effects of change; and ensure initiatives and issues are integrated and resolved at appropriate levels.

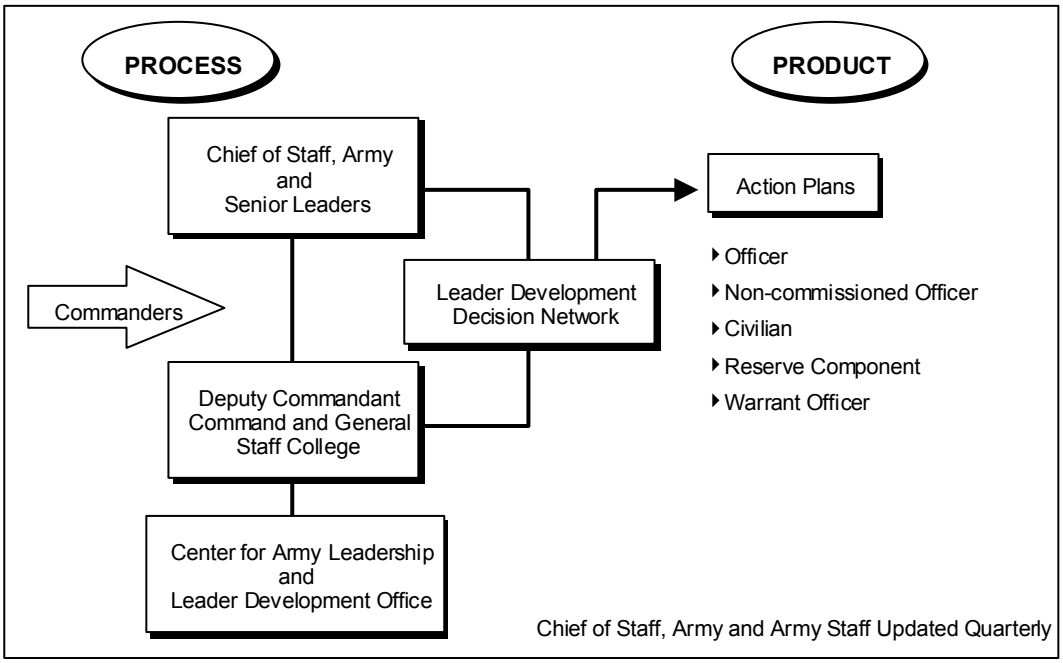


Figure 10-4. LDSS

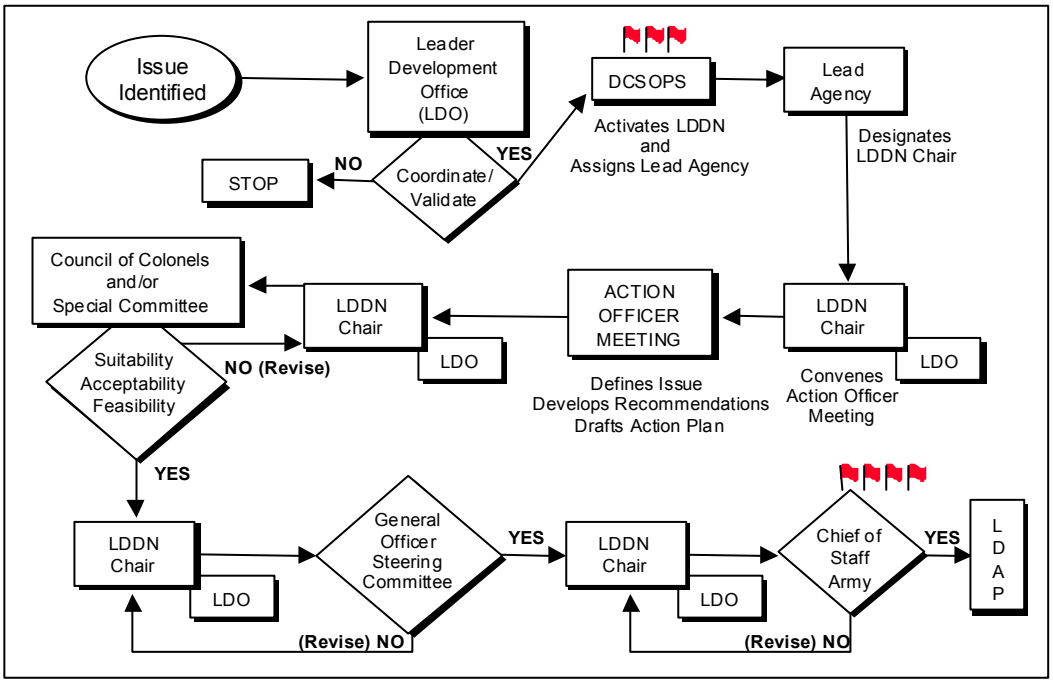


Figure 10-5. LDDN

c. The operative LDSS mechanism is the Leader Development Decision Network (LDDN) (see fig 10-5).

(1) The LDDN consists of eight permanent members: DA DCSOPS; DA DCSPER; Deputy Commandant, Command and General Staff College; CG, TRADOC (or designated representative

augmented as necessary by appropriate subject or functional experts); Deputy Assistant Secretary of the Army for Civilian Plans and Policy (DASA(CPP)); Office of the Chief, Army Reserve (OCAR); Chief, Army National Guard; and Sergeant Major of the Army. LDDN is activated by DCSPER to systematically examine specific leadership or leader development issues using a committee of action officers, a council of colonels, and a general officer steering committee to determine suitability, acceptability, feasibility, and affordability. The Leader Development Office, Center for Army Leadership, is the LDDN action agent.

(2) Solutions satisfying these criteria emerge from the LDDN and are presented to the CSA for consideration. FOCs play a role in TRADOC's evaluation and contribution to the overall LDDN evaluation process.

(3) Approved recommendations are added to the appropriate Leader Development Action Plans (LDAPs) and assigned to appropriate agencies for execution. Recommendations requiring training changes will be injected into the TRAS described in paragraphs 10-3d(1), (2), and (3).

(4) The CSA receives quarterly progress reports during the CSA Leader Development Update.

10-5. Organization requirements overview.

a. The TRADOC POC for organization requirements is Force Design Directorate (FDD), DCSCD, HQ TRADOC (ATCD-F), Fort Leavenworth, KS.

b. Organizational requirements are documented through a series of connected and related processes: Unit Reference Sheet (URS) development, Force Design Update (FDU), TOE development, and Total Army Analysis (TAA). Completion of all four processes may not always be required before organizational changes are made to the force structure. New or major revisions to force designs that involve brigades or equivalent and higher may require the establishment of an ICT.

c. The URS process (TRADOC Reg 71-17).

(1) Organizations have their beginnings in warfighting concepts. These concepts provide the basis for the proposed organization and address a unit's mission, functions, and required capabilities. Organizational solutions to FOC require the development of a URS. The URS is the first organizational document that leads to a new TOE. It contains sufficient detail about the unit's personnel and equipment to be used to support Army force design initiatives and related studies and analyses. Personnel computations (number of officers, warrant officers, and enlisted soldiers) and major end items of equipment quantities should be developed as accurately as possible and reviewed/refined throughout the process. As a minimum the URS contains:

(a) Personnel requirements by job title, grade, and quantity.

(b) Major equipment requirements, including nomenclature and quantity.

(c) A breakout of organization elements, with related personnel and equipment requirements.

(d) A summary that includes other relevant information, such as unit title, design description, mission, assignment, tasks, assumptions, limitations, mobility requirement, and concept of operations.

(2) The CBTDEV assembles the URS package, obtains the commandant's approval, and secures approval for all designs from HQ TRADOC.

(3) HQ TRADOC, DCSCD approves force designs, URS studies, FDU issues, and secures senior Army leadership approval as required. DCSCD, working with the proponent, develops unit allocation rules for use in the TAA process and continually monitors the impact of proposed unit changes on the force structure allowance (FSA).

d. The FDU process.

(1) The FDU is a semi-annual process used to obtain DA approval for new force designs as well as changes to existing force designs. FDU issues are organizational solutions to FOCs and other improvements to existing designs in which doctrinal, training, materiel, and/or leader development solutions are insufficient. The FDU serves as the link between the development of a URS for a new or changed design and the development of a TOE. Once the TOE is approved, it becomes part of The Army Authorization Documents System (TAADS) database. The FDU is not a resourcing process. If approved, FDU issues involve a resource savings, are resource neutral, or are accompanied by a feasible bill paying methodology. HQDA may implement the new or changed design immediately. If approved FDU issues lack an immediate bill paying methodology, HQDA submits them to the DA Force Feasibility Review (FFR) committee for determination of resourcing options. TRADOC DCSCD FDD (ATCD-F) will establish and coordinate a prioritized TRADOC "1-N" list of approved FDU proposals and MARC studies that present personnel bills without accompanying bill payers. The FFR will address resourcing of these unresolved personnel bills according to the priority order of the TRADOC "1-N" list. Resourcing of these issues generally occurs within the context of the upcoming TAA cycle. Appendix H provides an action officer's guide for the FDU process.

(2) FDU methodology (see fig 10-6).

(a) Organizational design or FDU issues result from changes in doctrine, the development of new or revised concepts of operation, acquisition of new equipment, or the significant restructuring of an MOS.

(b) CBTDEV receives organizational design issues from HQDA, MACOMs, and FDD, and, in addition to its own issues, develops URSs, and the FDU issue package in conjunction with FDD (see para 10-5e). A URS is required any time there is a proposed organization structure change.

(c) Proponents brief their respective issues at a review board chaired by FDD (see appendix H for participants and procedures). The review board, commonly referred to as the "Murder Board," validates that an issue is ready for field staffing or returns the issue to the proponent for further development. Issues that require a great deal of additional staff work and coordination may be deferred until a future FDU cycle. At the review board, proponents must identify and address resourcing strategies for any growth in personnel strength, grade of ranks, and materiel requirements. The review

board also makes a determination on the extent of the draft documentation required to fully analyze the issue. At a minimum, all FDU issues require a standard URS prepared IAW TRADOC Reg 71-17. Force structure changes of greater complexity may require more extensive draft documentation, such as an automated URS (AURS) or a developmental TOE (DTOE). For cases requiring an AURS or DTOE, U.S. Army Force Management Support Agency (USAFMSA) Requirements Definition Document (RDD) will build the document based on the detailed information provided by the design's proponent. Following the review board, and when all due-outs concerning issues are complete, FDD obtains the approval of the TRADOC ADCSCD to release the issues for field staffing to MACOMs and CINCs.

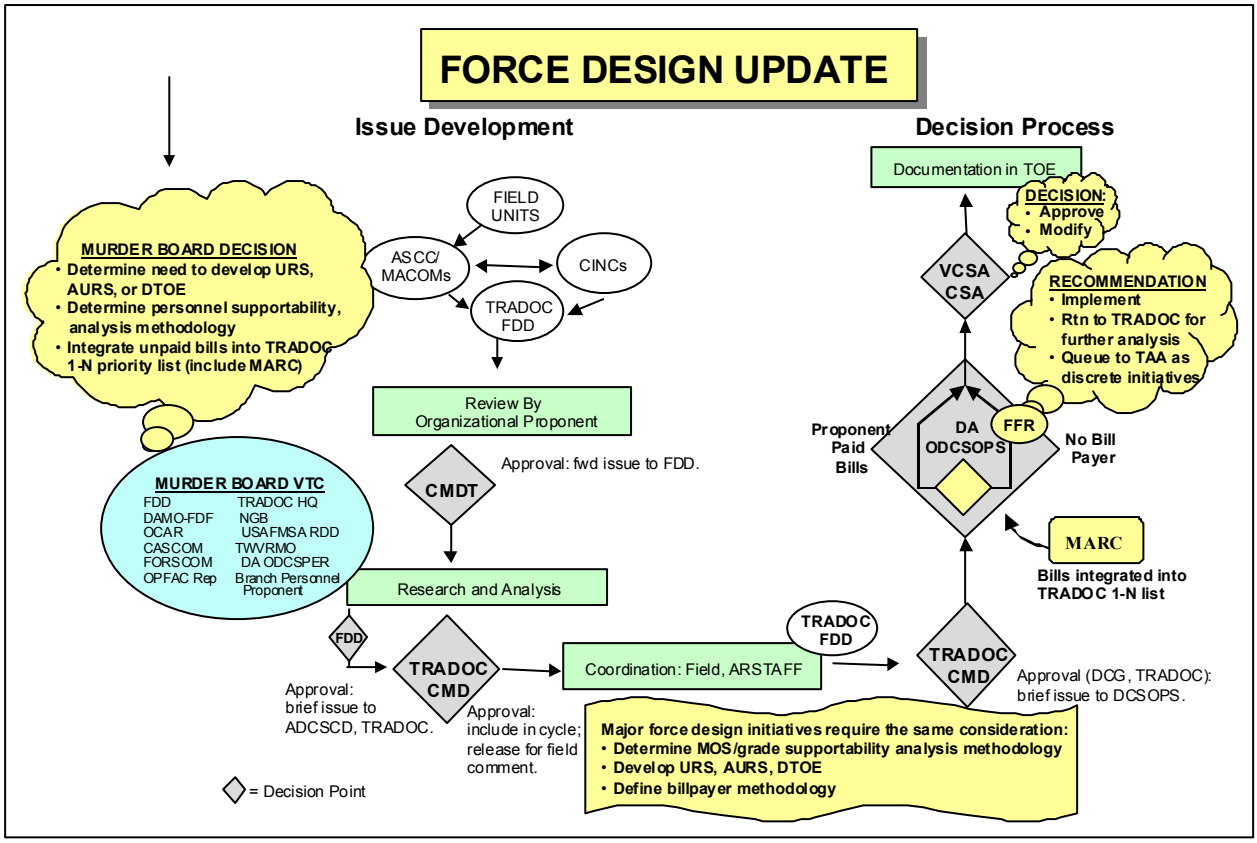


Figure 10-6. Force Design Update

(d) Once field comments are received, the FDD presents the issues in sequence to the TRADOC ADCSCD, DCG TRADOC, DA ODCSOPS Director, Force Programs, DA DCSOPS, and when required, the VCSA/CSA. HQDA ultimately approves FDU issues for implementation by TOE documentation and by resourcing determinations. Figure 10-7 provides guidelines for the decision authority for FDU issues.

FDU DECISION AUTHORITY

DCSCD, TRADOC:
- Resource trade- offs /issues that save resources.
- Changes consistent with current policy/guidance.
- Conflicts between schools and centers.
- Can disapprove changes to policy, resourcing, and warfighting issues.

CG, TRADOC:
- Issues consistent with existing policy/resource availability.
- Minimal impact on CINC warfighting capability.
- Conflicts between schools and centers.
- Can disapprove changes to policy, resourcing, warfighting Issues.

DCSOPS:
- Requires additional resources.

CSA / VCSA:
- Requires a policy change.
- Affects CINCs warfighting capability.
- High visibility issues.
- Requires additional resources.
- Politically sensitive issues.

Figure 10-7. FDU Decision Authority

(e) Following HQ, TRADOC and HQDA decisions on FDU issues, HQDA ODCSOPS (DAMO-FDZ) publishes a message that announces the results of the FDU cycle. FDD maintains the decision presentations, along with any associated directives or guidance, on file for future reference.

(3) FDU proposals are based on existing warfighting doctrine or the development of a new or revised concept of operation. A change in organization often has impact in other DTLOMS domains. As the FDU issue is developed, the following considerations should be addressed:

(a) Mission, functions, capabilities, and limitations of the proposed organization.

(b) Individual, collective, and leader training strategy.

(c) Doctrinal impacts required to implement change.

(d) Personnel impacts (unit strength, rank structure, standards of grade, MOS/Area of Concentration (AOC).

(e) Impacts on materiel programs.

(f) Resource requirements and the strategy for implementation (e.g., identification of proposed bill payers to compensate for personnel strength and grade increases; identification of budgeting and fielding plan changes or equipment redistribution plans to cover increased materiel requirements).

(g) CSS supportability/sustainability impact.

e. FDU issue packages must contain, as a minimum, the following:

(1) Fact sheet. A one-page summary of the proposed issue with proponent POC name and phone number. This fact sheet is used to initially brief general officers.

(2) Information paper. Basic information regarding the issue; limit three pages. Mandatory paragraphs are:

(a) Purpose. What warfighting requirement does this fulfill?

(b) Background. What is the problem — a new requirement calling for a new organization or a long-standing requirement for which an existing organization has proven inadequate? What brought the problem to light (e.g., TRAC analysis, warfighting experiments, lessons-learned from CTCs or operational missions)? Why is an organizational solution the answer rather than a doctrinal, TTP, or materiel solution?

(c) Organization design. Describe in detail the issue (C2 links, mission(s), capabilities, limitations, organization diagrams). Amplify "how" and "why" the organization has changed and how the new design solves the problem or meets the warfighting requirements.

(d) DTLOMS impacts. Assess and analyze the impacts of the issue in the DTLOMS domains, strategic mobility, and CSS supportability/sustainment impact.

(e) Personnel. Provide a detailed explanation of any unit strength and/or rank structure increases and the proposed bill payer methodology that will compensate for any growth.

(f) Equipment. Are the materiel requirements accommodated by existing budget programs and fielding plans? Identify any budget increases, changes to fielding plans, or equipment redistribution that must take place to pay for any increased materiel requirements.

(g) Recommendation. State the recommended course of action.

(h) POC. Include phone, fax, and e-mail numbers and addresses.

(3) Briefing slides. Include the slide presentation for issue briefing.

(4) URS. If applicable to the organization design.

(5) Organization design paper. Use the same format as the information paper; however, this is an even more detailed analysis of the organization design, especially new designs. The fact sheet and information papers provide basic information. The organization design paper enables the FDD AO and others to adequately understand and brief the issue.

f. TOE development process (AR 71-32).

(1) A TOE prescribes the required structure, manpower, and equipment for a particular type unit. The TOE also specifies the normal tasks the unit is designed to perform and the capabilities the unit has to accomplish its mission. TOEs are the basis for developing authorization documents at the unit level and are a vital input for determining Army resource requirements.

(2) Force design guidance, developed in the URS and/or FDU processes, provide TOE developers (USAFMSA) with recommended TOE additions/modifications required to resolve battlefield weaknesses. The CBTDEV provides initial input to the TOE developer and participates in the development and review process. The DCSCD provides the TOE developer an approved URS for TOE development and participates in the developmental and review process.

(3) USAFMSA considers the unit's mission and required capabilities when applying equipment utilization policies, manpower requirements criteria (MARC), basis of issue planes (BOIPs), and standards of grade authorizations to develop the proper mix of equipment and personnel for an effective organizational structure.

(a) Manpower requirements are determined by doctrine for combat squads and crews, and by the MARC for combat support and combat Service support functions.

(b) A BOIP (AR 71-32), developed by USAFMSA, is a document that establishes the distribution of new equipment and associated support items of equipment (ASIOE) and personnel, as well as the reciprocal displacement of equipment and personnel. CBTDEV and ODCSCD review the USAFMSA draft BOIP, as well as those developed by other BOIP developers, such as Army Medical Department Center and School (AMEDDC&S), U.S. Army Special Operations Command (USASOC), and U.S. Army Intelligence and Security Command (USAINSCOM). The BOIP process identifies minimum mission-essential wartime requirements for inclusion into organizational models based on changes in doctrine, personnel, or materiel. Materiel developers use the BOIP as input for system concept studies, life-cycle cost estimates, and trade-off analyses during the research and development process. MACOMs use the BOIP to plan for equipment, facilities, initial provisioning, and personnel required to support new or improved materiel systems. The BOIP process begins when the materiel developer receives an approved ORD and develops the BOIP feeder data. This allows the assignment of developmental line item numbers and the development of the qualitative and quantitative personnel requirements information (QQPRI) (AR 71-32) by the MATDEV. The BOIP feeder data and QQPRI are consolidated into a single document and forwarded to USAFMSA for development of the TOE.

(c) The QQPRI provides organizational, doctrinal, training, duty position, and personnel information used to develop the BOIP. It identifies new or revised MOSs and is used to plan for personnel accession and training needed to operate and maintain the new or improved item. The QQPRI and BOIP also form the basis for the operator and maintainer decision.

g. The TAA process (AR 71-11).

(1) The TAA is the Army force structuring process. It consists of two phases: requirements (what and how much force structure is needed); and resourcing (what is affordable within given

constraints). TAA generates the tactical support forces and general support forces necessary to sustain and support the divisional and nondivisional combat forces.

(2) Force allocation rules, initially developed in the URS process, drive force structure requirements.

(3) All FDU-approved actions compete for TAA resourcing and are integrated into the resourcing process. FDU approval does not always guarantee TAA resourcing.

(4) Before a TOE can be entered into the TAA process and its requirements identified, it must be approved by HQDA.

10-6. Soldier requirements overview.

a. The TRADOC POC for soldier requirements is Leader Development Division, Individual Training Directorate, DCST, HQ TRADOC (ATTG-IL). Detailed soldier requirements guidance is in ARs 600-3 and 611-1.

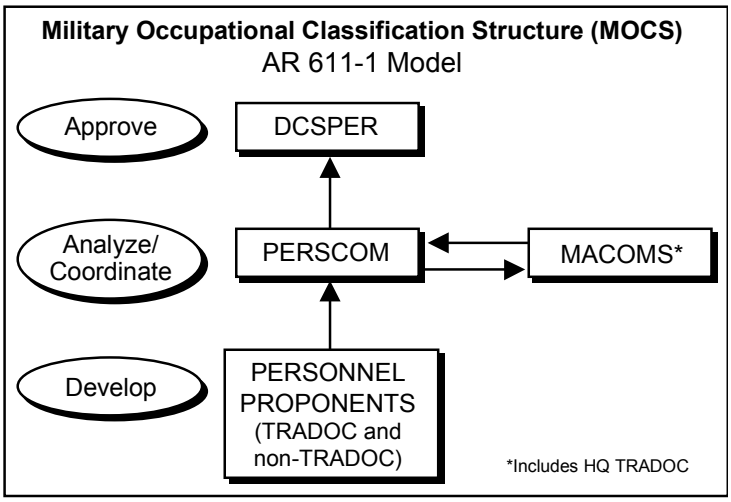


Figure 10-8. MOCS

b. Soldier requirements include additions, deletions, or modifications to the Army's MOCS system. These range from proposals affecting the force and/or grade structure of existing occupational specialties to the creation of entirely new occupational specialties to accomplish assigned missions. Personnel proponency offices are responsible for preparing these soldier requirements, assuring their compatibility with other domains, and forwarding them to DA DCSPER for occupational and resource affordability analysis, Army-wide coordination, and final decision.

c. Personnel proponents submit soldier requirements per guidance in AR 611-1. Figure 10-8 represents the AR 611-l model for processing MOCS actions.

10-7. Materiel requirements overview. (See chap 11 for details.)

a. A materiel solution will be considered only when non-materiel (DTLOS) answers cannot satisfy the identified need. Once a materiel solution is identified as the solution to a specific need, the combat developer initiates actions which (if successful) will lead to the fielding of a materiel system.

b. The combat developer formally enters the acquisition process with the initiation of the MNS. If an MNS is not required (see para 11-2b(2)), the initial document will be an ORD. The MNS represents a formal request to begin defining requirements and exploring different technology concepts. The ORD details the results of that process in the form of detailed requirements leading to technically achievable systems.

c. Figure 10-9 outlines the acquisition process. The point at which a program enters into the acquisition process and the extent the process is tailored depends on the thoroughness of the combat developer's pre-Milestone I activities and the maturity of the technology. Chapter 11 details the process for MNSs and ORDs.

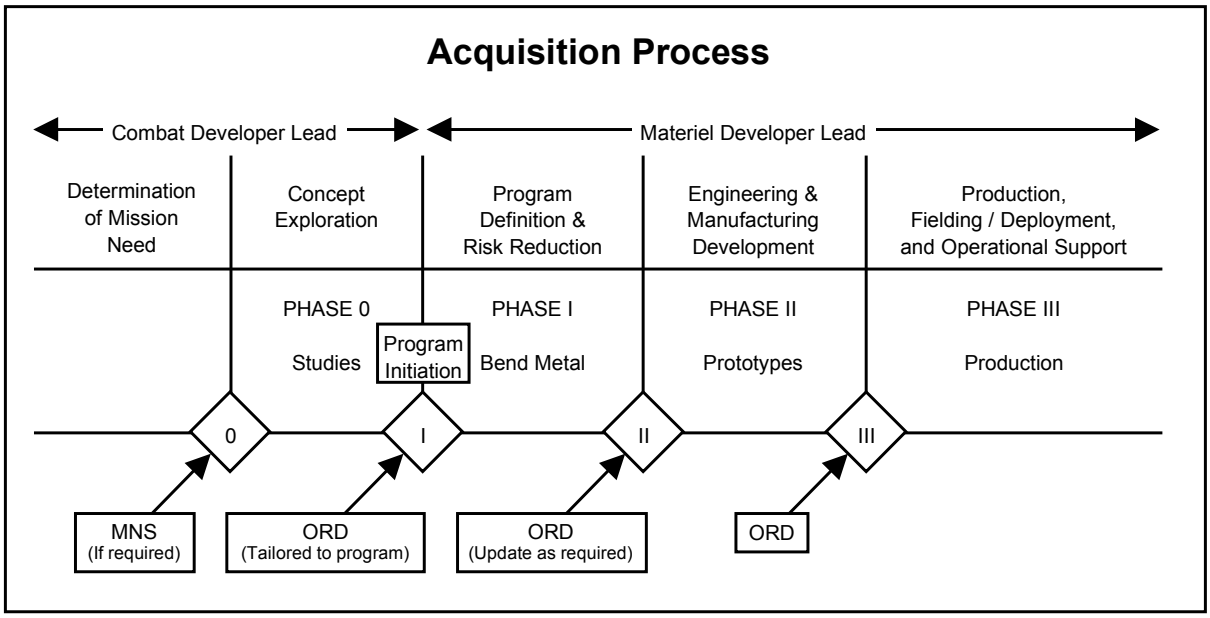


Figure 10-9. Acquisition process

d. In pursuing a materiel system, the most cost-effective solution over the system's life cycle will have priority consideration. The following is the hierarchy of materiel alternatives:

(1) The procurement (including modification) of commercially available systems, the additional production (including modification) of already developed U.S. military or allied systems or equipment.

(2) Cooperative development program with one or more allied nations.

(3) New joint Service development program.

(4) A new Service-unique development program. (The combat developer ensures that the requirements in the MRD are stated so the materiel developer is not unnecessarily prevented from pursuing the most cost-effective solution available.)

e. Soldier modernization.

(1) Soldier system modernization requirements are first and foremost based on items worn, carried, or consumed by the individual soldier in a tactical/deployed environment. Soldier systems integrate lethality, survivability, mobility, sustainment, and command and control requirements into soldier items and equipment that enhance and support individual performance of Army (and joint) MOS-required individual and collective missions and tasks under all operational conditions. Soldier system requirements are identified and documented in the Warrior, Soldier Enhancement Program (SEP),

clothing and individual equipment (CIE) and organizational clothing and individual equipment (OCIE) program MNSs, CRDs, and ORDs. Soldier systems impact on the domains of organization, doctrine, training, and leader development across the branches and MOSs of the Army. The TRADOC POC for soldier modernization MRDs is CSSD, Soldier Support and NBC Division, DCSCD (ATCD-SN).

(2) Soldier systems identified and developed to support warfighting requirements are integrated into, and drive requirements for, human systems integration/MANPRINT for all Army and some other Service equipment. Materiel systems, individual or crew operated, that are impacted by soldier systems include such diverse areas as individual weapons, NBC protective clothing, combat vehicles, nutrition, communication, and night vision equipment.

(3) OCIE requirements include occupational (MOS) health and safety equipment used in both combat and non-tactical/home station roles to provide appropriate protection to soldiers, sailors, airmen, and marines performing a variety of duties. CIE programs also include non-tactical clothing and individual equipment, including dress uniforms. Both tactical and non-tactical items are included in the soldier's clothing bag, issued to initial entry Service members upon entry into active duty.

(4) Soldier system development activities generally follow the Army's materiel acquisition process (illustrated in fig 10-9). Specific exceptions for the congressionally-mandated SEP and the unique situation for clothing bag items are addressed in paragraph 11-9.

f. Given the pace of technological change and the potential complexities on the battlefield, the Army needed a plan that would shape development of new technologies while enhancing the traditional approach of developing military applications of existing technologies. Experimentation is one component of the Force XXI process for the future. It provides the insights needed to make decisions on concepts, organizations, and material. The other key component is spiral development, a cutting edge partnership between scientists, industry, soldiers, the research and development community, and testing agencies. Spiral development allows the Services to anticipate and leverage change in an integrated fashion in contrast to the more traditional linear approach that was the mainstay of Cold War development. Previously, linear, evolutionary change met the pace of technology change, but this is not the case today nor will it be in the future. Breakthroughs in information technology feed the velocity of change. Spiral development enables the Army to meet the demands of this accelerating pace, embrace its responsibilities to produce appropriate technologies for soldiers, and meet regulatory requirements and rigors of qualified testing.

Chapter 11
Warfighting Materiel Requirements

(**NOTE:** This chapter outlines the procedures the combat developer uses to draft, process, and approve materiel requirements documents (MRDs). Training developers should refer to the Training Developers Procedure Guide, Volumes 1 and 2, published by Devices Management Directorate, Army Training Support Directorate, for procedures and guidance on how to draft and process requirements documents for a nonsystem training device (NSTD)).

11-1. Introduction.

a. MRDs serve to document any warfighting materiel requirements, as stated by the CBTDEV. MRDs bridge the gap between a deficiency or need, and the contractual instruments (technical language) used to develop and acquire systems. The materiel acquisition process can be accelerated if MRDs are properly prepared and coordinated prior to approval. The ultimate goal is to ensure a timely, quality product for the soldier.

b. The three types of MRDs are the capstone requirement document (CRD), mission need statement (MNS), and the operational requirement document (ORD).

11-2. Materiel Requirements Documents (MRDs).

a. The capstone requirement document (CRD) (format for the CRD is in app I, para I-1).

(1) The CRD is a requirements management document that sets common standards and requirements across a function or mission area. It ensures any materiel fielded within that function or mission area is interoperable and maximizes the use of common resources. CRDs apply to programs that can be grouped into an integrated system-of-systems. The CRD cannot be used to justify procurement. Each individual system still requires its own ORD. The CRD identifies the system-of-systems requirements to define mission area(s), provides guidance for development of the independent system ORDs, and for ACAT I systems, serves as a vehicle for the JROC to maintain oversight. The CRD is a living document and should be periodically reviewed and updated. CRDs are usually initiated by the JROC for ACAT I systems prior to MS I.

(2) The JROC may also provide guidance in the tasking letter. The JROC may task either a CINC or a Service component as the lead agency for developing and presenting a CRD for approval. When the Army is assigned the lead, the CG, TRADOC approves the CRD prior to submission to the JROC.

b. Mission Needs Statement (MNS) (the format for the MNS is in app I, para I-2).

(1) The MNS documents deficiencies in current capabilities and identifies opportunities to provide new capabilities expressed in broad operational terms. The MNS identifies and describes the mission deficiency and consequences of not overcoming the deficiency; discusses the results of the needs analysis - describes why non-materiel changes (e.g., doctrine and tactics) are not adequate to correct the deficiency; identifies potential materiel alternatives; and describes any key boundary conditions and operational environments that may impact satisfying the need, such as Information Operations.

(2) All requirements with ACAT I potential or requirements that represent a new Army mission require an MNS. For requirements other than ACAT I or new Army missions, an MNS is not required. See figure 11-1 for a description of acquisition categories and see the glossary for a definition of each ACAT.

Program Category	Primary Criteria ($ = FY96 constant)
ACAT I	
ACAT ID	more than $355M RDTE more than $2.135B Proc
ACAT IC	more than $355M RDTE more than $2.135B Proc
ACAT IA	
ACAT IAM (ACAT IA with OSD Acquisition Decision Authority and Management).	excess of $30M single year excess of $120M total program excess of $360M total life-cycle costs
ACAT IAC (ACAT IA with DA Acquisition Decision Authority and Management).	excess of $30M single year excess of $120M total program excess of $360M total life-cycle costs
ACAT II	
ACAT II	more than $140M RDTE more than $645M Proc
ACAT IIA	$10 - 30M single year $30 - 120M total program $159 - 360M total life-cycle costs
ACAT III	
ACAT III	High visibility, special interest (includes C4/IT systems)
ACAT IV	
ACAT IV	All other acquisition programs (includes C4/IT systems)

Figure 11-1. Categories of acquisition programs

(3) All MNSs that document warfighting requirements are approved by the CG, TRADOC and must be accompanied by a documented DTLOMS determination analysis (see para 9-2a(4)) when forwarded for approval.

c. Operational Requirement Document (ORD) (the format for the ORD is in app I, para I-3).

(1) The ORD is the definitive statement describing the operational capabilities needed to satisfy a mission need. It concisely states the minimum essential operational information needed for the acquisition of the materiel solution. The acquisition of the materiel solution must fully consider the impact on DTLOMS. An approved ORD supports an MS I decision. An MS I decision is required for program initiation and authority to enter a program into Phase 1 (Program Definition and Risk Reduction). The ORD is updated to support MS II as required by the MS I Acquisition Decision Memorandum (ADM).

(2) When the Phase 0 studies have progressed to the point that the CBTDEV and the MATDEV agree there is sufficient information to support a program initiation decision, the ORD is drafted by the DOD members of the ICT under the lead of the CBTDEV. Subsequent revisions of the ORD are drafted by the same process. The CG, TRADOC is the approval authority for all ORDs.

(3) An ORD is required for all systems, with the following exceptions:

(a) Another Service has an approved document for the same requirement.

(b) The item is exempt from type classification (except TADSS) (see AR 70-1).

(c) The program is a modification or a preplanned product improvement (P3I) that has requirements that are completely bounded by the thresholds and objectives existing in an approved document.

(d) The requirement is non-warfighting (except TADSS).

(e) The requirement is directed by HQDA.

(4) All ORD are approved by CG, TRADOC. When forwarded for approval all ORD are accompanied by a DCST-approved STRAP and, a documented requirements analysis (for ACAT I and ACAT II systems). (See app L, fig L-2.)

11-3. Writing MRDs.

a. General.

(1) The CBTDEV convenes the ICT to develop the draft MRD. See app B for guidelines on the composition and conduct of the ICT.

(2) The CBTDEV reconvenes the ICT to finalize the draft MRD and includes the principal members and agencies with unresolved issues from the initial staffing. All attempts will be made to incorporate comments and resolve differences prior to reconvening the ICT. (If there are no issues from the MRD staffing, reconvening the ICT to finalize the MRD may not be necessary.) If the ICT cannot resolve all of the issues, the system requirements can be reassessed, or the CDR/Comdt can forward the MRD to HQ TRADOC for approval with the issues detailed on the forwarding cover letter.

b. Writing the CRD (the specific format is in app I, para I-1).

c. Writing the MNS - general guidelines (the specific format is in app I, para I-2).

(1) Ensure the MNS is not system-specific. An MNS describes a materiel capability needed, not the solution. Potential materiel solutions that may meet the need are to be described in paragraph 4, "Potential Materiel Alternatives."

(2) Ensure the MNS does not describe a need that is already described in another MNS which has been approved or is being processed.

(3) Discuss and evaluate non-materiel alternatives and state why they were considered unacceptable in satisfying all or part of the deficiency. This should be a summary of the DTLOMS determination analysis (see para 9-2a).

(4) Ensure the potential materiel alternatives listed in paragraph 4 of the MNS are not evaluated. Cite only those alternatives to be considered during Phase 0 analyses.

(5) Ensure operational characteristics are not placed in paragraph 5, "Constraints," of the MNS.

(6) Edit the MNS to no longer than five pages.

d. Writing the ORD - general guidelines (the specific format is in app I, para I-3).

(1) The operational and organizational (O&O) description must be detailed. Paragraph 1 of the ORD requires [a description of] "…the anticipated operations and support concepts..." This portion of the ORD is referred to as the O&O description and is currently the focal point of senior level reviews. The O&O description must detail how the system will be employed on the future battlefield and which systems it will interface with, all within the context of an approved TRADOC concept. This narrative should demonstrate that the system is necessary to the success of the future concept. An example of an O&O description is in app R, fig R-5.

(2) Requirements must be well-written. Requirements must be operational in nature and should not specify a materiel solution. Each requirement must be measurable, achievable, and operationally based. It must be accompanied by its own operational rationale. Minimum requirements will be stated as operationally justifiable thresholds. If there is a desired capability beyond the threshold which is operationally justifiable, it should be stated as an objective. A requirement (threshold or objective) will not be stated unless it is operationally justifiable. The PM's participation in the development of the requirements (through the ICT process) is critical.

(3) Key performance parameters (KPPs) must be well supported. The rationale for each KPP must clearly describe, in operational terms, why the parameter is essential and what the operational consequences are for not meeting the requirement. Rationale will be supported, to the maximum extent possible, by results of sound experimentation and/or proponent or TRAC analysis grounded in the system's employment concept. The rationale supporting the KPPs will be supported by the system's requirements analysis.

(4) ACAT I and IA ORDs must fully conform to the format and content outlined in app I, para I-3, before it is approved. For all other ACATs, the CBTDEV tailors the ORD within the parameters outlined in paragraph I-3. If the format paragraph is not pertinent, an N/A notation should be entered.

e. Key performance parameters (KPPs).

(1) KPPs are essential to the proper definition of our requirements and have become the focus of the JROC, PEOs/PMs/materiel developers, testers/evaluators, and decision makers at all levels. A KPP is that capability, characteristic, or cost threshold (CAIV) that is so significant that failure to meet the threshold can be cause for the concept or system selection to be reevaluated or the program to be reassessed or terminated.

(2) Each ORD submitted for approval contains the proposed KPPs in paragraph 4, "Capabilities Required." Designate the proposed KPP with an asterisk in front of specific subparagraphs. Initially designate KPPs in ORDs for MS I. A KPP may be redesignated or revised during the ORD update between MS I and II. Changes between MS II and MS III should be rare.

(3) Each KPP must truly affect a system's warfighting function; i.e., if its threshold is not achieved, the system does not contribute to the fight. An ORD will have the absolute minimum number of parameters designated as KPP.

(4) KPP must be achievable and evaluative. A KPP's threshold must reflect the bottom line performance standards to be achieved by MS III. PM advice and experimentation insights are essential in projecting achievability. ATEC evaluator advice must establish that the KPP can be measured.

(5) Rationale for each KPP must clearly describe, in operational terms, why the parameter is most essential and what the operational consequences are of not meeting the threshold. Rationale will be supported, to maximum extent possible, by results of sound experimentation and/or proponent or TRAC analysis grounded in the system's employment concept. The rationale supporting the KPPs will be supported by the system's requirements analysis.

(6) The JROC validates the KPPs for all ACAT I and selected IA programs. Changes to KPPs for ACAT I C/D systems require JROC approval.

(7) An example of KPPs in ORD is in app R, fig R-2.

f. Blocking or tiering requirements. To facilitate spiral development, particularly for information technology systems, specific system characteristics are blocked or tiered. This provides for future updates. For example, an initial system characteristic objective becomes a threshold as development matures and new characteristics are introduced as objectives (see para 11-12c).

g. MRDs for C4I systems. MRDs for C4I systems and those with C4I subsystems or components must receive an interoperability validation from J6 (see para 11-5a). As a minimum, the MRD should contain the following:

(1) A detailed description of the joint operational environment in which the system will operate.

(2) A statement that the system will comply with the applicable provisions contained in the Joint Technical Architecture (JTA) to include defense information infrastructure common operating environment (DII COE) compliance. The statement is placed in paragraph 5 of the MNS and paragraph 5h of the ORD.

(3) A statement defining the data rate requirements of the proposed system, if it requires support from the common user communications networks (coordinated and analytically based).

h. ORDs with terrain data requirements. If a system will require digital topographic (geospatial) data, the following must be placed in para 5i of the ORD:

(1) The NIMA product, data, level of detail, or Service required.

(2) The priority assigned to each requirement: Priority 1 means mission failure will occur if the product, data, level of detail, or Service is unavailable; Priority 2 means the mission will experience minor impacts if the product, data, level of detail, or Service is unavailable; and Priority 3 means the mission will experience minor impacts if the product, data, level of detail, or Service is unavailable.

(3) A justification for each of the requirements.

(4) The date the information will be required.

i. ORDs for (or containing) munitions. ORDs for munitions or containing munition subsystems must include the following statement in paragraph 4c: "Munitions used by this system will be developed to withstand unplanned stimuli identified in a lifecycle system threat hazard assessment."

j. ORDs without a preceding MNS. If an MNS did not precede the ORD, ensure that the DTLOMS determination analysis is documented in paragraph 1 of the ORD.

k. ORDs for information systems must be updated periodically (system dependent, but not to exceed one year).

11-4. Staffing MRDs overview (specific guidance is in app K, para K-1)**.**

a. The staffing process the CBTDEV must follow is dictated by whether or not the MRD will be sent to the JROC. JROC oversight is usually based on the ACAT of the system. The ACAT of the system is based on estimated total cost. (Refer back to fig 11-1, above, for the current cost criteria for each ACAT.) Those programs that have been designated ACAT ID and ACAT IAM have JROC oversight. If a program has not yet received its ACAT designation, the CBTDEV estimates the ACAT potential of the system. Those programs with ACAT I potential are sent to the JROC. The JROC may also designate any system, regardless of ACAT, as requiring JROC oversight.

b. MRD staffing is conducted by the CBTDEV. Electronic copies of MRDs should be forwarded to all addresses if at all possible. The draft MRD must be sent, as a minimum, to all addressees on the core staffing list (maintained on the DCSCD Internet Website at http://www.tradoc.army.mil/dcscd/core.htm). Other agencies are included based on the mission and interfaces of the proposed system.

c. When DCSCD receives copy of the MRD during staffing (see core staffing list), the directorate conducts a concurrent staffing within the HQs and return the comments to the proponent (see para K-1).

11-5. Certifications and validations.

a. C4I interoperability assessment.

(1) DODD 4630.8 requires all components to provide the Defense Information Systems Agency (DISA) a copy of all MRDs involving development, acquisition, or modification of C4I systems (or systems with C4I subcomponents) for an interoperability assessment and inclusion in the joint C3I interoperability requirements database. The MRDs are reviewed for compatibility, interoperability, integration, and adherence to standards.

(2) This review is normally done in two stages. The first stage is conducted during the staffing of the MRD by the proponent. The proponent POC sends the document electronically to the TRADOC POC, who then sends the document to ATCD-RP. ATCD-RP electronically sends the requirement document through DISA to J6. J6 solicits comments (back through DISA) from other DOD staff agencies and returns those comments to the component (ATCD-RP). ATCD-RP provides comments to

the TRADOC POC, who reviews and sends them to the originating proponent. Stage II is conducted during approval processing at HQ TRADOC for non-major systems, following the same sequence stated above; and by the JROC during JROC review for major systems. ATCD-RP forwards the final draft electronically through DISA to J6. J6 and DISA review the final draft to ensure the comments from Stage I have been incorporated. A J6 final decision is provided as a result of the Stage II review. Each review takes a minimum of 30 days.

b. Information Technology (IT).

(1) The DISC4, acting as the Army's Chief Information Officer, has been given the responsibility to ensure a process is designed and developed that maximizes the value and assesses and manages the risk of the Army's IT acquisitions. This is partially accomplished through an IT validation during MRD development.

(2) The validation is initiated when the DISC4 receives a copy of an MRD containing IT during staffing (the DISC4 is on the core staffing list). The DISC4 returns comments directly to the proponent. Validation is achieved when the DISC4's comments are incorporated. When an MRD containing IT is forwarded to HQ TRADOC for approval, the proponent states the disposition of the DISC4's comments on the forwarding memorandum. When the DCSCD forwards the MRD to the DCSCD for approval, the disposition of the DISC4's comments are annotated on the TRADOC Form 30.

c. Business Process Reengineering (BPR).

(1) BPR is the process by which an organization analyzes its missions and revises mission-related, administrative, and work processes. A BPR analysis focuses on the process and how it can improve performance, provides for a more effective process, and/or reduces resources. A BPR analysis should not be initiated with a mind set toward a materiel solution.

(2) The DISC4, acting as the Army's Chief Information Officer, has been given the responsibility within the Army to ensure that BPR has been conducted before new information technology investments are made. Consequently, requirements documents that contain new information technology requirements must be validated by DISC4 for BPR prior to approval.

(3) Currently, a DTLOMS determination analysis is required to analyze and consider all possible doctrine, training, leader development, organization and soldier (DTLOS) domain solutions before deciding on a materiel solution. The DTLOMS determination analysis must be detailed in paragraph 3 of the MNS, or in paragraph 1 of the ORD if there is no MNS for the program. The DISC4 has determined that this analysis will suffice as BPR with respect to materiel requirements documented in MNSs and ORDs.

(4) The DISC4 conducts this validation concurrently with the IT validation during staffing. Requirements documents that do not detail the DTLOMS determination analysis will not be validated by DISC4.

11-6. MRD approval overview (specific guidance is in app K, para K-2).

a. After the center CDR or school Comdt has finalized the MRD, it is forwarded to the DCSCD for TRADOC approval.

b. If the center CDR or school Comdt has identified unresolvable issues, a formal Council of Colonels (CoC) is convened.

c. If there are no unresolvable issues, the DCSCD staff officer prepares an approval package. The DCSCD staff officer must submit the approval package to the HQ TRADOC DCSCD within 30 days from the date the Comdt signed the forwarding memo. Although the MRD may require staffing for validations at this time, the MRD is not staffed for comment unless the proponent did not coordinate the initial draft with HQ TRADOC.

d. The MRD approval authority is the CG, TRADOC. In the absence of unresolved issues or major concerns, the CG, TRADOC has delegated the approval authority to the DCSCD. After approval, the DCSCD normally notifies the CG and the appropriate Comdt by e-mail.

11-7. Post approval processing overview (specific guidance is in app K, para K-3).

a. After TRADOC approval, MRDs with JROC oversight (see para 11-4a) are forwarded through DCSOPS (DAMO-FDJ) to the JROC. After JROC validation, the MRD is returned to HQ TRADOC for publication.

b. MRDs without JROC oversight are published directly after approval from HQ TRADOC.

11-8. Supporting documentation. HQ TRADOC must ensure that parallel processes that are working toward the fielding of the same system are integrated. To facilitate this integration, the following documents are attached to the memorandum releasing the ORD for staffing. The ICT and proponent command/center/school maintain a coordination file until the next level MRD is approved. JROC O-6 level and other Service coordination should be maintained until after JROC validation of the next level MRD is obtained.

a. System training plan (STRAP). The STRAP is the master training plan for a new or improved system. It outlines the development of the total training plan for integrating the item into the training base, new equipment training (NET) and unit sustainment and gaining units; plans for all necessary training support, training products, and courses; and sets milestones to ensure the accomplishment of the training strategy. Proponents must develop the STRAP simultaneously with the MRD. The format for the STRAP is in TRADOC Reg 350-70. A draft STRAP accompanies the ORD during staffing. The STRAP is approved prior to sending the MRD to HQ TRADOC for approval. Approval authority for the STRAP is HQ TRADOC, DCST. The cover memorandum forwarding the ORD for approval cites the date that the STRAP was approved.

b. Operational mode summary/mission profile (OMS/MP). The OMS/MP describes how a system or training device will be used in wartime or peacetime when it is fielded, with an additional focus on

the future. Information in an OMS/MP presents a structured, quantitative picture of annual equipment usage. The format for the OMS/MP is in appendix J.

11-9. Special processes. Several areas of materiel requirements have such unique circumstances that singular processes have been developed for requirement definition and/or acquisition.

a. Soldier Enhancement Program (SEP). The SEP encompasses all items worn, carried, or consumed by the soldier in a tactical environment and is designed to improve the lethality, survivability, mobility, command and control, and sustainability for all categories of soldiers. The U.S. Army Soldier and Biological Chemical Command's (SBCCOM) PM soldier, and the TRADOC TSM soldier are responsible for managing the SEP. The TSM soldier has user management responsibility and represents all soldiers in the field. PM soldier is the AMC counterpart responsible for materiel development and fielding. The major thrust of the SEP is to identify and evaluate commercially available individual weapons, munitions, combat clothing, individual equipment, food, water, shelters, communication, and navigation aids to get the approved items into the hands of the soldiers in less than three years. Proposals for the SEP can be generated by anyone and go before the SEP Review CoC at least twice each year. The CG, TRADOC approves all SEP proposals and priorities, and forwards to HQDA DCSOPS for Army prioritization and funding. After the SEP proposal is approved, the originating schools may begin processing the SEP ORD. School Comdts have been delegated approval authority for SEP ORDs. The ORD format is used, but will be streamlined to the maximum extent possible, so that it only contains necessary operational requirements tailored to that individual system. For the required procedures, see the SEP MOI posted on the DCSCD Internet Website Homepage (http://www.tradoc.army.mil/dcscd).

b. Clothing and individual equipment (CIE). The CIE program consists of the core soldier items issued to every soldier upon their entry into the Army (clothing bag items). Core items consist of basic uniform items used in both tactical (battledress uniform) and non-tactical (dress uniforms) environments. The CG, TRADOC recommends approval of changes or improvements to CIE to the Army Uniform Board (AUB) chaired by the DCSLOG. The AUB then provides recommendations for final approval by the MDA to the CSA. CIE items are documented IAW DOD Reg 5000.2-R and AR 71-9.

c. Organizational CIE (OCIE). The OCIE and integrated fighting systems (i.e., Land, Air, and Mounted Warrior programs) user requirements are managed by the TSM soldier. The PM soldier manages execution of RDT&E and fielding of these items. OCIE consists of TA-50 and MOS-unique items tailored to the mission and operational environmental conditions. The CG, TRADOC approves the MRD and forwards it to the MDA, (CG, SBCCOM). OCIE items are documented IAW DOD Reg 5000.2-R and AR 71-9.

d. Base operations and nondeployable warfighting IT. MACOMs follow the procedures outlined in this chapter for approval of base operations and nondeployable warfighting IT requirements with program costs greater than $10 million (see para 13-2 for additional instructions). MACOMs must establish their own procedures for validating JTA-A compliance for their IT requirements with total program costs less than $10 million.

e. Requirements for models and simulations use special processes for submission, review, staffing, and approval that are described in chapter 12.

11-10. Revising and updating Capstone Requirements Documents (CRDs) and Operational Requirements Documents (ORDs).

a. The three primary processes used to review and update CRDs and ORDs are:

(1) System requirements review (SRR). The SRR is a cyclic comprehensive review of key materiel programs by the TRADOC leadership. These reviews establish the program's continued relevance to the future Army, determine the status of the TRADOC deliverables, identify and initiate resolution of issues, and prepare the TRADOC leadership to defend the need for the system to Congress. All SRR systems are briefed by the proponent TSM or DCD to the DCSCD. Some systems will be briefed to the DCG and the CG, TRADOC. The systems involved in any given SRR cycle are announced at the beginning of the cycle. The systems in the current cycle and the latest SRR policy memorandum are posted on the DCSCD Internet Homepage: http://www.tradoc.army.mil/dcscd.

(2) Annual reviews of C3I requirements documents.

(3) Milestone Decision Reviews (MDRs). MDRs are comprehensive reviews conducted by the MDR authority at each milestone (MS 0, MS I, MS II, and MS III).

11-11. Processing changes to Capstone Requirements Documents (CRDs) and Operational Requirements Documents (ORDs).

a. Changes to approved CRDs and ORDs may be generated by the formal reviews outlined in paragraph 11-10, or may come from lessons learned through analysis and/or testing, threat, technology, or mission needs. All changes to approved CRDs and ORDs are approved by CG, TRADOC. ORD changes should be only made to support an MDR II milestone. Changes to support an MDR III milestone should truly be an exception. Procedures for affecting changes are:

(1) Generally, the process of staffing and approving changes to an MRD follows the same process as the original MRD (see paras 11-4 and 11-6).

(2) MRDs using formats from before August 1991 (e.g., ROC, QMR) must be updated to the new ORD format before staffing, processing, or submitting for a review. All MRDs, even those in the current format (e.g., CRD and ORD), must be revised to include all of the requirements stated in this pamphlet. (E.g., an ORD created before the introduction of KPPs must include KPPs in the revised document.) The update process will also update all existing portions of the document, such as threat and interoperability.

(3) The document that is staffed can be either the original document with the proposed changes in DA Form 2028 format or a completely revised edition with line outs (for deletions) and bold face (for insertions) to highlight the changes to the original. The CBTDEV selects the format that is easiest to read and understand for their purposes. In either case, the rationale is given for each change. An updated STRAP and OMS/MP is included, if applicable.

b. After approval, the changes are published in the same manner as the original MRD. The appropriate combat developments directorate incorporates the changes into a revised document and publishes the revision in its entirety. The revision is numbered and recorded using the original CARDS number and other information outlined in appendix K, para K-3b(1), unless the magnitude of change qualifies the document as a new requirements document. The title of the document reflects the change number (e.g., change 2) and the MRD carries the date the last change was approved.

c. If KPPs are added after the initial ORD is approved, a cost analysis of the KPPs is developed and the impact on the program is ascertained. Results of this analysis are documented and forwarded to DCSCD, with a request for approval of the draft, revised ORD.

11-12. Product improvement.

a. Priority consideration is always given to the most cost-effective solution over the system's life-cycle. Generally, the use or modification of a system or equipment that the government already owns is more cost effective than acquiring new materiel.

b. There are two types of product improvement. The first is called pre-planned product improvement (P3I) and is planned for before the system reaches production. The second is usually called a modification and is identified for systems that are being or have been produced.

c. P3I.

(1) P3I is used when market research or testing indicates current technology will not meet the user's requirements. P3I allows fielding a cost-effective, near-term solution with current technology while planning to add or upgrade capabilities as technology matures. Those requirements that exceed what is currently technically possible are identified as P3I requirements in paragraph 4 of the ORD. Each P3I requirement represents an essential capability and intent to eventually modify the system to satisfy those requirements. The ORD must also specify a time for the fielding of the P3I.

(2) When P3I is used, the corresponding objective value of the basic or near term requirement is reduced to reflect what is achievable in the near term.

(3) Whenever possible, P3I requirements should be grouped together when such a grouping can achieve economies in funds, manpower, equipment, and/or time. Such a grouping is called a block modification. A block modification is managed and fielded as a single modification. A single ORD may use several block modifications and phase them in sequentially on a specific timetable. When a block modification is used, a paragraph in the ORD lists the P3I requirements that belong in each block and the time schedule for fielding each block. The individual P3I requirements still explained in detail (with rationale) in paragraph 4 of the ORD.

d. Modifications.

(1) A proposed modification can originate from any of several sources, e.g., U.S. Government, industry, or allied country. The proposed modification could be to technically upgrade a system or for any of the following reasons:

(a) Interface.

(b) Compatibility.

(c) Correction of a deficiency.

(d) Operational or logistics support.

(e) Production stoppage.

(f) Cost reduction.

(g) Safety.

(h) Value engineering.

(2) The MATDEV usually approves modifications affecting contractual factors. When form, fit, function, and/or logistics supportability are affected, the MATDEV and CBTDEV evaluate the recommendation jointly. If the recommendation is accepted, the CBTDEV approves and prioritizes the modification.

e. Documenting and approving the modifications.

(1) If a modification fits within the objective requirements defined within the systems supporting MRD, then there is no need to change the supporting MRD. The modification in this case is approved by the CDR/Comdt of the associated TRADOC center/school.

(2) If a modification breaches the objective requirements stated in the systems supporting MRD, the combat developer amends the MRD, staffs it, and submits it for approval. The staffing and approval process follows the same process outlined for a new document in this chapter. The CG, TRADOC is the final approval authority for MRD changes.

(3) For those modifications which in themselves breach the ACAT I or IA thresholds, a new ORD is developed and processed for approval IAW the procedures for an ACAT I system defined in this chapter. Modifications that do not cross the ACAT I or IA threshold shall be considered part of the program being modified.

f. Prioritizing the modifications.

(1) The CBTDEV, in coordination with the MATDEV, generates a list of all approved modifications, including a recommended priority. This priority represents the urgency of the modification relative to all other modifications for a particular system.

(2) An acquisition strategy (AS) is prepared for all acquisition programs. The AS is the framework for planning, directing, and managing a program. It records the evolution of a given system and provides an indication of current and planned capabilities and/or deficiencies for the development of needs and solutions for future battlefields. The MATDEV prepares the modification portion of the AS in coordination with the CBTDEV and includes those modifications approved and prioritized by the CBTDEV. The MATDEV integrates the total modification list.

(3) The MATDEV and CBTDEV jointly review, and the MATDEV updates the AS through a program's life cycle, as required, but at least annually as part of the budget preparation cycle.

11-13. Re-procurement. Re-procurement of an item is authorized when there is a continuing need for a fielded item and the operational requirements have not changed. The CBTDEV or training developer provides a statement that a continuing need exists for the item. The MDA determines if the item is eligible for re-procurement. The ORD does not require updating for a re-procurement. The MATDEV initiates the re-procurement based on an updated performance specification or purchase description from the last procurement. Re-procurement should not require any research, development, test, and evaluation (RDTE) funds other than 6.5 RDTE funding for market surveys and associated testing.

11-14. Joint Potential Designators (JPDs).

a. Prior to approval/final validation, every MRD must contain an indication of all other Services' interest in the program. During the approval process of non-JROC oversight MRDs, TRADOC staffs the MRD with all other Services for review (see app K, para K-2b(2)(c)). Each Service responds with a recommended JPD. The three possible JPDs are:

(1) Independent. No potential for other Service use or systems interface or for joint development or procurement.

(2) Joint interest. Joint program management is inappropriate, but a potential for other Service use or systems interface exists.

(3) Joint. A potential for joint program management, joint funding, and/or joint development or procurement exists.

b. Other Services staff their draft MRDs through DA DCSOPS to HQ TRADOC (ATCD-RP) for review and recommendation of a JPD. These MRDs are sent to the appropriate DCSCD functional directorate for action, which responds directly back to the other Services. MRDs that affect or fall in TRADOC proponent school areas are then staffed with those schools by the appropriate DCSCD directorate.

11-15. Joint requirements.

a. Army lead in requirements determination.

(1) During the ICT to build the requirements document, the other participating Services are given the opportunity to tailor the basic requirements in the MRD to suit their individual needs. If the program is designated "joint" after the preparation and approval of the Army's requirement, the ICT must reconvene with the other Services in attendance to ensure their requirements are incorporated. The final product is a joint document that either outlines one set of requirements (preferred), or outlines a basic set of requirements with Service-unique requirements listed separately. The latter case would likely lead to Service-unique variants of the same system and should only be pursued if absolutely necessary.

(2) The document undergoes concurrent staffing with the other Services involved to gain their concurrence of the requirements. Each of the other Services uses their own established processes for staffing and approval.

b. Army support in requirements determination.

(1) When another Service has been designated the lead service for a program in which the Army wants to participate, the Army proponent participates with the lead Service in building the MRD under the procedures and guidelines of the lead Service. The Army proponent ensures the requirements stated in the joint document fulfill the Army's needs.

(2) The Army proponent must still acquire CG, TRADOC approval of the MRD and will use the procedures in this chapter to the extent that they fit within the timelines established by the lead Service. The Army STRAP and OMS/MP are staffed within Army channels as outlined in paragraph 11-4. The CBTDEV, in conjunction with DCSCD AO, is authorized to streamline these processes if the lead Service dictates a more compressed staffing and approval schedule.

c. Joint NBC defense and CB medical defense requirements documents.

(1) The Joint Service Integration Group (JSIG) was formed in 1995 under the requirements of PL 103-160, the National Defense Authority Act for FY 1994 (Title XVII). This law directed the Secretary of Defense to assign responsibility for overall coordination and integration of the chemical and biological (CB) defense program and the CB medical defense program to a single office within the Secretary of Defense. PL 103-160 also designated the Army as executive agent to implement the program. The budget for the NBC defense now reflects a coordinated and integrated program for the military departments. NBC defense funds for research, development, test, evaluation, and acquisition were removed from the Services and placed under control of the (now) Deputy Assistant to the Secretary of Defense for Counterproliferation and Chemical Biological Defense (DATSD CP/CBD).

(2) A joint Service agreement (JSA) to implement PL 103-160 was signed in August 1994. The JSA established the Joint NBC Defense Board (JNBCDB), JSIG, and Joint Service Materiel Group (JSMG) to fulfill DOD requirements of the public law. The JNBCDB, cochaired by the VCSA and AAE, consists of the Chairman, JSIG; Chairman, JSMG; and members from all Services, the Joint Staff and Defense Logistics Agency. The JNBCDB oversees the JSIG and JSMG and approves the products and actions of these organizations.

(3) The generation of, and the timelines for, Joint NBC ORDs are outlined in app W (JSIG Operational Requirements Document Process).

(4) Regardless of the lead Service, the Army proponent must still acquire CG, TRADOC's approval. Supporting documentation (STRAP/OMS/MP/Army annex) is required and is staffed within Army channels as outlined in paragraph 11-4. The Army annex contains Army unique requirements. Specifically, the annex addresses a detailed O&O plan and its program support objectives, as outlined in app I, para I-3 (ORD format).

(5) Changes to approved joint NBC ORDs. The Army proponent staffs and changes within Army channels as outlined in paragraph 11-10.

d. Adopting other Service's equipment (or approved MRD).

(1) Investigations may reveal that another Service has a fielded system (or approved MRD) that, as is or with minor modifications, adequately fulfills (or describes) an Army MRD. Such a system (or MRD) may be adopted as an Army system (or MRD).

(2) To adopt the other Service's MRD as an Army requirement, the TRADOC proponent staffs the other Service's approved requirement document using the Army's approval process described in this guide. If the other Service has proceeded beyond MS III, the proponent staffs the other Service's MRD with an Army STRAP. If the other Service has not gone beyond MS III, the proponent staffs the other Service's MRD with an Army STRAP and an OMS/MP. After CG, TRADOC approval, the MRD is processed IAW the procedures outlined in this chapter, depending on the systems ACAT (e.g., through DCSOPS to the JROC for an ACAT I system; to DCSOPS for a CARDS number for a non-major system). The announcement letter is issued by DCSCD (see app L, para L-11).

(3) Regardless of originating Service, CG, TRADOC approves all Army-interest MRDs.

11-16. Operational Needs Statement (ONS). The ONS may be submitted only by an operational field commander to document a contemporary operational issue that jeopardizes soldiers' lives or mission accomplishment within that unit or its area of operation. AR 71-9 provides content and processing guidance for ONSs. The originating organization forwards the ONS under a GO's signature to HQDA (DAMO-FDJ) for approval processing. If DCSOPS validates and approves the commander's need, it may be resourced and sent to the MATDEV for immediate procurement. If DCSOPS does not resource it, the ONS is forwarded to HQ TRADOC. TRADOC assesses the requirement in the ONS for Army-wide applicability. If TRADOC decides to pursue the requirement stated in the ONS, a standard requirement document (MNS/ORD) is generated to initiate a new Army-wide program.

11-17. User Functional Description (UFD). See appendix O for more details. A UFD is prepared by the CBTDEV as a follow-on to the ORD to refine/explain in detail ORD requirements related to IT. The CBTDEV decides the need for a UFD based on the anticipated degree to which the system will use IT. The CBTDEV may decide not to write and maintain a separate UFD if their input into the MATDEV IT system documentation provides sufficient operational information. The CBTDEV consults with the MATDEV and operational tester and evaluator regarding the utility of a UFD for a particular system. The CBTDEV ultimately decides whether the UFD is necessary.

11-18. International requirements.

a. U.S. Army lead in international requirements determination.

(1) During the international ICT to build the requirements document, the other participating nations/Services are given the opportunity to tailor the basic requirements in the MRD to suit their individual needs. If the program is designated "international" after the preparation and approval of the Army's requirement, the international ICT must reconvene with the other nations/Services in attendance to ensure their requirements are incorporated. The final product is an international document that outlines one set of requirements (preferred), or which outlines a basic set of requirements with national/Service-unique requirements listed separately. The latter case would likely lead to national/Service-unique variants of the same system and should only be pursued if absolutely necessary. The title name, Operational Requirements Document, is negotiated with the international requirements partners and is not necessarily a mandatory name. When significant variations exist between the international requirements document and the U.S. requirements document, the U.S. requirements is attached as an annex to the international document to support requirements traceability.

(2) The ORD undergoes concurrent staffing with the other nations/Services involved in the program to gain their concurrence of the requirements. Each of the other nations/Services will use their own established processes for staffing and approval. The Army proponent follows the normal procedures outlined in this chapter to gain Army approval of the requirement. OMS/MP and STRAP are still necessary to achieve Army approval, but will not be considered a part of the international MRD.

b. U.S. Army support in international requirements determination.

(1) When another nation/Service has been designated the lead Service for a program in which the Army wants to participate, the Army proponent participates with the lead nation/Service in building the MRD under the procedures and guidelines of the lead Service. The Army proponent ensures the requirements stated in the international/joint document fulfill the Army's needs.

(2) The Army proponent must still acquire CG, TRADOC approval of the MRD and will use the procedures in this chapter to the extent that they fit within the timelines established by the lead nation. The Army STRAP and OMS/MP are staffed within Army channels as outlined in paragraph 11-4. The Army proponent is authorized to streamline these processes if the lead nation dictates a more compressed staffing and approval schedule.

c. Adopting other national equipment or approved MRD.

(1) Investigations may reveal that another nation has a fielded system (or approved MRD) that, as is or with minor modifications, adequately fulfills (or describes) an Army requirement. Such a system (or requirement document) may be adopted as an Army system (or requirement).

(2) To adopt the other nation's MRD as an Army requirement, the TRADOC proponent staffs the other nation's approved requirement document using the Army's process described in this chapter. If the other nation has proceeded into procurement, the proponent staffs the other nation's MRD with an

Army STRAP. If the other nation has not gone beyond MS III, the proponent staffs the other nation's MRD with an Army STRAP and an OMS/MP. After CG, TRADOC approval, the MRD is processed IAW the procedures outlined in this chapter, depending on the systems ACAT (e.g., through DCSOPS to the JROC for an ACAT I system, to DCSOPS for a CARDS number for a non-major system). The announcement letter is issued by DCSCD (see app L, para L-11).

d. MRD staffing. The purpose of international development and acquisition programs is to reduce U.S. development costs through cost-sharing. The final requirements are based on a trade between the international partners concerning operational effectiveness, operational suitability, and program development, acquisition, and life-cycle costs.

e. JROC approval. The U.S. designates national KPPs for the system and explains the purpose and U.S. program potential impacts to the international partners associated with failing to meet a KPP threshold. The JROC approves the U.S. KPPs associated with any U.S. participation in an international development and acquisition program.

Chapter 12
Models and Simulations (M&S) Requirements Integration and Approval Process

12-1. Introduction.

a. The responsibility of TRADOC to approve all warfighting requirements extends to all M&S requirements across the live, virtual, and constructive simulation environments. This chapter documents the unique process for documentation, submission, and approval of M&S requirements. The need for this process is recognized in AR 5-11. The requirements integration and approval (RIA) process has been approved by the DCG, TRADOC and endorsed by the Army Model and Simulation Executive Council (AMSEC), which is jointly chaired by the DCSOPS, the Deputy Under Secretary of the Army (Operations Research) (DUSA(OR)) and the Military Deputy to the ASA(ALT). Detailed definitions, actions, and documents to support the process are provided in app M.

b. The RIA process is designed to address all M&S requirements. However, the process recognizes that some M&S fit the standard materiel acquisition process, and therefore, imposes only minimal changes upon those processes.

c. Objectives of the RIA process:

(1) Ensure M&S requirements are initiated and conducted IAW the Army vision for M&S.

(2) Support Army management of all M&S.

(3) Maximize leveraging among M&S efforts with a view to reducing overall development, procurement, and post-deployment costs.

(4) Maximize the use of M&S standards among M&S efforts with a view to reduce overall development and procurement costs and to facilitate verification, validation and accreditation of M&S.

(5) Ensure all M&S requirements have been integrated across the M&S domains.

(6) Ensure Simulation Support Plans (SSPs) are created from concept exploration through full system development to implement the Army's Simulation & Modeling for Acquisition, Requirements, and Training (SMART) objectives. The purpose of an SSP is to provide a tool to use in thinking through modeling and simulation requirements throughout the acquisition life cycle to reduce time, resources, and risk, as well as improve program implementation. Any program includes four functional areas: engineering development, combat development, test and evaluation, and training. The SSP drives the inclusion at an early stage of planning for simulation that supports each functional area. The TRADOC Combat Development and Battle Lab elements are responsible for development of initial SSPs during concept exploration. Simulation corresponding to each stage focuses on development of hardware and software, soldier requirements and TTP, system quality and constructive feedback, and training requirements/proficiency/MANPRINT issues. The aim of the SSP is to produce a simulation roadmap that can be overlaid on the acquisition strategy to link required simulation support to each phase of the program, to predict requirements, to drive development of test plans, and to identify training resources/devices (see app M).

d. Management of the identification, review, and approval of M&S requirements is based on M&S domains. The three M&S domains are: ACR (concept evaluations, requirements determination, tactics, and doctrine); RDA (technology development and evaluation, system development, test and evaluation, and force modernization); and training, exercise, and military operations (TEMO) (individual, crew, and unit training, command and battle staff training, mission planning, mission rehearsal, and joint operations). Some M&S serve more than one domain. M&S requirements of this type are called cross-domain requirements. Note that handling of domain requirements at HQ TRADOC is facilitated by the DCSCD's role as the ACR domain agent, the DCST's role as the TEMO domain agent, and DCSSA's role as the coordinator for cross-domain requirements.

12-2. Requirements and documentation.

a. Historically, major M&S have utilized MRDs such as MNSs and ORDs (which are also recognized as supporting the RIA process). Among those are the major M&S, such as Warfighters' Simulation 2000 (WARSIM), that fall under non-system TADSS. For convenience of discussion, these previously recognized MRDs will be referred to as M&S MNS/ORD requirements.

b. A much larger grouping of M&S requirements occur in support of efforts such as AWE, ATD, study plans, training exercises, SSPs, customer funded requests, mission funded development, ACT II, technology base developments and, key enabling investments, which require M&S development and/or changes. These are seldom directly submitted in an MNS/ORD, are often out-of-cycle with POM development, and prior to the RIA process were mostly unintegrated across simulation domains. These "other M&S" requirements are documented in the model and simulation requirements document (MSRD) unless special circumstances indicate the need for an MNS/ORD. DCSSA assists in determining the proper documentation when requested. Requirements for new M&S may be documented in SSPs.

c. The Army has invested significant resources developing standards for Army M&S. The use of standards can significantly reduce development time and cost. Use of approved standards will ease the

verification, validation and accreditation of Army M&S. The Army Model and Simulation Office has a process to nominate M&S standards in different functional categories of M&S. The process is referred to as the Standards Nomination and Approval Process (SNAP). Nominated standards are reviewed by a senior board of functional experts and submitted to the DUSA (OR) for approval. Approved standards are stored on the Internet in the Army Standards Repository System (ASTARS). Detailed information on how to access SNAP and ASTARS can be found on the Army Model and Simulation Office (AMSD) Internet Homepage at http://www.amso.army.mil. All requirements documents, either specifically for the M&S or that include M&S, should emphasize the use of standards throughout the program development.

d. Requirements for geospatial information Services (GIS) support for M&S are documented in a memorandum and forwarded to the TPIO-Terrain Data at the following address: Commander, USAMANSCEN, ATTN: ATSE-TPIO, 427 Engineer Loop, Suite 2417, Fort Leonard Wood, MO 65473-8926. The memorandum requests the National Imagery and Mapping Agency (NIMA) Foundation Data Set. If the NIMA Foundation Data Set will not suffice, the memorandum should request a Mission Specific Data Set (MSDS). (An information briefing on Foundation Data and MSDS can be accessed on the Internet at http://www.wood.army.mil/TPIO-TD. A template to assist in the development of geospatial requirements can be found at the same web site.) A request for an MSDS must include the following:

(1) Description of the system or activity and definition of the type of geospatial product or support expected, including the related application of the expected support to specific operational concepts, weapon system support, planning, or other specified uses.

(2) Impact on development, test, and evaluation or operational commitment if the product or Service is not provided as requested. Express the impact in terms of the operating plan (OPLAN), contingency plan (CONPLAN), training requirement, or other mission essential requirement that will be supported by the request.

(3) Content and accuracy requirements, correlated with the technical characteristics and accuracy of the system or activity that the product or Service will support.

(4) Interrelationship, if any, of the intended use of the required item with the use or design of existing products.

(5) Initial area of coverage.

(6) Maintenance requirements and predicted life expectancy of the system.

(7) Urgency of the proposed product, proposed priority, and date required, with justification.

(8) POC at the lowest appropriate level for technical coordination.

e. Threat representations (both classified and unclassified) in M&S must be validated. The National Ground Intelligence Center (NGIC) is the designated executive agency in the DOD Intelligence Production Process (DODIPP) for validation authority of ground systems. NGIC provides validated

entries for ground vehicles to the Defense M&S Model and Simulation Resource Repository (MSRR). Agencies that have requirements for M&S with threat representations, especially those of new or future systems, must follow the guidelines of the DODIPP.

f. If a materiel system needs GIS support, the requirement should be placed in paragraph 5i of the ORD (see app I, para I-3).

12-3. Requirements approval. (See fig 12-1.)

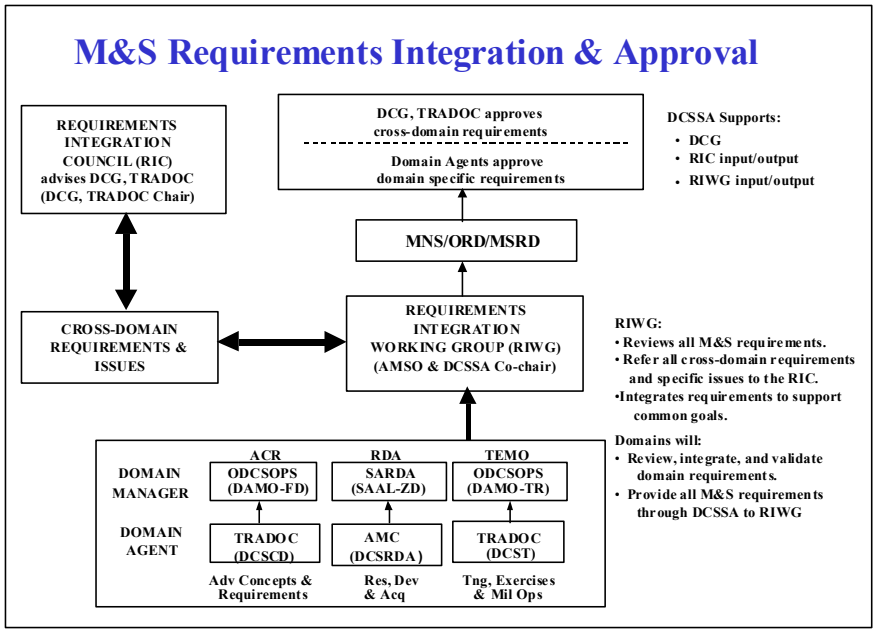


Figure 12-1. M&S requirements integration and approval

a. Authority to approve M&S requirements is delegated to the DCG, TRADOC by the CG, TRADOC.

b. M&S domains collect their own requirements. The domains submit the requirements through DCSSA to the Requirements Integration Working Group (RIWG) during the normal staffing process. Cross-domain requirements are sent directly to DCSSA (Commander, TRADOC, ATTN: ATAN-SM, 5 North Gate Road, Fort Monroe, VA 23651-1048). M&S requirements must be reviewed by the RIWG. The RIWG reviews the requirement for need, integration opportunities, and leveraging of existing capabilities, such as M&S standards. SSPs are staffed through the RIWG. Cross-domain requirements and requirements with integration issues are referred to the Requirements Integration Council (RIC) for review and resolution. The RIC advises the DCG, TRADOC, who chairs the council. In the absence of cross-domain issues, MNS, ORDs, and MSRDs (after staffing with the RIWG), are returned to the domain agent. RIWG endorsement is mandatorily noted on the HQ TRADOC Form 30 and in the memoranda transmitting the MRD following approval. MNS/ORD follow the standard approval process as defined in chapter 11. SSPs generated prior to MS I are staffed along with MNS/ORDs. In effect, the RIWG is simply one additional and concurrent place to staff the requirement during the normal staffing process. Once the domain completes its staffing process, the MSRDs are provided to the domain agent

for approval. The domain agent provides the RIWG members a copy of the approved requirements document.

c. Cross-domain MNSs, ORDs, and MSRDs will be approved by the DCG, TRADOC. RIWG endorsement (and if appropriate, RIC endorsement) is mandatorily noted on the HQ TRADOC Form 30 and in the memoranda transmitting the MRD following approval. DCSSA sends the RIWG members a copy of the approved MRD.

d. Details of the process are described in app M.

Chapter 13
Special Considerations

13-1. Threat support to requirement process.

a. Introduction. Threat assessment is a key element in the requirements determination process. Early definition of threat capabilities, with periodic updates, supports warfighting concept development, requirements documentation, and revisions. Analysis and experimentation supporting requirements determination often require a threat portrayal sufficient for credible simulation. The Cold War concept of limiting the definition of threat to merely opposing enemy forces on the ground is no longer relevant. A holistic threat assessment is needed. Proponent (center/school) threat offices, HQ TRADOC DCSINT, and HQDA ODCSINT must be included in the initial stages of concept/requirements development.

b. Holistic threat capabilities assessment. A holistic threat analysis, depicting the global situation and projected warfighting capabilities of potential adversaries, is a key element of the requirements determination process. The increasing number of Army roles and the number of potential regions in which the Army could perform these roles are critical considerations in any requirements determination undertaking. Global threat analyses ensure those DTLOMS-based systems that most effectively and efficiently respond to the evolving threat environment are developed.

c. Threat approval. The DCSINT/SIO is the threat approval authority for combat and materiel development. The TRADOC DCSINT is the TRADOC threat approval authority.

d. Support to concept development. Threat representatives must be integrated in the early stages of concept development and be included in ICTs to determine threat support requirements.

e. Support to DTLOMS requirements determination. As alternative courses of action are explored in terms of DTLOMS to satisfy an identified need, the ICT threat representative provides threat support to aid in the selection of the most appropriate solution, whether it be changes in doctrine, tactics, or training, or leads to the development of a materiel system.

f. Support to materiel requirements documents. Threat support for required documentation is detailed in AR 381-11 and TRADOC Reg 381-1. All warfighting systems requirements documentation include some level of worldwide threat analysis. For some non-warfighting systems, the threat may be listed as not applicable.

(1) MNS and ORD paragraphs. Paragraph 2 of the MNS and ORD provide a threat statement describing the threat environment in which the proposed system will operate and the threat the system is designed to counter. The MNS contains a general threat statement to support the materiel capability needed. The ORD provides a more focused threat statement to support the development of a single system. The proponent threat office should be consulted early in the process to develop an appropriate threat statement or to ensure that the existing threat statement is accurate and relevant.

(2) STAR. A STAR is required for ACAT I and II acquisition programs. ACAT III and IV programs require a STAR unless waived by the TRADOC DCSINT in coordination with the AMC DCSINT. The STAR provides a worldwide threat analysis, system-specific threat, reactive threat, and a discussion of targets, if appropriate, for both initial operational capabilities (IOCs) and the IOC plus 10 years. The STAR is developed and updated to support milestone decision reviews and when the threat or requirements change. Threat personnel supporting combat development initiate the preparation of the STAR when they receive the MNS. Threat personnel supporting materiel development prepare STAR updates after Milestone I. The STAR is updated every two years, when threat capabilities change, or when system requirements change. The Defense Intelligence Agency (DIA) approves STARs for ACAT ID and other OSD-oversight programs. HQDA DCSINT approves STARs for ACAT IC and II programs. MACOM DCSINTs approve STARs for ACAT III and IV programs (e.g., TRADOC DCSINT prior to Milestone I and AMC DCSINT after Milestone I).

(3) Experimentation and analysis application. Consideration must be given to the threat in every experiment or analysis whether it is a CEP, LOE, AWE, AoA, or study. Every AoA final report describes the threat relevant to the specific scenario used.

13-2. Information Technology (IT) considerations. IT is any equipment or interconnected system or subsystems of equipment that is used in the automatic acquisition, storage, manipulation, management, movement, control, display, switching, interchange, transmission, or reception of data or information in support of installations/garrisons or tactical operations. IT includes, but is not limited to, computers, ancillary equipment, software, and communications equipment. Some systems consist entirely of IT while others have IT components. Managing requirements for IT requires unique procedures to ensure interoperability throughout the Army's IT architecture and with other Services' IT systems.

a. IT guidelines. Guidelines for documentation; Chief, Information Officer (CIO) validation; joint interoperability certification; and Army approval for IT materiel requirements are summarized in figure 13-1.

Requirement Type	ACAT	Army Documents	Validate	Certify	Approver
Deployable (warfighting)	I	MNS, ORD	DISC4	J6I	TRADOC
	II	ORD	DISC4	J6I	TRADOC
	III	ORD	DISC4	J6I	TRADOC
	IV	ORD	DISC4	J6I	TRADOC
Nondeployable (warfighting)	I	MNS, ORD	DISC4	N/A	TRADOC
	II	ORD	DISC4	N/A	TRADOC
	III/IV*	ORD	DISC4	N/A	TRADOC
	III/IV**	MACOM	MACOM	N/A	MACOM
Base Operations (non-warfighting)	I	MNS, ORD	DISC4	N/A	TRADOC
	II	ORD	DISC4	N/A	TRADOC
	III/IV*	ORD	DISC4	N/A	TRADOC
	III/IV**	MACOM	MACOM	N/A	MACOM

*If total program costs exceed $10 million, CG, TRADOC approves IT requirements.
**MACOMs will establish the Materiel Requirements Document (MRD) format and the procedures for validating Joint Technical Architecture-Army (JTA-A) compliance for their IT requirements with projected total program costs less than $10 million.

Figure 13-1. Approval levels for IT requirements

b. Warfighting IT requirements. In an interoperable architecture for IT, data flows across traditional boundaries making it difficult to distinguish between what is and is not warfighting. From an IT perspective, AR 71-9 and this pamphlet define warfighting requirements as IT in direct use by or support of the Army warfighter in training for and conducting operational missions (tactical or other) or connecting the warfighter to the sustaining base. Warfighting requirements may be for materiel that is deployable or nondeployable. Deployable materiel is authorized on a TOE for use by a warfighting unit in the area of operations. Nondeployable materiel is not taken to and employed in the area of operations by a warfighting unit. Some IT has both deployable and nondeployable components, in which case it will follow requirements management procedures for deployable materiel. Treat as warfighting requirements those training devices that include IT to develop and maintain warfighter support skills, those simulators and simulations for operations planning and rehearsal, and those automated devices/systems which have the purpose of connecting the deployed units to the sustaining base.

c. Base operations IT requirements. IT requirements that do not fall within the definition of warfighting IT requirements are considered base operations IT requirements. These requirements have no interaction with tactical units and do not support and exchange warfighting information. Examples of base operations IT applications include, but are not limited to, morale, welfare, and recreation Services; base Services support; real estate; facility support Services; some building maintenance and repair; minor construction; and environmental compliance.

d. TRADOC approval processing. IT requirements developers (CBTDEV, TNGDEV, TRADOC command/center/school, MACOM) determine the appropriate category for their IT requirement and process it accordingly. Chapter 11 provides guidance for approval processing of MNS and ORDs required by figure 13-1. MACOMs send their IT MNS and ORDs requiring TRADOC approval to HQ TRADOC (ATTN: ATCD-RP) for assignment to the appropriate TRADOC office for approval processing.

e. MACOM procedures. MACOM commanders promulgate their own procedures for documenting, validating, and approving IT requirements delegated to them as reflected in figure 13-1.

f. CIO validation. All requirements for IT must be determined, validated, approved, and implemented with full considerations for interoperability, commonality, and adherence to applicable standards as approved in the JTA-A. To ensure interoperability is achieved, the Army's CIO (DISC4) validates all MNS and ORD requirements for IT during the ICT process. The CIO validation is delegated to the MACOMs for those nondeployable and base operations ACAT III and IV requirements as shown in figure 13-1. The intent of the validation process is to:

(1) Ensure MRDs that include IT requirements conform with applicable technical architectures and address integration into the Army's system architecture.

(2) Ensure the requirements have gone through Business Process Reengineering (BPR). BPR can be accomplished and documented in a variety of ways. DTLOMS analysis conducted in accordance with this pamphlet satisfies the requirement for BPR analysis.

(3) Ensure the MRDs are in concert with emerging information technologies.

(4) Maximize the value and assess and manage the risk of the Army's IT acquisitions.

g. Procedures. The procedures for managing IT warfighting requirements are the same as other warfighting requirements, with the following additions:

(1) CIO validation is required for all requirements greater than $10 million. MACOMs validate programs less than $10 million.

(2) Requirements for deployable warfighting IT need JCS C4, Architecture and Integration Division (J6I) certification. Other requirements do not.

(3) The Army's Operational Architecture (OA), when published, supports IT requirements determination. Procedures are published separately.

(4) The Command, Control, Communications, and Computers Requirements Definition Program (C4RDP) integrates several aspects of requirements management for deployable warfighting IT. It includes operational facility (OPFAC) rules that specify the distribution of IT to TOE units. These rules ensure there is a match between an OPFAC's information exchange requirements and its IT assets. C4RDP is also the repository for user interface requirements (UIRs). UIRs build on the user interface description (UID). UIRs provide quantifiable data to characterize each required information exchange, e.g., its size, frequency, classification, criticality, and perishability. C4RDP organizes this data into a database for use in specifying interfaces and simulating the performance of communications systems. C4RDP procedures are provided in app N.

(5) The UFD is used to refine and amplify the basic operational requirements for IT capabilities approved in the ORD. The UFD is not mandatory. The ICT and IPT should consider the utility of

generating a UFD as a tool to reach a mutual understanding of complex IT issues, especially those pertaining to requirements for software. Procedures for writing a UFD are provided in app O.

13-3. Staffing and approval of offensive Information Operations (IO) Special Access Programs (SAPs).

a. The increased security requirements of SAPs has necessitated a special staffing/approval process for IO SAP MRDs.

b. To complete the staffing of IO SAP MRD and establish recommendations to the DCSCD for document approval, an IO SAP MRD working group (WG) is established. WG members consist of representatives from TRADOC Pam 71-9's core staffing list and members of the Joint Staff, as required, ensuring review by combat arms branches and key staff elements. WG members are identified by name and remain in the WG as long as feasible. Members must meet security classification requirements as determined by the MRD being staffed - most of the requirements are Top Secret/Special Compartmental Information (TS/SCI).

c. The WG convenes at the request of the proponent. Due to the sensitive nature of these documents, the expense involved in assembling the WG, and the time organizations invest, representatives must be empowered to act for their organizations. WG members evaluate the MRD, determine its potential to fulfill a warfighting need, and forward the results to the MRD proponent. Upon receipt of the WG recommendation, the proponent submits the MRD to HQ TRADOC for approval.

13-4. Power sources/power management. Power management is a crucial component of operations. It encompasses reduction in power consumption of electrical equipment through the use of low power electric circuits and power management within the equipment, as well as the use of advanced power generation and overall management of power on the battlefield. This results in a lighter load for the warfighter, longer mission times, enhanced functional capabilities, simplified battery replacement and disposal, and a decreased logistical burden across the force. In complex platforms, cooling requirements can be reduced so that electronics require less volume, smaller generators can be used, capabilities and reliability can be improved in a smaller system footprint, and operations can be quieter (significant signature reductions). Implementation of power management as a strategy for the digital force requirements determination process begins with efforts pursued through ICTs and IPTs. These efforts determine the full spectrum of electrical power requirements for future capabilities and improvements to current Army capabilities. Requirements developers should consider improved lightweight power sources such as batteries, fuel cells, ultra-capacitors, thermophotovoltaics, and hybrid systems. Other key elements are low power electronics, the smart use of power (smart circuitry), innovative power delivery concepts/technologies, the pursuit of total system power consumption on the battlefield, and the development of general and system-specific trade-offs and exit criteria for requirements.

13-5. Transport by commercial assets. The ability to rapidly deploy the force is critical to future Army operations. Current and future military air, sea, and intermodal transport assets will be insufficient to handle the Army's deployment requirements. Additionally, commercial air and sea fleet lift capacity is five times greater than the DOD capacity. Consideration of the use of commercial air, sea, and intermodal transport assets is, therefore, necessary when developing requirements for future

Army systems. Depending on the system, these requirements may be either threshold and/or objective requirements.

13-6. Operational Requirements Document (ORD) requirements relationships to other program documents/events.

a. The objective of the materiel acquisition process is to deliver an affordable, operationally effective, and suitable system (i.e., satisfying the identified need) to the operational user. The ORD is the acquisition center piece for making this happen (see fig 13-2). The system articulated in terms of threshold and objective value requirements in the ORD is initially determined to be a cost and operationally effective alternative solution by the AoA, when performed. The ORD requirements are the operational basis for the technical requirements and specifications of the MATDEVs RFP and contract, as well as the issues and criteria for T&E. Without this linkage, there is no assurance that a system satisfying the contract and/or the T&E criteria will satisfy the ORD and be cost and operationally effective. While early acquisition decisions (Milestone I and II) depend significantly on analysis, such as the AoA and evaluation of technical feasibility, the later decisions (low rate initial production (LRIP) authorization and Milestone III, Full Production) depend more on demonstrated achievement through test and evaluation. The CBTDEV/TNGDEV must assure that the requirements are consistent, properly understood, and written with an audit trail during the ORD requirements process, and the translation of those requirements into RFP technical requirements and T&E criteria.

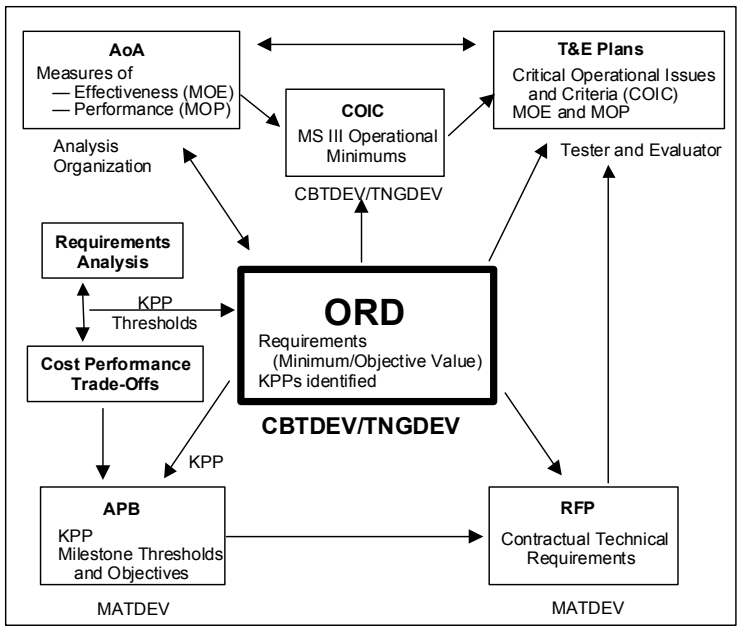


Figure 13-2. ORD requirements relationships

b. The development of the various documents occurs concurrently with recognition that approval of the ORD must precede approvals of some documents, as portrayed in figure 13-2. ORD approval must precede approvals for the critical operational issues and criteria (COIC), acquisition program baseline (APB), RFP, and T&E plans. The process is not a "lock-step" process in which one document is developed then the next. The CBTDEV/TNGDEV-led ICT developing the ORD performs requirements analyses drawing on the DTLOMS determination analyses. Additionally, the MATDEV's cost performance trade-offs interact with CBTDEV/TNGDEV's requirements analysis, as well as providing cost targets for APB. The KPPs are a direct lift from the ORD for inclusion in the APB. Other performance parameters may also be included as determined by the MATDEV (PM and PEO) or the acquisition executive. KPP thresholds and objectives in the APB include those in the ORD. The PM/PEO may also establish intermediate thresholds/objectives for any parameter applicable to early milestones. During development and processing of the ORD, the CBTDEV/TNGDEV determines and drafts the COIC. Likewise, the T&E community, by participating in the ICT to develop the ORD,

participating in the AoA study group, and participating in COIC development, identifies the T&E issues and associated MOE and MOP for drafting T&E plans. The reliability failure definition and scoring criteria (FDSC) is another document used during the ICT to plan T&E. It details essential functions and failure definitions associated with ORD reliability requirements and establishes a framework for classifying and charging test events. Guidelines for developing reliability FDSC are in app V.

c. To efficiently execute the requirements determination process, action officers must be familiar with the types of measures, thresholds and criteria. These include:

(1) Measure of effectiveness (MOE). MOEs are measures of a unit's or system's ability to perform its operational missions (e.g., probability of kill, tonnage delivered, probability of successful message delivery, loss exchange ratio). MOEs primarily apply to AoA and T&E. Some criteria in COIC fit the definition of MOE.

(2) Measure of performance (MOP). MOPs are system characteristics (e.g., speed, reliability, bit error rate). MOPs can be either operational (including soldier and environment) or technical (controlling or excluding soldier and/or environment). MOPs apply to AoA and T&E. The performance requirements in ORDs and RFP, as well as the criteria in COIC, fit the definition of MOP.

(3) ORD thresholds are minimum operational performance standards to be achieved at, or soon after, IOC unless identified as KPP, then they must be achieved before MS III. If KPPs are not achieved by MS III (Full Production Decision), then a reexamination of the program and program alternatives may occur with the possibility of termination or restructure of the program or alternative.

(4) ORD objective requirements apply only when there is a specific level of performance above the threshold that is operationally significant and the CBTDEV/TNGDEV desires that level of performance.

(5) COIC are those operational concerns (issues) and bottom line operational effectiveness or performance standards to be achieved prior to MS III (Full Production Decision). They are a few operationally relevant measures for the total system in the operational environment. In some cases, the system may be a force level (e.g., platoon, combined arms team). COIC also consider the maturity of the system (equipment, software, and DTLOS products). For ACAT I and other OSD T&E oversight programs, the OSD Director of Operational Test and Evaluation uses the COIC to evaluate and report to Congress on the system's readiness to move from LRIP to Full Production. COIC are initially developed prior to MS I with the initial ORD and updated prior to MS II. Further update of COIC should not be necessary unless a P3I applies or modification demands an ORD change. The CBTDEV/TNGDEV should coordinate COIC during development with ATEC. COIC approval processing at HQ TRADOC includes an ORD/COIC crosswalk (see App R, figures R-3-1 and R-3-2). DA Pam 73-3 provides guidance on COIC.

13-7. Operational Requirements Document (ORD) to Request for Proposal (RFP) crosswalk.

a. The CBTDEV and MATDEV, or TNGDEV and MATDEV for a NSTD, conducts an ORD to RFP crosswalk to verify that the RFP (to include system specification or purchase description and the SOW) accurately reflect all requirements stated in the approved ORD. The crosswalk is conducted prior to MS I, II, and III decision reviews and any ASARC or IPR applicable to a P3I or proposed system modification/upgrade that results in a revised ORD. The principal CBTDEV/TNGDEV representative is the TSM (when one is appointed). The TSM is supported by the proponent's CBTDEV and/or TNGDEV, when appropriate. Otherwise, the principal CBTDEV or TNGDEV is provided by the proponent organization (e.g., command/center/school). The system independent evaluator (i.e., ATEC) also participates in the crosswalk.

b. The ORD to RFP crosswalk must be documented IAW figure 13-3. CBTDEV/TNGDEV document the threshold and objective values of the ORD requirements and identify which ORD requirements are KPP. The MATDEV documents all RFP requirements that apply to the ORD requirement. CBTDEV, TNGDEV, and MATDEV document reasons for differences between ORD and RFP (e.g., exit criteria for MS II, approved growth program at MS III for other than KPP, oversight as a result of concurrent ORD, and RFP development activities). The ATEC independent evaluator documents impact of differences on testing.

ORD to RFP crosswalk for system X or applicable modification at milestone decision review/ASARC/IPR			
Requirement in ORD	**Statement(s) in RFP**	**Rationale for Difference**	**Testing Impact (if any)**
* An ORD requirement that is a KPP			

Figure 13-3. ORD to RFP crosswalk

c. The purpose of the crosswalk is to ensure that the RFP accurately reflects the ORD requirements for the next acquisition phase and to certify this to the decision review (ASARC/IPR) considering entry into the next phase. When the crosswalk indicates that the RFP does not accurately reflect the approved ORD, the MATDEV is expected to modify the RFP to reflect the ORD.

d. For ACAT I, IA, II, and IIA programs, the principal CBTDEV/TNGDEV coordinates the crosswalk results with the proponent CDR/Comdt and the HQ TRADOC, DCSCD (DCST for a NSTD). E-mail coordination is encouraged. If there are no unresolved issues based on this coordination, the CBTDEV and MATDEV (normally TSM/TPIO and PM) jointly sign a memorandum certifying to the ASARC chairperson and AAE that the crosswalk has been completed and the RFP accurately reflects the approved ORD. If there are unresolved issues, the issues are raised to appropriate CBTDEV/TNGDEV and MATDEV general officer level for resolution and certification that the RFP reflects the ORD. The specific general officers involved in the resolution are determined during coordination with the proponent CDR/Comdt and HQ TRADOC, DCSCD (DCST for NSTD).

e. For ACAT III, IIIA, and IV, the crosswalk occurs at the proponent level. The CBTDEV (TNGDEV for NSTD), MATDEV, and system-independent evaluator (ATEC) are represented. The format in figure 13-3, above, applies. The proponent CDR/Comdt, or Director of CBTDEV/TNGDEV,

as determined appropriate, reviews the results. If the RFP accurately reflects the ORD requirements, CBTDEV/TNGDEV and MATDEV sign a memorandum to the IPR chairperson and designated MDR authority stating that the RFP accurately reflects the ORD. This memorandum must be provided prior to the IPR.

13-8. Horizontal Requirements Integration (HRI).

a. HRI is the holistic process of developing future, "total force-oriented" requirements based upon approved concepts and related FOCs. HRI is, in reality, not totally new to the Army. Today, the Army has many systems that were inherently designed to accomplish missions across the total force. Example systems include the Single Channel Ground-Air Radio System (SINCGARS), High-Mobility Multipurpose Wheeled Vehicle (HMMWV), Integrated Family of Test Equipment (IFTE), mobile subscriber equipment (MSE), and GPS. Historically, however, most horizontal initiatives have been driven, at least initially, by senior Army leaders. In today's budget and modernization environment, HRI must be an inherent part of the requirements determination process. Multi-disciplinary ICTs will provide an efficient means to achieve more horizontal integration early in the requirements determination process, thus promoting more efficient and affordable modernization solutions.

b. There are different ways to incorporate HRI into the materiel requirements determination process.

(1) One approach to HRI would be for an ICT to identify a system solution that addresses several different future capabilities; e.g., contributes to combat capabilities for multiple users or warfighting functions. This new or modified existing system could be a multi-mission, multi-role system/weapon, or a system that is developed with different configurations (variants) to provide a broad range of warfighting and support capabilities across the force.

(2) Another approach to HRI would be the application of an HTI subsystem (e.g., Second Generation Forward-Looking Infrared (FLIR), Battlefield Combat Identification System (BCIS), or laser range finder) or common group of components/common software/electronic architecture that will be integrated into a wide variety of systems across the force. In either case, the HRI solution would be considered by the ICT along with other competing options/alternatives.

(3) HRI procedures are an integral part of the Army's S&T review process. The horizontal focus in concept and FOC development promotes future, horizontally focused S&T initiatives (STOs, TDs, ATDs, ACT II, ACTDs). These S&T efforts should provide a broad range of technology/system options instead of a group of single systems/solutions for each future capability.

(4) HRI initiatives are applicable to other DTLOMS areas beyond materiel solutions. These non-system HRI efforts could include innovative consolidations or standardization of types of units in a part of the force, new "operational architectures" for tactical functions, such as airspace management, common situation awareness/air pictures, standardized TTP, or common approaches to leader development and training curriculum. An example of a past effort that reflects an HRI approach to organizational design is the Aviation Restructure Initiative (ARI). ARI lead to the standardization of a wide variety of aviation units, which facilitated the reduction of the types of rotary wing aircraft in the Army force from ten to four (long term objective). These non-materiel HRI efforts can often be implemented faster than materiel solutions.

(5) HRI principles can also be implemented by ICTs for system modifications to a current Army system, through the integration of an existing system or subsystem (HRI & HTI), from other areas of the force, or from other Services' systems. As an ICT assesses options for a future capability, modification to an existing system should be a major opportunity area for consideration. This could also include a P3I to insert an HTI subsystem, still in development, that will be integrated when available and required to keep a system fully combat capable and supportable. This approach to HRI can be executed by the ICT by updating an approved MRD and using the approved HTI process discussed in paragraph 13-9.

(6) HRI solutions should not be limited to Army applications, but should also extend to other Service, federal, or allied nation applications.

c. HRI consideration during requirements development. CBTDEV, TNGDEV, and MATDEV should consider HTI opportunities during development of new and revised materiel requirements. Requirements that are common or compatible across a group or class of systems fosters applications of HRI initiatives. Focusing performance oriented, operationally relevant, minimum requirements helps avoid overly restrictive requirements.

d. Additional information on HRI is included in the helpful hints section of the ICT appendix (see app B, para B-9).

13-9. Horizontal Technology Integration (HTI).

a. Introduction. HTI is the common application of enabling technologies across multiple systems to increase total force effectiveness. It provides a new and more efficient means to integrate selected high value technologies into the force to gain modernization efficiency and advanced warfighting capability. Common systems, components software, and development programs reduce acquisition and O&S costs. HTI strives to keep the Army's modernization program affordable by maximizing the return on investment for the Army's research, development, and acquisition resources.

b. Guidance. Army HTI policy and procedures are described in AR 71-9, AR 70-1, and DA Pam 70-3. This section and appendix P provide the key HTI guidance for CBTDEVs/TNGDEVs/MATDEVs.

c. MATDEV HTI emphasis. HTI is the Army's preferred materiel development option to achieve a new or improved warfighting capability. The S&T community (laboratories and RDECs) provide technologies with potential for multiple system applications or roles. Acquisition and modernization strategies and plans reflect this emphasis and routinely apply HTI principles from the initiation of the program through fielding and follow-on modifications. CBTDEVs and TNGDEVs are called on to review their systems for application of HTI initiatives. Battle Labs are called on to experiment with HTI initiatives. A determination to apply an initiative to a system may necessitate a change to the system MRD.

d. HTI management structure. Figure 13-4 depicts the Army's HTI management structure and organization. TRADOC CBTDEVs and TNGDEVs are involved throughout.

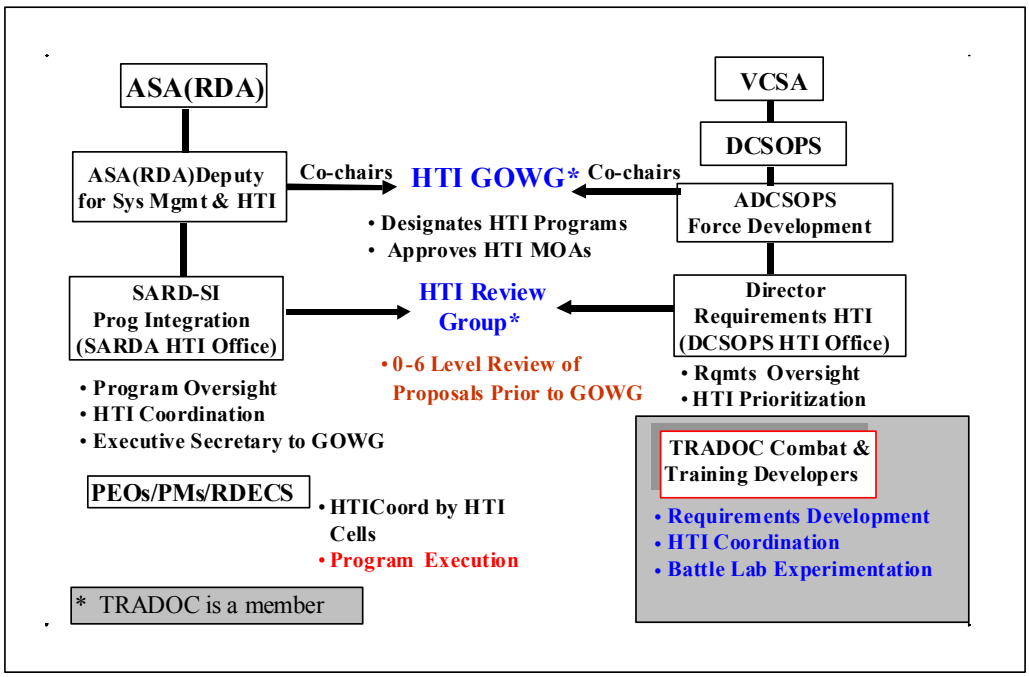


Figure 13-4. Primary HQDA HTI organizations

e. The HTI process. Figure 13-5 depicts the HTI review and approval process. HTI efforts involve two programs. One is the enabling technology for application to host systems, subsystems, or components. The other is the host systems, subsystems, and components to receive the HTI technology. Processes for the two programs occur in parallel and require significant coordination. An HTI process objective is to keep the programs coordinated. While there are several steps in the process, there are distinct stages as discussed below. Appendix P provides more detailed information on each step.

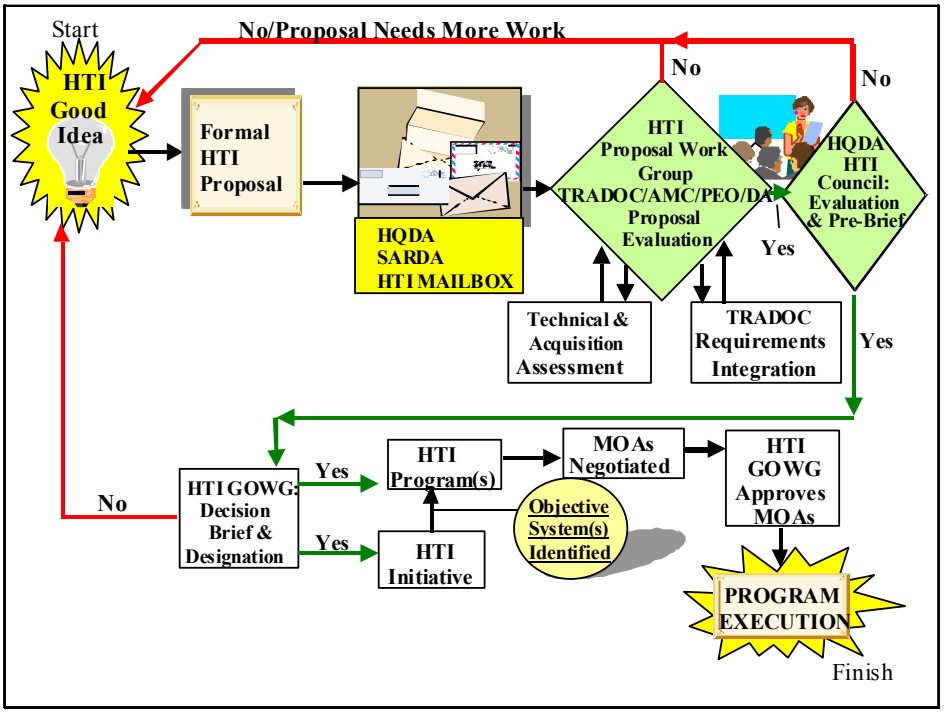


Figure 13-5. HTI review and approval process

(1) Stage 1 - Requirements determination/assessment. This stage begins with the refinement of an HTI idea into an HTI proposal and concludes with the submission of the proposal to HQDA. HTI proposals can come from any source, even from outside the Army.

(2) Stage 2 - Review and HTI designation. This stage begins with the review and coordination of the HTI process by the HTI proposal work group. It concludes with the HTI General Officer Working Group (GOWG) decision to designate the effort an HTI program or initiative, require more work, or discard the proposal. This phase includes requirements, technical, and acquisition assessments. TRADOC has representatives in the requirements group.

(3) Stage 3 - HTI execution. HTI programs are executed using the normal acquisition process with continued oversight, as needed, by the HTI GOWG.

These stages are descriptive rather than prescriptive. These stages are not formal milestones, but are a means of dividing HTI actions into categories that describe similar work or issues. Not every HTI effort passes through all three stages. HTI efforts based on emerging or long-range technology normally proceeds through all three stages.

13-10. Warfighting Rapid Acquisition Program (WRAP).

a. Purpose. WRAP implements the Army's accelerated procurement of systems identified through TRADOC warfighting experiments as compelling successes that satisfy urgent needs. It is implemented within existing Army structures and organizations. WRAP is compatible with and supports the FAR and DOD policy (DODD 5000.1/DOD Reg 5000.2-R), and is in keeping with the objectives of the National Performance Review and DOD acquisition reform initiatives. AR 71-9 provides Army WRAP policy.

b. WRAP process.

(1) The WRAP process is a bridge linking TRADOC experimentation and systems acquisition. WRAP provides CG, TRADOC a mechanism to accelerate the acquisition of selected operational warfighting enhancements borne of successful warfighting experiments. WRAP can apply to AWE, CEPs, LOEs, ATD, ACTD, or similar demonstrations, experiments, and evaluations (see fig 13-6).

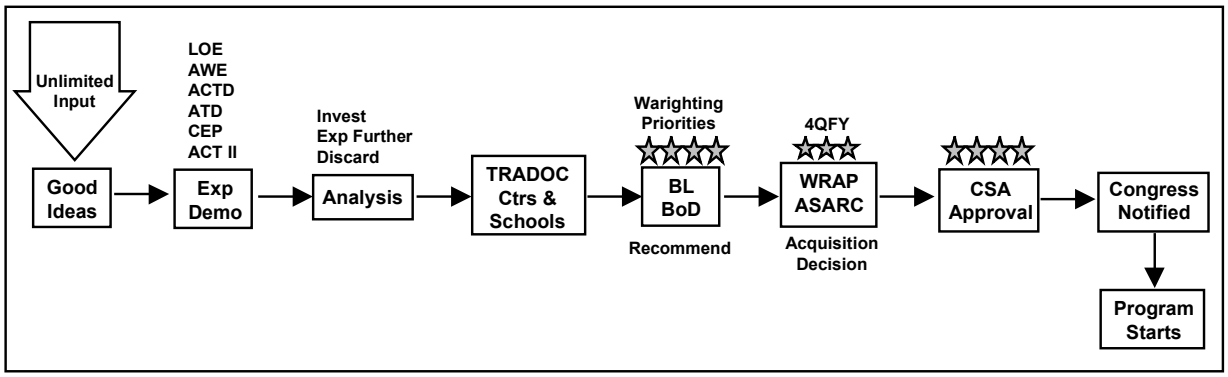


Figure 13-6. WRAP candidate identification and approval process

(2) The warfighting experimentation process is described in chapter 8. Planning and execution of experiments are accomplished by a Battle Lab-led experimentation team that is responsible for the generation of a LOEP. The team integrates combat, materiel, and testing objectives into a warfighting experiment. The LOEP details the goals, resources, and methodology of the experiment. When the Battle Lab and the CBTDEV/TNGDEV of a TRADOC center/school agree that an experiment shows a technology to be a compelling success that satisfies an urgent need, they jointly initiate action to get the experiment results and WRAP recommendation to the Battle Lab Board of Directors for approval as a CG, TRADOC WRAP candidate for consideration by the WRAP ASARC (see para 8-1). WRAP candidates are reviewed and approved by a WRAP ASARC (see AR 71-9).

(3) To qualify as a WRAP candidate, an initiative must be based on mature technology, satisfy an urgent need, show compelling success in experimentation, and be capable of achieving a Milestone III decision immediately or following one to two years of continued development, at most. WRAP candidates can be new initiatives not previously funded in the POM, or they can be new initiatives that experimentation has demonstrated the Army needs to field faster or in greater quantities. WRAP is not intended to provide a means to acquire resources to pay old bills, nor is it intended to fund indefinite experimentation. The intent is to provide a bridge to the POM by providing the resources to procure limited quantities of prototypes to provide an initial limited capability, continue evaluation, or complete development.

c. Documentation for WRAP ASARC. Upon proponent and Battle Lab agreement on a potential WRAP candidate, the proponent prepares the WRAP ASARC documentation. If a system already has an ORD and a test and evaluation master plan (TEMP), it does not need an ORS and a LOEP. An updated LOEP (see app F) and an ORS for Rapid Acquisition are submitted 45 days prior to a WRAP ASARC. The LOEP must be supplemented with an urgency of need statement, experimentation results documenting the compelling success, an acquisition strategy, and a budget estimate for the proposed program. The ORS for rapid acquisition must contain:

(1) Defense Planning Guidance (DPG). Annotate supporting paragraphs from latest DPG.

(2) Threat. Address all threats to the system, expected mission accomplishments, and why the requirement is important and urgent.

(3) System requirements. In operational terms, address what the system is expected to do: key performance parameters, other requirements, and objective/future requirements (potential growth or new technology).

(4) Constraints (if necessary). Specify any parameters that could limit system capabilities including logistics, safety, and training constraints.

d. WRAP ASARC membership. A WRAP ASARC consists of the following ASARC members or their designees:

(1) Military Deputy to ASA(RDA) co-chair.

(2) Assistant Deputy Chief of Staff for Operations and Plans, Force Development, (ADCSOPS(FD)) co-chair.

(3) DUSA(OR).

(4) ASA(FM&C).

(5) Assistant Secretary of the Army (Installations, Logistics, and Environment) (ASA(IL&E)).

(6) CG, USAMC.

(7) CG, TRADOC.

(8) General Counsel.

(9) DISC4.

(10) HQ DA DCSLOG.

(11) HQ DA DCSPER.

(12) Director, Program Analysis and Evaluation (DPAE).

(13) CG, ATEC.

e. WRAP ASARC decision.

(1) A WRAP ASARC determines if candidates warrant rapid acquisition and are affordable, effective, sustainable, and suitable. A WRAP Council ASARC:

(a) Reviews requirement and urgency.

(b) Reviews affordability.

(c) Reviews experimentation results.

(d) Approves an acquisition strategy.

(e) Assigns management responsibilities to AMC, Advanced Concept Manager (ACM), or designated PEO/PM.

(f) Assigns a milestone entry point as appropriate.

(g) Approves a funding strategy (identify immediate funding, commit to reprogramming action, defer to normal PPBES cycle).

(2) Candidates can be submitted to a WRAP ASARC at any time. CG, TRADOC requests the ASA(ALT) convene a WRAP ASARC and then the CG TRADOC submits identified compelling success systems, which have urgent requirements, to the WRAP ASARC for approval. WRAP ASARCs are normally scheduled in October to accommodate PPBES actions. Funding of WRAP candidates (unfunded requirements) is improved within the long-range RDA prioritization and planning process if the WRAP ASARC meets during the first or early second quarter of the fiscal year. Candidates approved for rapid acquisition are not guaranteed immediate funding even if they are submitted in time to place funding in budget and programming documents. Approved WRAP programs can be funded as prototypes for two years. Subsequent funding must compete in the POM and is the responsibility of the appropriate battlefield operating system.

13-11. Warfighting Lens Analysis (WFLA).

a. The WFLA exists for two reasons: to provide resourcing recommendations to DA, and to support TRADOC's mission in building "the Future Army." A timeline chart showing how WFLA is linked to PPBES for both POM/Mini-POM is shown in figure 13-7.

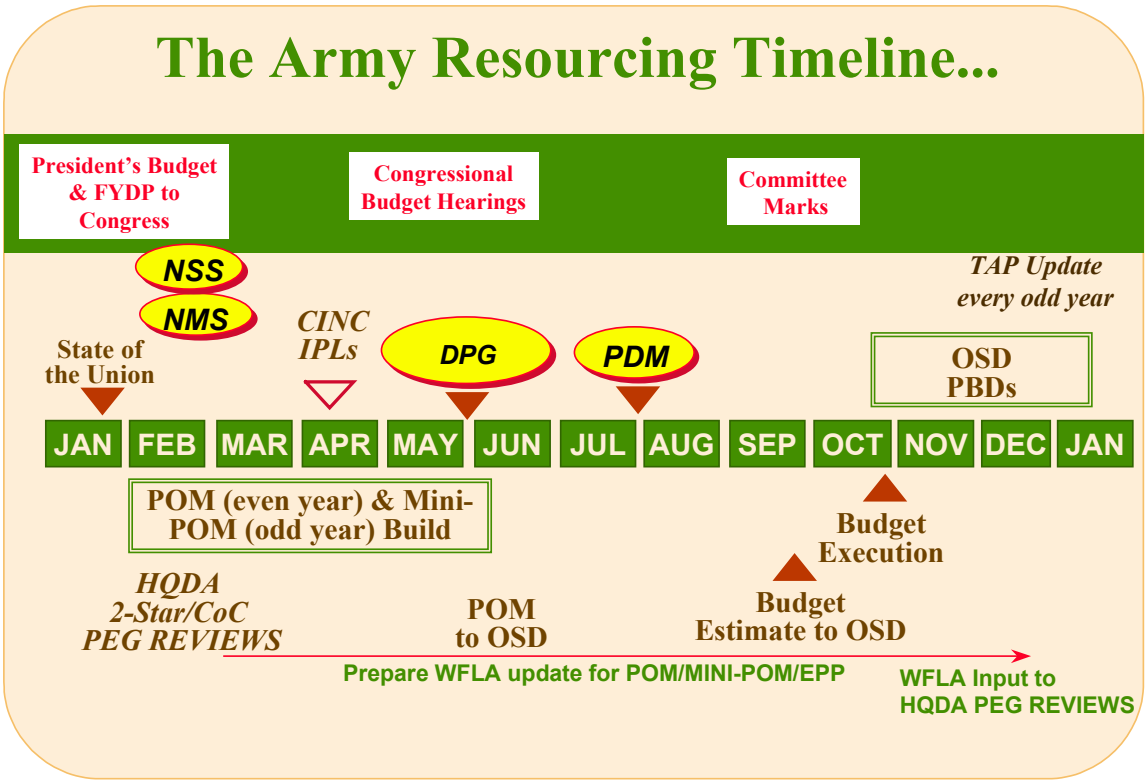


Figure 13-7. The Army resourcing timeline

b. TRADOC uses WFLA to provide input to the Army's RDA Plan and POM considerations. WFLA is developed based on following principles:

(1) Includes system-of-systems approach to fielding the Brigade Combat Team (BCT).

(2) Current focus is on organizations scheduled for modernization in the POM.

(3) Adjust process as results of STOs, AWEs, AECP, AAN and other key processes become available.

c. The requirements determination process begins at the TRADOC schools and proponencies. TRADOC assesses and integrates branch/proponent recommendations through the WFLA process.

d. WFLA compares required future capabilities of the total force against fiscal constraints to determine modernization priorities. These priorities are established according to their objective measure of relative value to mission accomplishment. Recommendations are then developed to address those needs. WFLA modernization recommendations are provided to DA to ensure a balanced modernized warfighting capability for the future Army.

e. TRADOC provides WFLA recommendations to DA as key input for POM (December-odd year) and, if needed, for mini-POM (December-even year). WFLA is an evolving process and is initiated/updated each cycle through TRADOC implementation guidance developed to meet DA current year guidance.

f. The TRADOC WFLA POC is Capability Integration Division (CID), Requirements Integration Directorate (RID), DCSCD (ATCD-EC).

13-12. Materiel acquisition reviews. Key reviews are held periodically throughout the life cycle of the system. The frequency and level of these reviews depends on the system's ACAT, the interest in the system, and the extent to which the program has been streamlined. The combat developer participates in varying degrees in all of the reviews. A brief summary of the major reviews is in app Q.

13-13. Hardware and software configuration control.

a. When fielding new capabilities for multiple systems, some order must be established to reduce unit disturbances. For the Army Battle Command System (ABCS), fielding a hardware and software configuration control concept is established that involves maximum participation from the interested parties while minimizing the impact to units. Configuration control is a process that imposes administrative control on incorporating new or enhanced system requirements to the baseline product.

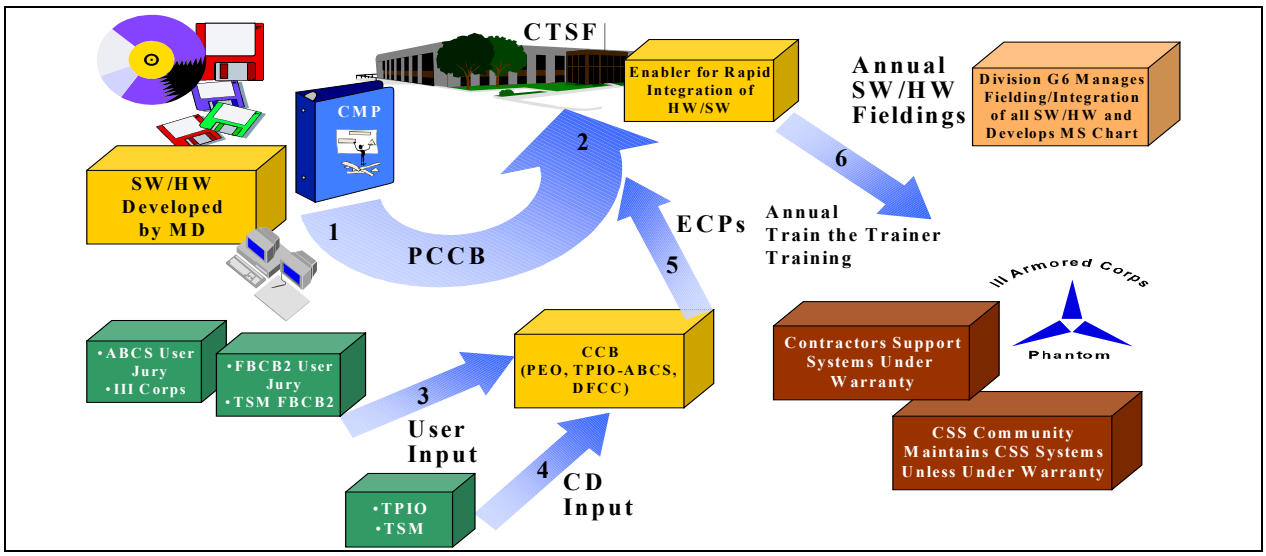


Figure 13-8. Hardware and software configuration management for FBCB2

This process involves the materiel developer, combat developer, and the field user working together to determine system capabilities and establishing an optimum timing for release of the added capabilities. Within the context of the Force XXI ABCS development, the following hardware and software configuration control model is in place to ensure coordinated development and fielding of new hardware and software. (The configuration management plan for the Force XXI Battle Command (Brigade and Below) (FBCB2) is provided as an example in fig 13-8.)

b. The process begins with the MATDEV developing and providing capabilities defined by the system operational requirement documents. These functions form the baseline system capabilities for the system. The configuration control of these baseline functions is monitored by the MATDEV system Configuration Control Board (CCB).

c. The configuration control model makes maximum use of the spiral development cycle (see fig 13-9). Spiral development takes the baseline capabilities and continues to refine them in an iterative and continuous process. Functions are designed, implemented, exercised, and evaluated in a shortened development cycle. Requirement prototypes are developed and integrated within the existing system capabilities. These capabilities are used in exercises and experiments to determine suitability. They ultimately undergo testing in a more structured environment to satisfy interoperability requirements. The refined capability is then incorporated into the next baseline version for formal fielding. Involvement in this process includes the materiel developer, combat developer, and field users, all supported by scientists and engineers.

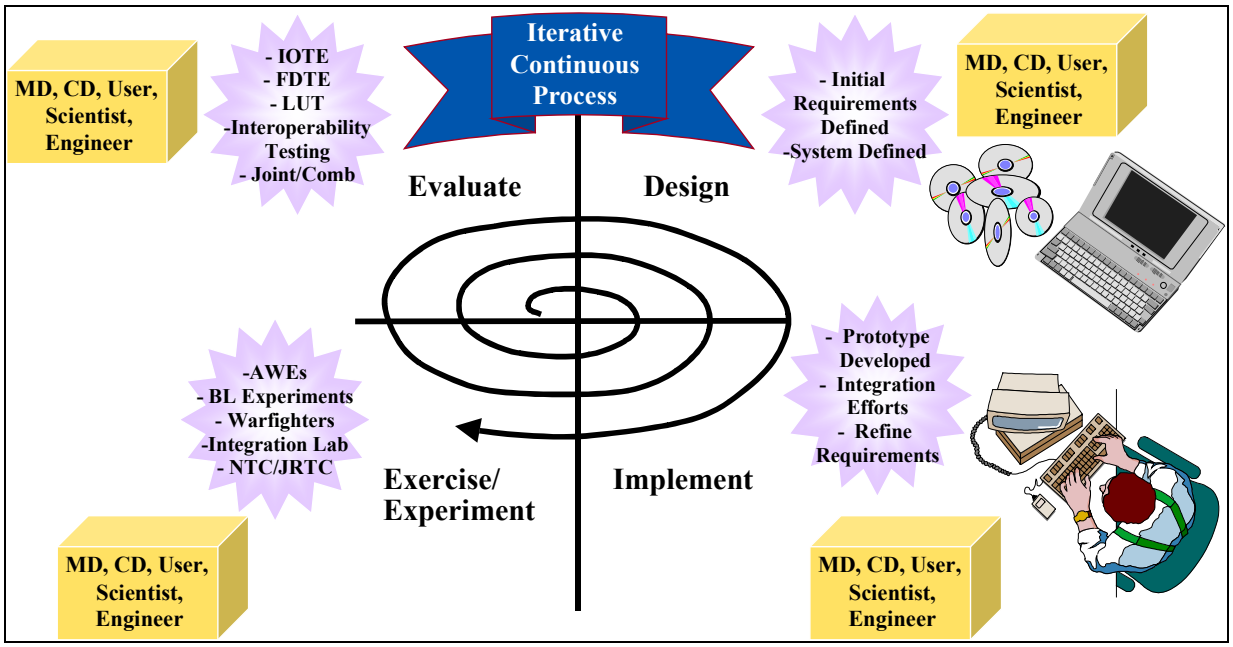


Figure 13-9. Hardware and software configuration management spiral development

d. The User Jury supports the refinement of, or the enhancement to, the baseline capabilities. This process provides for early user feedback and input to the system development decision cycle. It consists of representatives from field units, TRADOC system managers (TSM), TRADOC program integration offices (TPIO), program managers (PM), and program executive officers' (PEO) offices. The User Jury discusses user feedback to provide a focus for refined capabilities or new system requirements.

e. Supplementing the User Jury is direct input from the CD community. These sources of input include the representatives from the proponent combat developer, TSM, and TPIO offices.

f. Reviewing the stream of User Jury and CD input is the CCB. The CCB consists of PEO, TPIO, and Digitized Force Coordination Cell (DFCC) representatives. It reviews the suggested system enhancements for conformity to ABCS Capstone Requirement Document, system ORDs, and other documents as appropriate. Suggestions approved by the CCB enter the development cycle as documented Engineering Change Proposals (ECPs) and are incorporated into appropriate software releases or hardware modification by the MATDEV or contractor at the Consolidated Testing and Support Facility (CTSF).

g. Scheduling the release of new hardware and software capabilities is performed in conjunction with the unit commander, G-6 officer, and the trainer. The G-6 is responsible for scheduling the implementation of changes. The trainer is responsible for conducting the necessary "train-the-trainer" training to ensure a pool of unit level instructors is available to train unit personnel on new features.

h. A contractor provides system support for those system items under warranty. The unit bears the burden of support for those items no longer carried under a warranty program.

13-14. Software Change Cycle

a. This defines the TRADOC process by which all requirements for updating software for ABCS member systems are documented, synchronized, bundled and prioritized. This process assures that this system of systems continues to function as a collective entity with each incremental upgrade in capability. As such, this process implements configuration control at the requirements level (see fig 13-10).

b. Definitions.

(1) "I-Day" is the date on which PEO command, control and communications systems (C3S) issues implementing contract instructions to individual program managers. All timing must work backward from this date.

(2) "R-Day" is the date on which the TPIO delivers a synchronized, integrated and prioritized set of software upgrade requirements to PEO C3S.

(3) "Bundling" refers to groups of functions/subfunctions that must interact successfully, both within a given member system and between member ABCS systems.

c. ABCS system components/subsystems are the Global Command and Control System-Army (GCCS-A), Advanced Field Artillery Tactical Data System (AFTADS), All Source Analysis System (ASAS), Combat Service Support Control System (CSSCS), Air and Missile Defense Planning and Control System (AMDPCS), Maneuver Control System (MCS), Force XXI Battle Command-Brigade and Below (FBCB2) System, and the Tactical Airspace Information System (TAIS).

d. Support systems to ABCS are the Digital Topographic Support System (DTSS) and the Integrated Meteorological System (IMETS), while the Warfighter Information Network (WIN), Tactical Internet (TI) and the Integrated Systems Control (ISYSCON) are enabling systems.

e. Scope and granularity. The TRADOC process applies to all software upgrades of any member of ABCS, and is managed by the TPIO-ABCS. The TRADOC process works at the level of detail defined in User Functional Descriptions (UFDs).

f. Mechanics of the process (see fig 13-10).

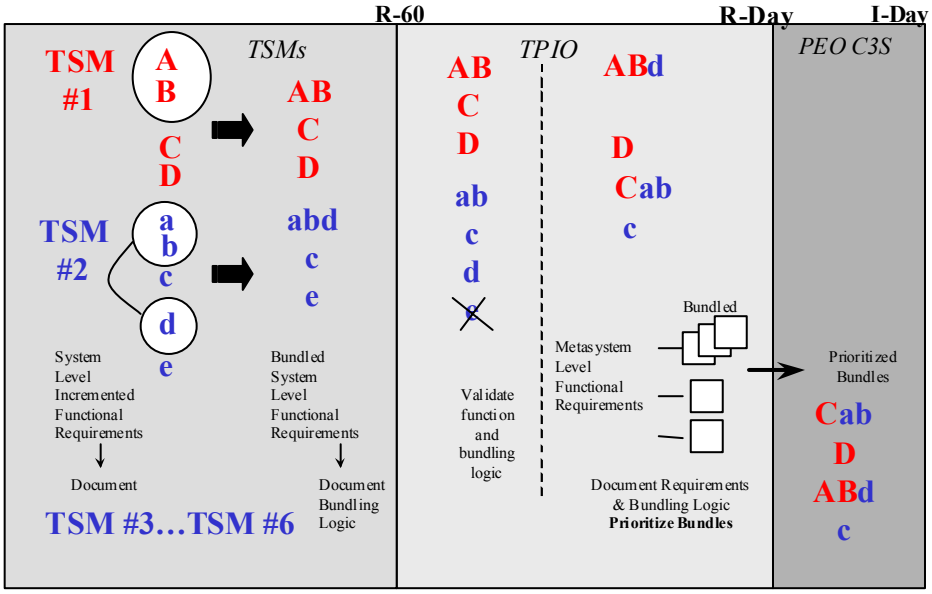


Figure 13-10. Software Change Requirement

(1) TPIO-ABCS determines R-Day in consultation with PEO C3S, based on the lead-time required by the latter to implement requirements, but normally three months before I-Day. Software upgrades can be on a scheduled or a periodic basis (e.g., yearly) or irregularly scheduled special event (e.g., significant force fielding). In either case, the TPIO-ABCS establishes a single R-Day for each set of upgrades.

(2) TSMs forward a prioritized list of system software upgrade requirements to the TPIO by R-60. The proposed upgrades identify individual functions/subfunctions to be modified, as detailed in the system's UFD. The UFD must clearly identify interactions within the component system and interactions with any other ABCS system. This will define the logic by which functions will be bundled and subsequently managed as a single entity. Each individual TSM prioritizes the bundles with respect to their system and delivers the prioritized bundles, their respective UFDs and bundling logic to the TPIO by R-60.

(3) The TPIO validates the requirements and bundling logic. This is a two-part evaluation process, conducted at the individual system level. The first part addresses the importance of each

proposed new or upgraded function/subfunction on an individual basis. The second part verifies which functions/subfunctions must interact successfully and which must be upgraded simultaneously. The reasons for validating, nullifying, or deferring proposed functional upgrades are documented.

(4) The TPIO performs horizontal integration across the ABCS and rebundles proposed functions/subfunctions based on interoperability requirements; otherwise he/she risks overall system/force failure. The intent is to enable bundling on a cross-system basis. Further, the bundling logic is based on the premise that the entire bundle must be funded and fielded, or none of it will be. The UFDs and bundling logic for each bundle are documented, including the expected change in capabilities.

(5) Finally, the TPIO prioritizes the resulting bundles, which will be managed subsequently as single entities. The intent is to ensure that the most important bundles are fully funded and fielded. If a complete bundle cannot be delivered and fielded according to schedule, then the entire bundle will be withheld until it is complete.

g. HQ TRADOC does not entertain ABCS related software upgrades as unfinanced requirements (UFRs) submitted by individual centers or schools. All incremental changes in software upgrades are managed through the TPIO-ABCS IAW the integrated prioritized list of bundles.

13-15. Information system protection - computer network attack considerations.

a. Computer network attack (CNA) can threaten information systems, networks and the IT associated with host platforms/combat systems. IT systems hardware/software (HW/SW), (platform and transport) must be able to detect, prevent and respond to system intrusions. Additionally, IT systems require an effective means to restore operational capability following successful CNA. All information systems (standalone and platform embedded) material requirement documents must address the CNA threat and include appropriate computer network defense (CND) requirements in a defense in-depth context. Systems must undergo vulnerability assessments/testing ("Red Teaming") prior to Milestone III. After appropriate risk assessments are completed, fixes are applied and tracked via the DISC4 vulnerability assessment database. All systems must meet information assurance requirements IAW appropriate AR 25-series regulations.

b. IT-related HTI programs include "Red Team" vulnerability testing and risk assessments. Software changes and upgrades taking place under the Software Process Improvement (SPI) program and under the post production software support (PPSS) program include vulnerability testing and risk assessments.

c. The Signal Center's technical analysis conducted as part of the Command, Control, Communications, and Computer Requirements Definition Program (C4RDP) specifically addresses the architecture aspects of network, information system, and host platform computer network defense (see app N).

Appendix A
References

Section I
Required Publications

DODD 5000.1
Defense Acquisition

DOD Reg 5000.2-R
Mandatory Procedures for Major Defense Acquisition Programs (MDAPs) and Major Automated Information System (MAIS) Acquisition Programs

CJCSI 3170.01
Requirements Generation System

CJCSI 6212.01A
Compatibility, Interoperability, and Integration of Command, Control, Communications, Computers, and Intelligence Systems

AR 5-5
Army Studies and Analyses

AR 5-11
Management of Army Models and Simulations

AR 70-1
Army Acquisition Policy

AR 70-75
Survivability of Army Personnel and Materiel

AR 71-9
Materiel Requirements

AR 71-11
Total Army Analysis (TAA)

AR 71-32
Force Development and Documentation—Consolidated Policies

AR 73-1
Test and Evaluation Policy

AR 200-1
Environmental Protection and Enhancement

AR 200-2
Environmental Effects of Army Actions

AR 350-10
Management of Army Individual Training Requirements and Resources

AR 350-38
Training Device Policies and Management

AR 381-11
Threat Support to U.S. Army Force, Combat, and Materiel Development

AR 385-16
System Safety Engineering and Management

AR 600-3
The Army Personnel Proponent System

AR 611-1
Military Occupational Classification Structure Development and Implementation

AR 700-138
Army Logistics Readiness and Sustainability

DA Pam 70-3
Army Acquisition Procedures

DA Pam 350-58
Leader Development for America's Army

TRADOC Reg 5-3
U.S. Army Training and Doctrine Command (TRADOC) Study Program

TRADOC Reg 5-11
U.S. Army Training and Doctrine Command (TRADOC) Models and Simulations (M&S)

TRADOC Reg 11-8
TRADOC Studies and Analyses

TRADOC Reg 25-32
TRADOC Doctrinal Literature Master Plan

TRADOC Reg 71-4
TRADOC Scenarios for Combat Developments

TRADOC Reg 71-12
TRADOC System Management

TRADOC Reg 71-17
Organizational Design, Unit Reference Sheets (URS), and Automated Unit Reference Sheets (AURS)

TRADOC Reg 350-32
The TRADOC Training Effectiveness Analysis (TEA) System

TRADOC Reg 350-70
Systems Approach to Training (SAT) Management, Processes and Products

TRADOC Reg 381-1
Threat Management

TRADOC Reg 385-2
TRADOC Safety Program

TRADOC Pam 11-8
Studies and Analysis Handbook

TRADOC Pam 350-70-8
Total Army School System (TASS) Training Requirements Analysis System (TRAS)

TRADOC Pam 525-5
Force XXI Operations

TRADOC Pam 525-66
Future Operational Capability

Section II
Related Publications

DODD 8320.1
DOD Data Administration

DOD 5000.3-M-4
Joint Test and Evaluation Procedures Manual

DOD STD 2167A
Defense Systems Software Development

MIL-STD 721C
Definitions of Terms for Reliability and Maintainability

MIL STD 882C
System Safety Program Requirements

MIL STD 1629A
Procedures for Performing a Failure Mode, Effects, and Criticality Analysis

Joint Pub 1-01
The Joint Doctrine Publication System

Joint Pub 1-02
DOD Dictionary of Military and Associated Terms

AR 1-1
Planning, Programming, Budgeting, and Execution System

AR 5-22
The Army Proponent System

AR 11-40
Functional Area Assessment (FAA)

AR 15-41
Nuclear and Chemical Survivability Committee

AR 25-1
The Army Information Resources Management Program

AR 25-30
The Army Publishing and Printing Program

AR 34-1
International Military Rationalization, Standardization and Interoperability

AR 37-100
Account/Code Structure

AR 40-10
Health Hazard Assessment Program in Support of the Army Materiel Acquisition Decision Process

AR 40-61
Medical Logistics Policies and Procedures

AR 70-38
Research, Development, Test, and Evaluation of Materiel for Extreme Climatic Conditions

AR 310-50
Authorized Abbreviations, Brevity Codes, and Acronyms

AR 350-35
Army Modernization Training

AR 380-19
Information Systems Security

AR 602-1
Human Factors Engineering Program

AR 602-2
Manpower and Personnel Integration (MANPRINT) in the Systems Acquisition Process

AR 700-127
Integrated Logistics Support

AR 700-129
Management and Execution of Integrated Logistics Support (ILS) Program for MultiService Acquisition

AR 700-142
Materiel Release, Fielding, and Transfer

DA Pam 25-40
Administrative Publications: Action Officer Guide

DA Pam 73-2
Test and Evaluation Master Plan Procedures and Guidelines

DA Pam 73-3
Critical Operational Issues and Criteria (COIC) Procedures and Guidelines

DA Pam 700-142
Instructions for Materiel Release, Fielding, and Transfer

FM 3-5
NBC Contamination

FM 100-5
Operations

FM 100-11
Force Integration

FM 100-14
Risk Management

Federal Information Processing Standards Publication 183
Announcing the Standard for Integration Definition for Function Modeling (IDEF0)

Federal Information Processing Standards Publication 184
Announcing the Standard for Integration Definition for Information Modeling (IDEF1X)

TRADOC Reg 25-30
Preparation, Production, and Processing of Armywide Doctrinal and Training Literature (ADTL)

TRADOC Reg 25-31
TRADOC Armywide Doctrinal and Training Literature Program

TRADOC Reg 25-35
Preparing and Publishing United States Army Training and Doctrine Command (TRADOC) Administrative Publications

TRADOC Reg 71-4
TRADOC Standard Scenarios for Combat Developments

TRADOC Pam 25-34
Desk Guide to Doctrine Writing

TRADOC Pam 25-35
Desk Guide to Doctrine Management

Section III
Referenced Forms

DA Form 1045
Army Ideas for Excellence Program (AIEP) Proposal

DA Form 2028
Recommended Changes to Publications and Blank Forms

HQ TRADOC Form 30
Transmittal, Action, and Control

Appendix B
Integrated Concept Team (ICT) Guidelines

B-1. Introduction. This appendix provides guidance and supporting information in the following areas:

a. General ICT guidelines.

b. Typical steps for conducting an ICT.

c. ICT proposal.

d. ICT membership examples.

e. ICT helpful hints.

B-2. General ICT guidelines.

a. Overview. ICT members must be familiar with key Army long-range planning documents; e.g., Force/Army XXI plans and objectives, Joint/Army Vision 2010 documents, and Army After Next emerging results. ICTs are structured to seek both conventional "What is" and innovative "What could be" solutions to future warfighting capabilities. Challenging existing DTLOMS paradigms is encouraged, especially if it opens up new, more efficient options to fight or support the force. ICTs are conducted in an environment in which all practical ideas and options are sought out and evaluated from a total force perspective. Emerging digital capabilities to network action offices through telecomputers, e-mail, and video teleconferencing should be used to the maximum extent possible to improve efficiency and minimize travel.

b. Membership. A fundamental characteristic of an ICT is that all organizations having a significant interest in a warfighting capability or having critical supporting capabilities will be invited to have representation. ICT members must be empowered by their parent organization to negotiate and make decisions. The early involvement of these empowered "share holders" provides the ICT the means to promote more efficient, total-force focused solutions while shortening the overall requirements determination process. They are responsible for both horizontal and vertical coordination within their parent organization. ICT members' proactive issue identification and resolution replaces much of the traditional, time-consuming staff, rewrite, and restaff process of the past. A one-time staffing is the ICT objective. Stable representation on an ICT is necessary for continuity and efficiency of the team. While industry and academia will not normally be an ICT member, their views should be sought as input to the ICT (see para B-3).

c. Operational environment. ICTs consider both AC and RC options and opportunities. ICTs assess the full range of Army and joint Service operations impacted by the capability and all appropriate scenarios that the Army is likely required to operate within and support. ICTs also consider the impacts and opportunities to improve the Army ability to rapidly deploy worldwide, and more efficiently support both light and heavy force operations and special mission task forces.

d. Horizontal focus. ICTs must seek DTLOMS solution sets that include near-, mid-, and long-term capabilities. ICTs promote horizontally integrated requirements and solutions to future concepts and capabilities, to include multi-role combat and support systems and common training device solutions, where they are feasible. HRI principles (see para 13-7) are used to the utmost degree possible. If an ICT identifies a specific HTI solution/option, the team should prepare and submit an HTI proposal (see para 13-8 and app P).

e. S&T role. It is especially important that ICTs have active participation by the S&T/PEO/PM communities to ensure that all viable options are considered and that there is an awareness of the art-of-the-possible to preclude unnecessary risk and/or dead-end requirements.

f. Modeling and Simulation. ICT's must develop the simulation support plan (SSP) for management of simulations in support of simulation and modeling for acquisition, requirements, and training (SMART) goals for simulation-based acquisition. It is imperative that simulations be planned for as early as possible in the concept exploration phase. The SSP continues to evolve as the concept or system matures.

g. Non-DOD participation. Care must be used to ensure that all industry/academia, allied/other government, and non-DOD participation in ICTs complies with all applicable statutory and regulatory limitations. If their participation is desired, appropriate legal, contractual, disclosure, and/or security advisers must be sought. Guidelines for industry and academia participation are addressed in paragraph B-3. Allied liaison officer (LNO) participation depends on their credentials and should be addressed on a special request basis. Participation of other countries in joint programs/efforts depends on agreements in place between participating countries and applicable disclosure restrictions. Participation of other U.S. Government agencies must also comply with security and disclosure limitation.

B-3. Industry/academia participation. Industry/academia may not participate in an ICT as active/sitting members. Industry/academia information and input for the ICT may be accomplished by responses to a public announcement(s) soliciting written input or one-time participation during early ICT information gathering by use of an industry association representative, the AMC RDECs/Labs, or an independent contractor to canvas industry/academia; or by participation in a symposium or conference, often in cooperation with the materiel developer. Industry/academia should be invited to provide information in the early idea stage of the ICT to promote an open assessment of all feasible concepts and solution options (hardware, software, and technologies). Since the ICT generally makes an assessment of near-, mid-, and long-term solution options, industry/academia system developers and technology communities should have an opportunity to contribute their ideas and concepts. Generally, industry should not participate as described in paragraph B-3b, c, and d. However, if industry input is warranted, a request for comments should be widely disseminated, e.g., through the publication of a public announcement in the "Commerce Business Daily" (CBD). The publication of such a public announcement should always be subject to a legal review. Request for industry input should be forwarded to the AMC Technical Integration Liaison Office (TILO) to arrive no later than 30 days prior to the scheduled industry forum. The TILO in turn provides the announcement to the CBD and posts an announcement on the TILO Internet Website.

a. The results of ICT meetings should be shared with industry representatives who make a request for such information, while taking into consideration procedures for disseminating classified and proprietary information (see para B-3e). Government responses to industry inquiries should also be widely disseminated. No ICT activity should compromise industry or academic proprietary rights or affect an existing competitive advantage.

b. Industry/academia should not participate in ICT solution determination activities once specific solutions are being considered for elimination or support. Care must be used to ensure that all

industry/academia participation in ICTs meets applicable federal laws and Army and acquisition regulations guiding materiel acquisition and interaction with industrial representatives. Industry/academia shall not participate in the approval of any contractual documents, to include documents defining requirements.

c. Industry/academia should not participate in the actual development of a materiel requirements document (MRD) to avoid creating an unfair advantage in any future solicitation or a perception of improper bias or influence. Industry input on near-, mid-, and long-term operational capabilities may be sought early during the MRD ICT information gathering effort by using suitable broad industry solicitation for input.

d. The participation of industry/academia in the activities described above in paragraphs B-3b and c may result in their exclusion from a follow-on procurement.

e. Proprietary data. An industry representative providing information to an ICT may not wish to reveal proprietary data to potential competitors during the ICT process. Therefore, upon request, the government provides these industries with necessary protection of their proprietary information. This is accomplished by offering industry representatives the option of submitting proprietary information to only the government members of the ICT. Such information is not provided to other industry representatives. Industry representatives must be reminded that proprietary information should be prominently marked when submitted to an ICT. Government participants in the ICT process must not improperly disclose such proprietary information. Industry representatives participating in an ICT may also sign a statement of non-disclosure. All statements of non-disclosure should be subjected to legal review.

f. Voluntary participation. All industry/academia representatives who participate in an ICT sign a waiver of any entitlement to compensation before their participation with the ICT begins, or they are compensated for their Services during their participation with the ICT.

g. Follow-up with industry/academia. An ICT may follow-up with specific industry participants to clarify points raised during an ICT-industry/academia forum. Legal and contracting advisers can assist with methods and guidelines.

B-4. Typical steps for conducting an ICT. This information is provided as a guide to assist TRADOC action officers in conducting a successful ICT. These steps are not mandates, but should be tailored to the specific ICT based upon complexity, scope, issues, and level of impact/visibility.

a. ICT initiation and charter development/approval (see chap 4). Determine and establish a working relationship with the responsible legal and contracting office/agency. They will provide statutory and regulatory guidance and oversight support throughout the duration of the ICT.

b. The ICT lead assembles background read-ahead information (e.g., warfighting concept of operation, applicable FOC, charter, previous ICT minutes, studies/analyses/experiment reports, and white papers) prepares strawman draft ICT Action Plan and, when applicable, strawman draft MRD.

c. ICT planning considerations.

(1) Step 1. Initiate the ICT core team—this usually consists of 6-10 dedicated members with the most direct interest and experience in the ICT's area of focus and products and other on-call members (e.g., Battle Lab, S&T, and analytic/simulation representatives) as needed to plan the ICT effort. Provide team members read-ahead information and applicable strawman draft documents. Team members must be prepared to provide active participation and represent their organization in all ICT.

(2) Step 2. Develop draft ICT Action Plan, including the following items:

(a) Detailed milestone schedule.

(b) Overview of the operational context for the capability (e.g., Army and joint operations, peacetime and combat).

(c) ICT objectives and products.

(d) Tasks necessary to achieve each objective or product.

(e) Initial list of issues and opportunities for consideration.

(f) Organizations participating in the ICT (impacted directly or indirectly, or can provide ICT support).

(g) Plans for conducting, analyzing and documenting the results of experiments or analyses/studies.

(h) Plans for soliciting and managing industry/academia input to the ICT. Legal and contracting advisory oversight of industry/academia participation should be provided also.

(i) Plans for disclosure and security controls if participation by allied/other foreign governments or other U.S. Government agencies is planned.

(j) Plans for use of modeling and simulation.

(3) Step 3. Forward the draft ICT Action Plan with initial opportunities/issues to team members and other appropriate organizations. To the degree possible, any major issues or positions affecting the member's home organization are established/coordinated prior to the ICT meeting(s).

(4) Step 4. Convene core ICT team. Electronic measures are encouraged (e.g., video teleconference (VTC), conference call, e-mail). Figure B-1 provides a possible agenda for consideration.

- Brief draft Action Plan and refine as necessary
- Confirm appropriate membership; identify any organizations not represented.
- Identify all available capability contributors and necessary -supporting enablers.
- Brainstorm all known DTLOMS opportunities and solutions, and identify issues for consideration.
- Prepare study, analysis, and experimentation plan.
- Prepare simulation support plan (SSP).
- Confirm ICT objectives, products, and deliverables.
- Develop ICT tasks list with timelines.

Figure B-1. Possible ICT agenda

(5) Step 5. Provide minutes and updated ICT Action Plan to all core members. Provide information copy to HQ TRADOC functional directorate.

d. ICT execution.

(1) Step 1. Execute ICT Action Plan.

(a) Solicit industry/academia input to the ICT in accordance with the Action Plan. The legal or contracting office can advise which solicitation technique best suits the need.

(b) Assess existing information.

- Previous ICT minutes/report.
- Existing, applicable experiment, analysis, and study reports.
- Related concepts and FOCs (see chaps 5 and 6).
- Government/DOD laboratory, and industry/ academia input. Implement plans for industry experiments and analysis academia per ICT Action Plan (see para B-3).

(c) Identify the need for experiments and analysis and have the appropriate organization conduct them (see chaps 8 and 9).

(d) Brainstorm potential ideas and alternatives and lead open discussions of potential compromises and trade-offs.

(e) Conduct any required follow-up actions with industry/academia under the oversight of legal and contract advisors (see para B-3).

(f) Identify future M&S plans for SMART and incorporate into the SSP. Identify M&S needs for logistics, testing, and training as early as possible to maximize software sharing and code reuse.

(g) If issues arise that the ICT is not able to quickly resolve, quickly brief appropriate staff and decision makers within the affected organizations to seek resolution or assistance. If this does not lead to issue resolution, forward the issue, with alternatives and supporting rationale, to the HQ TRADOC functional directorate using the normal chain of command.

(h) Develop the draft new or revised concept, DTLOMS determination analysis report, or requirements document, as applicable (see chaps 5, 10, and 11, and para B-7e).

(2) Step 2. Initiate the full ICT. The full ICT includes all core and staffing ICT members (see para B-6, 7 and 8). This is normally initiated by a paper or electronic memorandum distributing and soliciting issues and comments from the full ICT on the core ICT draft product. Core ICT members

work to resolve issues with submitting ICT members employing appropriate media (e.g., telephone, e-mail, fax, VTC). Affected core ICT members consider comments received and make appropriate changes. Meetings, teleconferencing or other forums with necessary full ICT members will be used to resolve contentious issues.

(3) Step 3. Prepare and submit products for approval including any unresolved issues for decision authority action or forwarding to HQ TRADOC for resolution. Prepare and provide minutes to ICT members and HQ TRADOC functional directorate recording the actions and results of the ICT and concerns recommended for future actions (e.g., considerations for FOC integration by HQ TRADOC; MANPRINT areas needing MATDEV attention).

(4) Step 4. Dissolve the ICT or transition to the next phase. Criteria for ICT completion or termination is contained in the ICT proposal and charter (see para B-5).

B-5. ICT proposal and charter. The same content guidance applies to the ICT proposal as to the ICT charter (see fig B-2). The documents are differentiated by the level of detail and timing.

a. ICT proposal. The ICT proposal is a concise summary document developed at the idea stage and before major efforts and resources are expended. It normally only two pages in length—five pages maximum. After review by HQ TRADOC, the proposal serves as the initial ICT guidance until a charter is approved. The proposal may be submitted to HQ TRADOC as a memorandum or electronically via e-mail.

- Originating organization
- Title of ICT
- Date of request/charter
- Purpose
- Scope
- Key objectives
- Related -concepts and FOCs
- Products
- Participants (Dedicated and On-call core members and others)
- Schedule
- Joint implications
- Resources/support summary
- Authorities
- Criteria for completion/termination
- Chairperson (name, address, phone, fax, e-mail address)
- POC (name, address, phone, fax, e-mail address)

Figure B-2. ICT proposal and charter content

b. ICT charter. The ICT charter expands on the proposal to provide the detail necessary for planning and executing the ICT mission. An example of an ICT charter is provided in app R, figure R-1.

B-6. ICT (Concept). Chapter 5 details the processes used to develop, coordinate, and approve new or revised concepts using the ICT approach.

a. Figure B-3 defines the ICT membership who is involved in the concepts process. The charter will identify specific organizations and may include additional organizations deemed necessary. Paragraph B-3 provides guidelines for industry and academia participation in ICTs.

b. A simulation support plan (SSP) must be developed as early as possible in the concept exploration process. The SSP provides a plan for management of the simulations to be used in each phase of development. The SSP developed during this initial ICT will mature over time and will be revised during subsequent ICTs.

B-7. ICT (DTLOMS Determination Analysis).

a. DTLOMS determination solution strategy. Based upon approved concepts and associated FOCs, an ICT first seeks doctrine solutions to achieve a future capability. Then, the ICT looks for solutions in the training, leader development, organizational, and soldier areas. Finally, the ICT assesses materiel solutions; normally the most costly option that also takes longer to develop and field. The ICT-identified and decision authority-approved solutions are the DTLOMS solutions.

Chair: Designated in Charter

Dedicated Core ICT Members (specified in Charter)

- Doctrine/Tactics Expert(s)
- Organization/Force Designer(s)
- Combat Developer(s) (in-house and external)
- Training Developer/Trainer(s)
- HQ TRADOC, DCSCD Action Officer
- Analytical/Simulation/ Wargame Agencies
- MANPRINT Representative (from concept proponent or ARL)
- Other Services
- SMDC (for space and missile defense programs)

On-call Core ICT Members (specified in Charter)

- Local Threat Manger or TRADOC DCSINT
- TOE Units CINC(s)
- Reserve/National Guard
- Recent Commanders
- Command Sergeant Major/NCO's
- Retired General Officer Advisors
- MANPRINT Domain Experts (Manpower, Personnel, Training, Human Factors Engineering, Safety, Health Hazards, and Soldier Survivability)
- Battle Lab
- S&T (ARL Lab(s) & RDEC)
- Analytical/Simulation/Wargame Agency(ies)
- CSS/Logistics Experts (Primary TRADOC Combat Developer for system support)
- Environment Experts

Staffing ICT Members (specified in Charter)
Those organizations listed in core staffing list for Concepts (see para C-11)

Other Information Sources (Not ICT members; -special procedures apply)

- Industry/Academia (see para B-3)
- Allied Army/Services LNOs (see para B-2g on restrictions)

Figure B-3. ICT (Concept) representation

b. The ICT (DTLOMS Determination Analysis) membership includes those stated in figure B-4. Others may be added as determined by the chartering organization. The specific organization for core and on-call core members is stated in the ICT charter. Paragraph B-3 provides guidelines for industry/academia participation.

c. Brainstorming sessions. Brainstorming activities are particularly important to bring forth both traditional and innovative solution sets for the FOCs and concepts addressed.

d. Establishing senior level input and support. ICT senior leaders and key impacted organizations are briefed on recommended DTLOMS solution set(s) to achieve the overall force capability (near-, mid-, and long-term).

e. The DTLOMS determination analysis report provides information described in figure B-5 documenting DTLOMS ideas considered, analysis and/or experimentation, rationale/basis for discards, and recommendations. This report must be approved by the ICT convening official and forwarded to HQ TRADOC.

Chair: Designated in Charter

Dedicated Core ICT Members (specified in Charter)
- Combat Developer(s) (in-house and external)
- Organization/Force Designers
- Doctrine/Tactics Expert(s)
- Training Developer
- Personnel Proponent
- HQ TRADOC, DCSCD Action Officer
- analytical/Simulation/Wargame Agency(ies)
- MANPRINT Representative (from DTLOMS proponent or ARL)
- Other Services
- SMDC (for space and missile defense programs)

On-call Core ICT Members (specified in Charter)
- Battle Lab
- S&T/Materiel Developer (ARO, ARL Labs, RDECs)
- Federated Labs/DARPA
- Analytical/Simulation/Wargame Agency(ies)
- MANPRINT Domain Experts (Manpower, Personnel, Training, Human Factors Engineering, Safety, Health Hazards, and Soldier Survivability)
- CSS/Logistics Experts (Primary TRADOC Combat Developer for system support)
- Environment Experts
- Local Threat Manager or TRADOC DCSINT
- TOE Units/CINCs Staff
- Reserve/National Guard

Staffing ICT Members (specified in the Charter)

Other Information Sources (Not ICT Members and Special Procedures Apply)
- Industry/Academia (see para B-3)
- Allied Army/Services LNOs (see para B-2g on restrictions)

Figure B-4. ICT (DTLOMS Determination Analysis) representation

- Title of ICT
- Purpose of ICT
- Timeframe of ICT action (beginning and ending dates)
- Concepts and FOCs addressed
- Summary of any needs analysis done to date that helps define/support the need (testing, experiments, simulations, and studies)
- DTLOMS ideas considered for each concept and FOC
- DTLOMS ideas discarded for each concept and FOC and the decision's rationale/basis
- DTLOMS ideas recommended for adoption as a need supporting the concept and FOC and the decisions rationale/basis
- Record of simulations utilized and recommendations for future assessments
- Record of analysis and experimentation reports used by the ICT to arrive at ideas considered, discarded, and recommended
- Identification and description of any issues needing research either to determine whether is should be a need; -or to define in sufficient detail a recommended need into a requirement

Figure B-5. DTLOMS determination analysis report content

B-8. ICT (Materiel Requirements Document). An ICT produces appropriate MRDs (e.g., MNS, CRD, and/or ORD). MRD development normally responds to an approved DTLOMS Determination Analysis ICT recommended materiel solution (i.e., a materiel mission need). Chapter 11 details the materiel requirements development, coordination, and approval process. The MRD ICT membership includes those stated in figure B-6. Others may be added as determined by the chartering organization. Specific organization for core and on-call core members is stated in the ICT charter. Paragraph B-3 provides guidelines for industry/academia participation in ICTs.

Chair: Designated in Charter

Dedicated Core ICT Members (specified in Charter)
- Combat Developer(s)/TSM/TPIO
- Materiel Developer
- Independent Evaluator
- Training Developer
- HQ TRADOC, DCSCD Action Officer
- Analytical/Simulation/Wargame Agency(ies) as needed for SSP development
- Local Threat Manager or TRADOC DCSINT
- MANPRINT representative (from MRD proponent or ARL)
- Other Service(s) for joint programs
- SMDC (for space and missile defense programs)

On-call Core ICT Members (specified in Charter)
- Organization/Force Design Expert
- Doctrine/Tactics Experts
- MANPRINT Domain Experts (Manpower, Personnel, Training, Human Factors Engineering, Safety, Health Hazards, and Soldier Survivability)
- Battle Lab
- Analytical/Simulation/Wargame Agency(ies)
- CSS/Logistics Experts (Primary TRADOC Combat Developer for system support)
- Environment Experts
- Federated Labs/DARPA
- TOE Units/CINC/Reserve/National Guard

Staffing ICT Members (specified in Charter)
Those organizations listed in MRD core staffing list on DCSCD Internet Homepage

Other Information Sources (Not ICT members; special procedures apply)
- Industry/Academia (see para B-3)
- Allied Army/Services LNOs (see para B-2g on restrictions)

Figure B-6. ICT (Materiel Requirements Document) representation

B-9. ICT helpful hints.

a. How to think with a horizontal mindset.

(1) Understand Force/Army XXI warfighting concepts and "how to fight" principles/characteristics.

(2) Understand how this capability will support the Division/Corps Commander's overall campaign objectives.

(3) Who else on the battlefield does these same type of operations, functions, tasks, or missions?

(4) In the early stages, think about functions and concepts; suppress the desire to jump straight to a specific solution.

(5) Lead the ICT in a very unbiased manner. Look at today's capabilities across the branches and in the joint environment, including opportunities and limitations.

(6) Fill the plate with options, even ones that will probably be rejected; each one may stimulate others to add a different option or new knowledge about an area that has never been considered with additional research/experimentation but may have promise. Identify key areas of commonality or consensus, then build from that base to open up new options.

(7) Consider both traditional and non-traditional (innovative) solutions.

(8) Keep asking-"What could be?" Avoid the constraints of "What is today?"—the Army is changing and new, more efficient solutions are essential to meet future capabilities with limited resources.

(9) Compare the needs of today against the best estimate of similar needs that will be on the battlefield of the future; the 4th graders today will be the platoon sergeants or commanders in 2010/2015. Their Army will be different. They will need new capabilities. This comparison can provide focus for future Army concepts and S&T investments.

(10) Think of all of the complexities of operating the system and appreciate the demands of the operational environment. Can a new, non-traditional approach work better in the future than just a new and better replacement for what the Army has today?

(11) Identify and address environmental protection and safety considerations.

b. Questions to "ask" the ICT.

(1) What are the appropriate levels of focus for this capability?

(2) How do Force/Army XXI warfighting concepts affect this capability? Do new ways to fight open new opportunities for requirements integration? How does the concept/capability impact each pattern of operation?

(3) How can the Army or the unit do this mission better? What needs to change to improve related capabilities of other combined arms members? Encourage a team attitude; reject the old competitive spirit of the past. The future Army needs cooperation, not multiple parochial solutions that are not collectively affordable.

(4) Is there more than one logical way this capability can be broken down into elemental operational functions? What needs to be accomplished? In the future, can someone else do the function more efficiently than with today's solution?

(5) How can this capability be provided so that it is operationally robust, yet simple to operate and support?

(6) How can the requirement be defined to allow future insertion of state-of-the-art technology that will outmatch the enemy's capability over a long period of time? How can it be capability based—effective even against a wide variety of threat systems and environments?

(7) What are the most efficient, total-force solution sets—not just the party line or the old, conventional solution?

(8) What can be done to provide commanders and leaders more useful and flexible tools of battle? Avoid complex gadgets that are hard to employ and support in remote and hazardous environments.

c. Other factors in defining a horizontally integrated requirement.

(1) Joint Service considerations.

(a) Expand the scope of the ICT to include joint Service or joint warfighting doctrine and concepts wherever possible.

(b) How would the CINC or Joint Task Force Commander see this capability from the big picture?

(c) Are there joint, national agencies (e.g., U.S. Coast Guard, CIA/FBI), or coalition issues/opportunities?

(d) Does another Service have a similar mission role? If so, then seek out joint solution options with vigor; help stamp out parochial views that add complexity and unnecessary cost to the force.

(2) Other operational and assessment considerations.

(a) Multiple scenarios and environments.

- Peacetime support (O&S costs)/affordability.
- Total spectrum of conflict.
- Managing/protecting the electronic/information spectrum.

(b) Non-traditional operational considerations.

- Peacekeeping/making.
- Disaster relief.
- Refugee control/support.
- Shipboard operations (e.g., sea salt, EMI, insensitive munitions).

(c) Technology factors

- Commercial off-the-shelf solutions options.
- HTI opportunities (systems sub-system, software, and component levels).
- Emerging S&T opportunities.

d. Leading a horizontally focused ICT.

(1) Keep the ICT broadly focused; especially in the initial phase.

(2) Avoid letting a single view/perspective dominate the thought process.

(3) Define the full scope of the capability. Be sure all ICT members get to express their views freely. Challenge the status quo advocates. NOTE: They may become very vocal, but they may not be in tune with the future.

(4) Lead the ICT to understand the rationale for why a function is done the way it is today. Then discuss—Is there a better, more efficient option?

(5) Define total force implications: combat, logistical support, force projection, training, organizational opportunities, and how-to-fight changes.

(6) Define why this capability is critical.

(7) Address risk implications in operational matters (positive and negative).

(8) Seek horizontal solutions that can be reconfigured to meet other missions.

(9) Define affordability impact and/or opportunities.

(10) Define future Battle Lab experiments or force/system analyses needed to support a solution (or solution set) decision.

e. Additional ICT topics.

(1) Look across Army, DOD, federal labs, and industry S&T communities for new, innovative opportunities (systems and technologies).

(2) Consider relevant operational lessons learned, Battle Lab experimentation and analysis results, and overall Force/Army XXI and Army After Next objectives.

(3) Are there other major force options that could alter or affect this requirement? If so, what are the issues/options? How does the ICT plan to resolve them?

(4) Understand the impact of a digitized force and Information Warfare operations.

(5) What are the essential interfaces necessary to achieve this capability? Are there operational constraints that need to be addressed?

(6) Assess force deployability/projection impacts/opportunities.

(7) Consider affordability/cost as an independent variable.

(8) Describe the essential support (e.g., maintenance, supply, transportation) and training (embedded/institutional/simulations) capabilities that must be in place to execute the solution.

(9) What are the essential operational functions (e.g., target acquisition, intelligence, communications, situation awareness/C2, electronic warfare (EW); nuclear, biological, and chemical (NBC) warning or decontamination) that must be provided by other systems/organizations?

f. Consider all means of communication with ICT members—e-mail, VTC, teleconference, mail, and face-to-face meetings.

Appendix C
Concept Format and Coordination

Note: This appendix serves as the format for the structure of TRADOC Pam 525-series Concepts. Use TRADOC Reg 25-35 for the specific editing requirements of TRADOC administrative publications. (It is recommended that other recently published TRADOC Pams in the 525-5 series be reviewed for format and structure.)

C-1. Pamphlet Cover. A cover for a TRADOC pamphlet is not required. Publication on the TRADOC Internet Website does not require a cover. DCSCD action officers develop a generic cover for staffing purposes.

C-2. Foreword. The foreword is an introductory statement placed at the beginning of the pamphlet. The foreword is developed by the proponent and cannot exceed one double-spaced page.

C-3. Table of contents. The proponent develops a basic table of contents that contains chapter titles, paragraph titles, and page numbers. Use TRADOC Reg 25-35 for layout of table of contents, paragraph titles, and numbers.

C-4. Chapter 1. Introduction.

a. Paragraph 1-1. Purpose. Describe the purpose of the pamphlet in very general terms.

b. Paragraph 1-2. References. If there are 10 or more, list them in an appendix.

c. Paragraph 1-3. Explanation of abbreviations and terms. If there are 10 or more, incorporate them as Section I (Abbreviations) and Section II (Terms) in a Glossary.

C-5. Chapter 2. Overview.

a. Paragraph 2-1. Describe why this concept is needed.

b. Paragraph 2-2. Threat. Describe the threat environment or capabilities within which the Army operations described in this concept are intended to take place. (Contact HQ TRADOC DCSINT.)

c. Paragraph 2-3. Capstone concept. Describe how this new concept supports the currently approved capstone concept (TRADOC Pam 525-5).

d. Paragraph 2-4. Joint concepts. Describe how this concept supports any joint concepts.

e. Paragraph 2-5. Other concepts. Describe how this concept supports or relates to other current concepts or visions.

f. Paragraph 2-6. Limitations. This paragraph provides facts or situations that would limit the application of the concept. For example, a concept may not apply in some areas of the world or the concept's application may be regulated by U.S. public law, international law, religious laws, or treaties. Concepts are not limited by doctrine, training, organizations, equipment, personnel, or dollar constraints.

C-6. Chapter 3. Concept.

a. Paragraph 3-1. General summary. Provide a general summary of the concept that outlines the main ideas, explains in detail how the operation will be performed, and how it relates to the capstone concept and other subordinate concepts.

b. Paragraph 3-2. This paragraph provides a more detailed description of the concept. Clearly and concisely describe operational procedures within the context of Army Visions, Army XXI, and the Joint Vision. Indicate the capabilities needed to deploy, employ, and/or sustain the elements envisioned by the proponent. Lay out the operational and tactical structure for operations and C2 arrangements that pertain to the battlefield operations or function being addressed.

c. Paragraph 3-3. What are the current enduring battlefield functions that are supported by this concept (e.g., maneuver, fires effects, protect, sustain)?

d. Paragraph 3-4. FOCs. What are the interrelated FOCs that have principle objectives that are needed to implement this concept? These are not just FOCs developed by the proponent, but any FOC with a capability and objective that supports the concept future capabilities. A format and illustrative example for an FOC is shown in app D, figure D-1.

C-7. Chapter 4. Implications. From the capabilities identified in chapter 3, the concept developer must evaluate and assess how this capability affects each DTLOMS area.

a. Paragraph 4-1. Doctrine.

b. Paragraph 4-2. Training.

c. Paragraph 4-3. Leader Development.

d. Paragraph 4-4. Organizations.

e. Paragraph 4-5. Materiel.

f. Paragraph 4-6. Soldier.

C-8. Appendices.

a. References.

b. Glossary.

(1) Section I, Abbreviations (as needed).

(2) Section II, Terms (as needed).

c. Coordination Annex (for final draft documents only).

d. FOC appendix (for final draft documents only). FOCs developed as a result of ICT development for this concept are included as a separate enclosure with the final draft concept document. This FOC appendix is forwarded to the TRADOC staff action officer for entry into the next update of TRADOC Pam 525-66.

e. Other appendices, as necessary.

C-9. Executive summary. The proponent provides an executive summary for submission with the staffing of the final draft concept document. The summary cannot be longer than two pages in length. The summary is forwarded with the final draft as a separate enclosure and is used during staff final review.

C-10. Core staffing list for concepts.

a. CINCs.

b. MACOMs.

c. AMC major subordinate commands.

d. HQ, TRADOC.

e. TRADOC installations.

f. TRADOC centers/schools.

g. CAC and Command and General Staff College (CGSC).

h. Combined Arms Support Command (CASCOM).

i. U.S. Army War College.

j. Center for Army Analysis (CAA).

k. HQ AMC.

l. Joint Warfighting Center (JWFC) (as needed).

m. Other Services (as needed).

n. HQDA (as needed).

Appendix D
Future Operational Capabilities (FOC) Format

Combat developers prepare FOCs associated with concepts for inclusion into TRADOC Pam 525-66. FOCs are formatted as outlined below. The components of an FOC are the title and proponent identifier, principle objective, principle operational baseline, key and enabling elements considerations, DTLOMS concepts linkages, and other considerations (see sample at fig D-1). Future capability teams (FCTs) utilize the same format for construction of corporate FOCs.

a. Title and proponent identifier. All FOCs have a descriptive title and a proponent identifier. The identifier consists of a concept developer's two- or three-letter designator, a two-digit year of development, and three-digit FOC number (e.g., Infantry - IN 97-001, Air Defense Artillery - ADA 97-002). Combat developer two-letter designators are assigned in TRADOC Pam 525-66. Previously existing FOCs that have been modified are designated with an "R" following the proponent identifier and number. FOCs that are unchanged keep the same designation. New FOC titles begin with the current year's designation. The range of proponent FOCs is not to be renumbered/reordered to compensate for an individual FOC which has been deleted.

b. Principle objective. A brief, yet stand-alone, operational description of the intended end state of the desired future capability. Describe what it is that the warfighter wants accomplished on the battlefield, not how to do it. It should not simply describe a deficiency, nor should it simply describe a specific materiel solution.

c. Principle operational baseline. A simple statement of the known, well-defined baseline that serves as the basis of quantitative and/or qualitative goals and performance parameters.

d. Key and enabling elements. Expressions of quantitative and/or qualitative, measurable supporting objectives that contribute to achieving the new capability. These supporting objectives are normally listed as ranges of performance relative to the operational baseline.

e. DTLOMS considerations. A short discussion of the capability's potential impacts on the respective warfighting requirements domains; potential DTLOMS solution strategies.

f. Concepts linkages. The concept developer provides the "why?" with a brief description of the conceptual change driving the rationale for the capability. The concept developer references the TRADOC 525-series publication within which the FOC is described.

g. Other considerations. A brief discussion of examinations of additional considerations, e.g., joint potential or funding issues.

h. Figure D-1 is an example on an FOC.

(Illustrative Only) Unmanned Systems, US-YY-001 (Illustrative Only)

1. Principle objective: Expand tactical reach of mounted combat forces with unmanned systems.

2. Principle operational baseline: Current mounted cavalry scout mission.

3. Key and enabling elements (w/supporting objectives as applicable)

- **Lethality:** By 2010 increase lethal range by 10-15 km, by 2020 increase by 10-50 km.
- **Survivability:** Decrease manned system losses (casualties) by 3-5 times NLT 2010, by 10 times NLT 2020.
- **Mobility:** 1) Increase force tactical movement rates by 25% by 2010, by 50% by 2020;
  2) No increase or reduction in strategic lift.
- **C4I:** 1) Increase areas of regard and influence to 15 km NLT 2010, 25-40 km NLT 2020;
  2) Increase ability to identify friendly unit/system location with 90% accuracy, and enemy unit/system location with 80% accuracy NLT 2020;
  3) Interoperable with C^4ISR systems.
- **Sustainment:** No unique prime mover or support vehicles.

4. DTLOMS considerations: T - Must have embedded training; **O -** Must be predominantly organic at Brigade and Battalion level.

5. Concepts linkages: Future cavalry forces will perform recon and security missions at increased ranges and across broader sectors, but with fewer personnel and vehicles. They must be able to assist in developing the common picture of the battlefield with greater accuracy and speed (reference TRADOC 525-series).

6. Other considerations: Potential for use in clandestine joint and coalition force operations.

Figure D-1. FOC example

Appendix E
Concept Experimentation Program (CEP) Formats

E-1. Resume sheet (RS). Line-by-line instructions follow this CEP RS format. Electronic copies of these formats may be obtained from HQ TRADOC (ATCD-RP) or the DCSCD Internet Website at http://www.tradoc.army.mil/dcscd.

1/ Classification:
2/ Concept Experimentation Program
Resume Sheet

3/ Type Submission:
New___ Revised___
4/ Date:_____
5/ Ofc. Sym. & Phone

6/ Experiment Title:

7/ Type:

8/ Category:

9/ Authority:

10/ Sponsor No.:

11/ Installation:

12/ Organization:

13/ Unit:

14/ Location:

15/ Experiment Dates:

16/ Ammo:_____ Flying Hours:_____ Inst:_____: Sim:_____ Tgts:_____

17/ Total Direct Experiment Cost Estimates: (in thousands) Appn:___ Fy:___ _____

18/ Leverage:

19/ Army Experimentation Campaign Plan (AECP) and Future Operational Capability(s) Linkage:

20/ CEP Direction Factor:

DA-directed/ongoing	1 ____
TRADOC-directed	2 ____
Define warfighting concept	3 ____
Refine materiel requirement/evaluate DTLO	4 ____

21/ Sponsor Priority: 1___ 2___ 3___ 4___ 5___ 6___ Other__

22/ FY-CEP-XXX-1

23/ Classification

24/ Purpose/Objective/Description

25/ Purpose:

26/ Objective:

27/ Description:

28/ Experiment Concept:

29/ Scope:

30/ Concept of Employment:

31/ Impact Statements:

32/ Points of Contact (POCs):

Ln	Agency	Location	Office Symbol	Telephone (DCTN)

Section I
33/ Experiment Resource Requirements

34/ 1. Experiment Directorate:

35/ A. Personnel Requirements:

36/ B. Equipment Requirements:

37/ 2. Player Participants:

38/ A. Personnel Requirements:

(1) Individual Requirements:

Ln	Position	Grade	MOS	Qty	Incl Dates	Source

(2) Unit/Element Requirements:

39/ B. Equipment Requirements:

40/ 3. Item(s) to be Experimented on:

41/ A. Experiment Items:

42/ B. Support Requirements:

43/ 4. Data Collection/ADP Support:

44/ A. Data Collection/Processing System:

Ln	ADP Equipment/Supplies	Qty	Incl Dates	Source

45/ B. ADP Facility Support:

46/ C. Contractor or Other Government Agencies:

47/ 5. Ammunition, Pyrotechnics, and Missiles:

48/ A. Ammunition and Pyrotechnics:

49/ B. Missiles:

50/ 6. Petroleum, Oils, and Lubricants (POL):

51/ 7. Instrumentation:

52/ A. Equipment:

53/ B. Contractor or Other Government Agencies:

54/ 8. Experiment Facilities/Installation Support:

55/ A. Experiment Facilities Range Support:

56/ B. Communication/Engineering Support:

57/ C. Installation Support:

58/ D. Other Support:

59/ 9. Simulators/Targets:

60/ A. Simulators:

61/ B. Targets:

62/ 10. Flying Hour Support:

Section II
63/ Experiment Milestones

64/ 1. Mandatory Milestones:

Ln	EVENT	RESPONSIBLE	DATE
015	Resume Approved	TRADOC	T-120
130	Experiment Design Plan Submitted	Experiment Organization	T-90
140	Experiment Design Plan Approved	Experiment Organization	T-60
200	Environmental Impact Determination Stmt	Experiment Organization	T-30
210	Safety Release	Experiment HQ/Other	T-30
220	Experiment Item Due Executor	MATDEV/Other	T-30
250	Experiment Initiated	Experiment Organization	T-Date
260	Experiment Completed	Experiment Organization	C-Date
280	Experiment Report (Final)	Experiment Organization & Sponsor	C+90

65/ 2. Local Milestones:

Section III
66/ Direct Experiment Cost Estimates (in thousands)

Date Prepared:

Experiment Number: XX-CEP-XXXX

Experiment Title:

Experiment Type:

Category of Cost	Estimated Cost FY _____
A. Civilian Hire	_____
Narrative Description	
B. Civilian Overtime	_____
Narrative Description	
C. TDY	
(1) Experiments/Players	_____
Narrative Description	

(2) Sponsor Evaluation _____

Narrative Description

D. Transportation of Item _____

Narrative Description

E. Lease/Rental-Commo/Utilities _____

Narrative Description

F. Contracts _____

Narrative Description

G. POL _____

Narrative Description

H. Supplies/Material _____

Narrative Description

I. Equipment _____

Narrative Description

J. Instrumentation _____

Narrative Description

K. Simulators _____

Narrative Description

L. Targets _____

Narrative Description

M. Army Aviation _____

Narrative Description

N. Refurbishment _____

Narrative Description

O. Other Service Support Cost:

(1) ADP _____

Narrative Description

(2) Contract Maintenance _____

Narrative Description

(3) Maintenance and Repair Parts _____

Narrative Description

(4) Meteorological _____

Narrative Description

(5) Photographic _____

Narrative Description

(6) Printing _____

Narrative Description

(7) Training _____

Narrative Description

(8) Safety Release _____

Narrative Description

P. Ammunition Cost - APA
(list by LNs at section I.5.A.) _____

Narrative Description

67/ Total Experiment Cost _____

Section IV
68/ Obligation Plan

69/ Obligation Plan:

PREPARED BY: Enter Name of Individual who Prepared the Plan and His/Her Phone.
TITLE: Enter CEP Title.
CEP NO: Enter CEP # the same as on Resume.

COST CATEGORY	DTCE LN	1st QUARTER			2nd QUARTER			3rd QUARTER			4th QUARTER			TOTAL FUNDING REQUIRED
		OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	
Civilian Hire	A	1												1
Civilian Overtime	B													0
TDY:	C													
Tester/Players	C(1)	1	2		2		2		2			1		10
Proponent	C(2)	1	2		2		2		2			1		10
Transportation of Item	D													0
Lease/Rental	E													0
Contracts	F	250												250
POL	G													0
Supplies/Material	H	5			5			5			5			20
Equipment	I													
Instrument	J													
Simulators	K													
Targets	L													
Army Aviation	M								10					10
Refurbishment	N													
Other Service Support Cost:	O													0
(1) ADP	O(1)													0
(2) Contract	O(2)								5					5
(3) Maintenance and	O(3)													0
(4) Meteorological	O(4)													0
(5) Photographic	O(5)													0
(6) Printing	O(6)													0
(7) Training	O(7)													
Ammunition Cost	P													0
MONTHLY NET AMOUNTS		258	4	0	9	0	4	5	19	0	5	2	0	306
CUMULATIVE QTY		258	262	262	27	27	275	280	299	299	304	306	306	

Section V
70/ Operational Issues and Criteria

Experiment Number: XX-CEP-XXXX

Experiment Title:

Experiment Type:

1.0 Issue.

1.1 Scope.

1.2 Criteria. Investigative in nature.

1.3 Rationale.

2.0 Next Issue.

n.0 Next Issue.

E-2. Line-by-line Resume Sheet (RS) instructions

Pages 1 through 10 contain narrative supporting the preparation of an RS. The narrative is keyed by the left margin numbers to the sample RS that commences on page FY-CEP-XXXX-1. When preparing a RS, if no entry is required for a subject, enter NA to the right of the heading. If the major paragraph heading has an NA entered, subheadings should not be entered.

1&23/ Classification: Classification must be shown at the top and bottom of each page. The entry may be stamped or typed. Classified RS must also be properly marked with downgrading instructions.

2/ Title of Document: Enter and center the words "CONCEPT EXPERIMENTATION PROGRAM" on one line and "RESUME SHEET" centered on a line below.

3/ Type Submission: If a revised RS is being prepared, check the space after the word "REVISED." If it is a new RS, check the space after the word "NEW." The same applies (Revised/New) for out-of-cycle RS submissions.

4/ Date: Type the date the RS is prepared or reviewed on the right side of the page.

5/ Author: Directly below the date enter the office symbol, DSN prefix, and phone number of the person preparing the RS. Do not enter personal names.

6/ Experiment Title: Title of system and short title. Do not use caption "EXPERIMENT TITLE." Start at left margin/76 characters maximum. Place short title, no caption, in parenthesis on line below.

7/ Type: CEP.

8/ Category: Enter CEP experiment or CEP data collection effort (DCE) as appropriate. For an experiment, the executor plans and controls the complete operation. For a DCE, the executor gathers data during an exercise controlled by others to gather data (usually near noninterference).

9/ Authority: Designated experiment executor delegated to conduct the experiment/DCE. Entry will be as appropriate: e.g., TRADOC, TEXCOM, ATEC.

10/ System Sponsor: School or agency assigned functional area responsibility for the system or concept under experimentation.

11/ Installation: Installation(s) providing principle experiment support.

12/ Organization: The organization designated to conduct the experiment/DCE.

13/ Unit: TOE unit(s), activity(ies), and/or individuals required for experiment/DCE. If specifics are unknown, indicate unit type preferred.

14/ Location: Location(s) where experiment/DCE will be conducted.

15/ Experiment Dates: Start and end dates of experiment/DCE: DD/MM/YY.

16/ Summary Data: Each RS displays five subject areas (AMMO, FLYING HOURS, INST, SIM, and TGTS) and a short line. RS requiring these assets will reflect "yes" on the line after the subject area or "no" if not required. Individual requirements should be identified in the appropriate data paragraph.

17/ Total Direct Experiment Cost Estimates: Include the total direct experiment cost to TRADOC and the type of funds (OMA or RDTE) appropriate to fund the experiment. These totals should match the totals in Sections III and IV of the RS. RDTE funds are used for materiel-oriented experiments and OMA funds are used for nonmateriel-oriented experiments. Refer any questions on funding to the resource manager.

18/ Leverage: List other agencies/units that are providing funding in support of this experiment. List agency name, dollar amount, and appropriation.

19/ Army Experimentation Campaign Plan (AECP) and Future Operational Capability(s) Linkage: List all AECP axes and FOCs supported by this CEP. For each AECP axis supported describe how the CEP supports the axis. For each FOC cited, provide a narrative description of why and how the CEP supports the FOC's development or refinement.

20/ CEP Direction Factor: Check the applicable reason(s) for performing CEP.

21/ Sponsor Priority: Priority of sponsor in relation to other CEPs for that fiscal year.

22/ Page/CEP Numbers: (1) CEP page numbers are centered at the bottom of each RS page and will consist of the FY in which the CEP will be performed, followed by "CEP," the CEP number, and the page (FY-CEP-XXXX-1). (2) CEP numbers are built using a two-digit sponsor reference code followed by the priority assigned the CEP by the sponsor. Sponsor codes are as follows: Aviation (01), Chemical (03), Engineers (05), Field Artillery (06), Infantry (07), Medical (08), Signal (11), Finance (14), Chaplain (16), Armor (17), Military Police (19), Military Intelligence (30), Air Defense Artillery (44), Early Entry (57), Battle Command (51), Combat Service Support (63), and Space (70). If a sponsor does not fall into any of the reference codes above, contact HQ TRADOC (ATCD-RP) to be assigned a code.

23/ Classification: See item 1/ above.

24/ Purpose/Objective/Description

25/ Purpose: State why the experiment is required and describe what will be done with the results. What purpose does the CEP serve from an Army perspective? Is it required to better define or develop a FOC?

26/ Objective: State what the sponsor expects to gain by performing the CEP. What will the Army gain? Will it support the development of a FOC?

27/ Description: Briefly identify, in layman's terms, what the hardware, system, or concept is or does. If it is a component of a larger item, so identify. For FD issues, identify projected employment/reorganization.

28/ Experiment Concept: Briefly state how the sponsor and executor expect to conduct the experiment, collect the data, and assess the results.

29/ Scope: Qualitative or quantitative summary of experiment size, comparisons to be made, type of measures to be taken, and characteristics of methodology. The paragraph should state how the experiment is to be conducted.

30/ Concept of Employment: The situation, background, or environment relevant to the experiment requirement, e.g., friendly and threat forces, tactical concept, threat scenarios, type of events, nature of terrain, environment, and thrust of scenario.

31/ Impact Statements: Address as required: Environmental Impact Determination Statement, Laser and Energy, Signal Security (SIGSEC)/Operations Security (OPSEC), Human Volunteers, Radionuclide Certification, and Safety Release.

32/ Points of Contact (POCs): List all POCs involved in conduct of experiment. Do not enter individual names. Use format below:

Ln	Agency	Location	Office Symbol	Telephone (DCTN)

Section I
Experiment Resource Requirements

33/ Experiment Resource requirements: Provide estimate of resource required. The term "To Be Determined" (TBD) is unacceptable. If a paragraph does not apply, enter "NA" and omit any subelements. Footnotes are used for additional clarification.

(NOTE on Resources: Sponsoring agencies should ensure all resource requirements reflected in each CEP resume sheet are coordinated through normal channels. If non-funding resources are required from agencies outside the tasking authority of a particular sponsor's installation, TRADOC may be able to assist in coordination/tasking for them. Requests for assistance of this kind should be sent to the attention of TRADOC (ATCD-RP) in a separate memorandum.)

34/ 1. Experiment Directorate: Describe resources to establish and operate the experiment directorate.

35/ A. Personnel Requirements: List grade, MOS, quantity, and source using format below:

Ln	Position	Grade	MOS	Qty	Incl Dates	Source
A###						

36/ B. Equipment Requirements: List equipment required for command and control of experiment using format below:

Ln	Type	Qty	Incl Dates	Source
B####				

37/ 2. Player Participants: The requirements for individuals and units/elements will be shown.

38/ A. Personnel Requirements: List by grade, MOS, and/or unit/element and strength using format below:

(1) Individual Requirements:

Ln	Position	Grade	MOS	Qty	Incl Dates	Source
C###						

(2) Unit/Element Requirements:

Ln	Unit/Element	Strength	Qty	Incl Dates	Source
D####					

39/ B. Equipment Requirements:

Ln	Type	Qty	Incl Dates	Source
E####				

40/ 3. Item(s) to be Experimented On: Items of equipment under experiment and related support equipment.

41/ A. Experiment Items: List all experiment items using the format below:

Ln	Description	Appn	Qty	Incl Dates	Source
F####		(RDTE, OPA, or OMA)			

42/ B. Support Requirements: List all unique logistic support requirements for use in experimentation on the item. Use the format below:

Ln	Description	Qty	Incl Dates	Source
G####				

43/ 4. Data Collection/ADP Support: Describe resources to collect, process, and analyze experiment data.

44/ A. Data Collection/Processing System: List requirements for data collection and define processing system. Exclude computers and other automated equipment that is physically or electronically attached to data collection devices. Use the format below:

Ln	ADP Equipment/Supplies	Qty	Incl Dates	Source
H####				

45/ B. ADP Facility Support: Describe specific requirements for the ADP facility using the format below:

Ln	Service	Qty	Incl Dates	Source
I####				

46/ C. Contractor or Other Government Agencies: Include DSN, FTS, and contracts required for data collection.

Ln	Service	Qty	Incl Dates	Source
J####				

47/ 5. Ammunition, Pyrotechnics, and Missiles: Include the Department of Defense Identification Code (DODIC). Include ammunition, pyrotechnics, and missiles supporting the experiment, exclude items under experiment.

48/ A. Ammunition and Pyrotechnics: The source should indicate the installation ammunition supply point (ASP) that must forecast and requisition the ammunition and to which the ammunition must be delivered. Use the format below:

Ln	Description	DODIC	Qty	Incl Dates	Source
K####					

49/ B. Missiles: Use the format below in identifying requirements.

Ln	Description	FSN	Qty	Incl Dates	Source
L####					

50/ 6. Petroleum, Oils, and Lubricants (POL): Quantity of POL required should be expressed in gallons except when unit of issue is some other form. Use the format below:

Ln	Description	Qty	Unit of Issue	Source
M####				

51/ 7. Instrumentation: List equipment requirements to control the environment for the generation/collection/automated distribution of experiment data. Include specialized instruments, requirements to operate them, and other data collection devices.

52/ A. Equipment: Identify equipment required.

Ln Type Qty Incl Dates Source
N####

53/ B. Contractor or Other Government Agencies: Describe contract and other support required.

Ln Services Qty Incl Dates Source
O####

54/ 8. Experiment Facilities/Installation Support: List specific data entries under the appropriate subheading. Narrative entries must be placed in the footnote.

55/ A. Experiment Facilities/Range Support: List requirements for experiment ranges, maneuver areas, etc. Use the format below:

Ln Description Qty Incl Dates Source
P####

56/ B. Communication/Engineering Support: Identify support required to ensure that construction, electrical requirements, and telephone installation are requested and accomplished in a correct and timely manner. This includes identification of special requirements such as radio frequencies and jamming. Use the format below:

Ln Description Qty Incl Dates Source
Q####

57/ C. Installation Support: Identify requirements for rental vehicles, supply and maintenance support, audio-visual support, administrative support, and administrative facilities. Exclude other support that is addressed in other areas.

Ln Description Qty Incl Dates Source
R####

58/ D. Other Support: Identify any specific requirements that are not identified elsewhere in the RS.

Ln Description Qty Incl Dates Source
S####

59/ 9. Simulators/Targets: Identify specialized simulator equipment/hardware needed to provide a realistic threat environment and targets required.

60/ A. Simulators: List using format below:

Ln Description Qty Incl Dates Source
T####

61/ B. Targets: Aerial and ground, list using format below:

Ln Description Qty Incl Dates Source
U####

62/ 10. Flying Hour Support: List aircraft and flying hours required to support experiment using format below. Source is the command/agency furnishing the aircraft. Aircraft requirements should be entered in lines 36 and/or 39, as appropriate.

Ln Aircraft Description Hrs/Qtr/FY Incl Dates Source
V####

Section II
63/ Experiment Milestones

64/ 1. Mandatory Milestones: Key events in the experiment cycle.

Ln	Event	Responsible	Date
015	Resume Approved	TRADOC	T-120
130	Experiment Design Plan Submitted	Experiment Organization	T-90
140	Experiment Design Plan Approved	Experiment Organization	T-60
200	Environmental Impact Determination Stmt	Experiment Organization	T-30
210	Safety Release	Experiment HQ/Other	T-30
220	Experiment Item Due Executor	MATDEV/Other	T-30
250	Experiment Initiated	Experiment Organization	T-Date
260	Experiment Completed	Experiment Organization	C-Date
280	Experiment Report (Final)	Experiment Organization & Sponsor	C+90

65/ 2. Local Milestones: Local milestones can be entered by inserting them in the proper sequence, based on the scheduled occurrence date. There is no limit on the number of local milestones to be entered, but the line number shown for the mandatory milestones must always be the same.

Section III
66/ Direct Experiment Cost Estimates

Direct Experiment Cost Estimates: The direct experiment costs are displayed in the sample format below. If a category is not applicable, leave it blank.

Direct Experiment Cost Estimate (in thousands)

Date:

Experiment Number: FY-CEP-XXXX

Experiment Title: Any CEP

Experiment Type: CEP (Experiment or DCE)

Category of Cost FY (State the fiscal year)

A. Civilian Hire - Includes base pay and benefit cost for temporary employees hired for specific experiment.

Narrative Description: Briefly describe the above cost.

B. Civilian Overtime - Includes overtime costs for permanent employee as a result of subject experiment.

Narrative Description: Briefly describe the above cost.

C. TDY.

1. Experiments/Players - Include TDY cost for the Battle Lab or other organization charged with conducting the experiment; and the TDY cost for players participating in the experiment.

2. Sponsor Evaluation: Include the TDY costs of the experiment's sponsor to plan, conduct and report the evaluation.

Narrative Description: Briefly describe the above costs.

D. Transportation of Item - Includes costs associated with the transportation of items for experiment.

Narrative Description: Briefly describe the above cost.

E. Lease/Rental-Commo/Utilities - Includes equipment rentals, communication expenses (leasing communication circuits, networks, and systems), purchased utilities, and rentals from GSA (space and related Services).

Narrative Description: Briefly describe the above cost.

F. Contracts - Includes all contractual Services not otherwise classified. Examples include the purchase of ADP Services, management studies, and equipment maintenance Services.

Narrative Description: Briefly describe the above cost.

G. POL - Includes U.S. Army ship POL and other POL. Do not include aviation POL.

Narrative Description: Briefly describe the above cost.

H. Supplies/Material Category of Cost - Includes supplies and material cost estimate, such as repair parts, general supplies, ADP supplies, and medical supplies. Do not include aviation supplies.

Narrative Description: Briefly describe the above cost.

I. Equipment - Includes property that is more or less durable in support of the subject experiment (i.e., which may be expected to last a year or more without impairment of its physical condition).

Narrative Description: Briefly describe the above cost.

J. Instrumentation – Includes costs associated with items used to sense, measure, transmit, record, and process experiment event data.

Narrative Description: Briefly describe the above cost.

K. Simulators - Includes costs associated with threat simulators. These are items that generate electronic signature/messages and/or actual or surrogate simulators which represent a known threat force/item of equipment.

Narrative Description: Briefly describe the above cost.

L. Targets - Includes aerial or ground target costs.

Narrative Description: Briefly describe the above cost.

M. Army Aviation - Includes POL and repair parts costs.

Narrative Description: Briefly describe the above cost.

N. Refurbishment - Includes the cost to repair experiment items upon completion of experiment.

Narrative Description: Briefly describe the above cost.

O. Other Service Support Cost - Include costs that are not reimbursable to other Services. Costs are included in the Total Experiment Cost.

Narrative Description: Briefly describe the above cost.

P. Ammunition Cost - Include costs associated with ammunition to be consumed by the experiment. This cost is included in the Total Experiment Cost.

Narrative Description: Briefly describe the above cost.

67/ Total Experiment Cost: Total of all the costs above. The total must match the cost reflected in line 17.

Section IV
68/ Obligation Plan

69/ Obligation Plan: The obligation plan is done on an MS Excel spreadsheet. Contact TRADOC (ATCD-RP) for an electronic copy of this spreadsheet. Total CEP costs should be allocated across the fiscal year in accordance with when the funds will be required for obligation. This plan should be coordinated closely with your budget and contract offices.

Section V
70/ Operational Issues and Criteria

Operational Issues and Criteria:

Experiment Number: XX-CEP-XXXX

Experiment Title:

Experiment Type:

1.0 Issue. State (in question form) the operational concern to be investigated/answered by the experiment.

1.1 Scope. Expand on the issue. Describe the operational conditions and definitions applicable to answering the issue.

1.2 Criteria. State the standards of performance expected to be achieved by the item. This serves as a benchmark for answering the issue. May be stated "investigative in nature," which is most often the case for CEPs. Every investigative criteria statement must identify the measures of performance/effectiveness to be analyzed during the experimental evaluation.

1.3 Rationale. Provide justification for the issue.

2.0 Next Issue.

n.0 Next Issue.

E-3. Request for quick-reaction funding. The format for a memorandum requesting the release of quick-reaction funding is at figure E-1.

OFC SYM DD MM YY

MEMORANDUM FOR Commander, U.S. Army Training and Doctrine Command, ATTN: ATCD-RP, 20 Whistler Lane, Fort Monroe, VA 23651-1046

SUBJECT: Request for TRADOC FY98 Quick-Reaction Concept Experimentation Program (CEP) Funding

1. Provided, as requested, is the Battle Lab/Center/School request for release of FY98 quick-reaction CEP funding. The purpose of this funding is to directly facilitate the Battle Lab's/Center's/School's ability to execute quick-reaction experimentation that will assist in determining the military utility or potential of an idea to satisfy rapidly evolving DTLOMS issues or needs.

2. The execution of the Battle Lab/center/school quick-reaction funding will be in accordance with established policy and procedures as outlined in TRADOC Pam 71-9, chapter 8. For each individually executed quick-reaction experiment conducted, a Limited Objective Experimentation Plan (LOEP) and CEP Experimentation Report will be submitted IAW TRADOC Pam 71-9.

3. The execution of quick-reaction funds will be reported on the monthly Battle Lab Execution Report and at scheduled CEP Execution Reviews (CEPER) conducted every other month and held via video teleconferencing (VTC) capability. Quick-reaction funds will not be used to support "core" requirements (e.g., civilian pay, general TDY, equipment replacement). However, quick-reaction funds may be applied to an existing CEP if the scope of the CEP has increased.

4. The POC for this action is _____, DSN XXX-XXXX, Commercial (XXX) XXX-XXXX, e-mail _____.

JOHN E. DOE
Major General, U.S. Army
Commanding

Figure E-1. Example of a request for quick-reaction funding

Appendix F
Limited Objective Experimentation Plan (LOEP) Format

1. Executive summary.

2. Experiment objective.

3. Updated experiment concept.

4. Concept and technical approach.

   a. Experiment scenarios.

   b. Experiment concept of operations.

   c. Initial operational capability concept.

   d. EXFORs.

   e. Experiment OPFOR.

   f. Experiment resource requirements.

      (1) Sites, ranges, and instrumentation requirements.

      (2) Simulations support, including DIS network linkage.

      (3) Government furnished equipment.

      (4) Contractor furnished equipment.

      (5) Data collection resources.

      (6) Personnel.

   g. Data collection plan.

   h. Data reduction and analysis plan.

   i. Experiment technical risk assessment.

   j. Assessment of potential warfighting added value.

   k. Assessment of technology merits (if a materiel-related experiment).

   l. Preliminary/preceding experiments analytical results (if any).

5. Programmatic and organizational approach.

a. Sponsoring organization (center/school or other).

b. Experiment/AWE manager (Battle Lab or other T&E activity).

c. ACM (if materiel-related experiment).

d. Composition of experiment team (Integrated Process and Product Team (IPPT) for WRAP projects).

e. Contracting and procurement strategy for contractor-supplied experimental materials.

f. Plan for satisfying competition requirements of potential follow-on procurement (if materiel-related experiment).

g. Critical events milestones.

h. Measures of success.

i. Safety assessment reports (SAR) and health hazard assessment reports (HHAR) and plan for attaining safety releases.

j. Funding.

(1) Funding requirements and sources to execute experiment.

(2) Forecast of funding requirements for acquisition course of action.

k. Endorsements by IPPT constituent organizations.

Appendices

A. Points of Contact
B. Distribution
C. Resume Sheet (for CEPs)

Appendix G
Experimentation Report Format

OFC SYM DD MM YY

MEMORANDUM FOR Commander, U.S. Army Training and Doctrine Command, ATTN: ATCD-B, ATCD-RP, Fort Monroe, VA 23651-1046

SUBJECT: Memorandum Report - _____ (CEP Name and No.)

1. Reference, CEP Resume Sheet (CEP No.), dated ___. (Encl 1)

2. Based on this CEP, the following information is provided:

   a. Insights gained: (Completed jointly by Battle Lab and Sponsor)

   b. Conclusion(s): (Completed by Sponsor)

   c. Recommendation(s): (Completed by Sponsor)

3. Experiment details. (Completed by Battle Lab)

   a. Purpose and scope (RS): (Completed by Battle Lab)

   b. Background (RS): (Completed by Battle Lab)

   c. System description (RS): (Completed by Battle Lab)

   d. Accomplishment - Dates and Events: (Completed by Battle Lab)

   e. Results summary (by issue): (Completed by Battle Lab)

   f. Findings: (Completed by Battle Lab)

//signed//
Director, Sponsoring Organization

//signed//
Deputy Director, Battle Lab

3 Encls:
1. CEP Resume Sheet
2. Experiment Data (filled in data collection forms and/or summaries)
3. Distribution

Figure G-1. Experimentation report format

Appendix H
Force Design Update (FDU) Action Officer's Guide

H-1. Purpose. This guide applies to action officers (AOs) within TRADOC proponents, schools and centers, and to the FDD, DCSCD (ATCD-F) staff, involved in the FDU process. Specifically addressed are:

a. How to develop an issue for the FDU.

b. Sequence of events and/or responsibilities of the FDU process.

c. Required formats for submission of an FDU issue package (fact sheet, information paper, organization design paper, briefing slides).

H-2. General.

a. The FDU is a semi-annual process used to obtain HQ TRADOC and HQDA approval for new force designs, as well as changes to existing force designs. The DCG, TRADOC is the decision authority for determining the FDU issues that TRADOC will submit to DA. Within HQDA, the Director, Force Programs, ODCSOPS, and the DCSOPS determine the staffing and decision authority required to approve FDU issues. Most issues will go no higher than the VCSA for approval. Force design issues that could require CSA decisions are those that:

(1) Require a policy change.

(2) Affect a CINC's warfighting capability.

(3) Have high visibility or sensitivity.

(4) Require additional resources.

(5) Implement a new or significantly revised warfighting concept.

b. Following HQDA approval, development of BOIP, QQPRI, and TOE documents for the design are completed by USAFMSA (RDD). Once the TOE is approved, it may be implemented immediately, if resources are available, or it competes in the next TAA for resourcing.

H-3. Sequence and responsibilities in the FDU.

a. HQ TRADOC official tasking message. This message is sent by HQ TRADOC, DCSCD to all CINCs, MACOMs, and TRADOC proponent schools at least two weeks prior to the start of the FDU six-month cycle. The messages establishes the cycle timetable for critical decision points, solicits issues, and identifies previously proposed issues.

b. TRADOC proponents collect issues. CINC, MACOM, and HQDA issues are provided to the TRADOC proponents. Additionally, the proponents have issues from their requirements determination efforts.

c. TRADOC proponents submit FDU issue packages. Based on the issues collected, TRADOC proponents, in coordination with DCSCD (ATCD-F) and other proponents, prepare proponent FDU issues packages and forward them to DCSCD (ATCD-F) by either e-mail or U.S. mail. ATCD-F FDU AO and appropriate SMEs advise the proponent regarding content, feasibility, acceptability, and suitability of the FDU issue package. As the issue is developed, the following considerations are addressed: missions, functions, capabilities, and limitations of the proposed organization (including doctrinal requirement for organic mobility; e.g., unit must be 100% mobile or 50% mobile); command and control linkages; individual, collective, and leader development training strategy; sustainment, both in the field and in garrison; doctrinal impacts; resource requirements; materiel impacts; personnel bills or savings and billpayer methodology; and required coordination to implement the design. Particular attention is devoted to assessing and noting personnel bills, increases in grades of rank, and major equipment bills. Proponents must thoroughly analyze and be prepared to address the resources required to implement any proposed design. This analysis entails coordination with affected branch MOS proponents and DA ODCSPER to make an accurate assessment of the feasibility of the personnel requirements of the proposed design. Also, the design proponents must coordinate with responsible agencies, such as DA ODCSOPS system integrators (SIs), OPFAC board representatives, and the Tactical Wheeled Vehicle Requirements Management Office (TWVRMO), to capture whether current programs for major end items of equipment (weapons systems, trucks, communications gear) can accommodate the requirements of the new design or whether the design will necessitate changes in programmed procurements. Issue packages must contain, as a minimum, the following:

(1) Fact sheet. This is a one-page summary of the proposed issue with proponent POC name and phone number (see fig H-1 for an example). This fact sheet is used to initially brief GOs, if required.

(2) Information paper. This provides basic information regarding the issue. Limit to three pages. An example FDU information paper is in figure H-2 at the end of this appendix. Mandatory paragraphs are:

(a) Purpose. To provide information on the issue (e.g., “To gain TRADOC approval . . . .”). Identifies the requirement this design fulfills.

(b) Background and requirement. Develop the problem statement and list the facts and assumptions bearing on the problem and state the requirement the issue satisfies.

(c) Organization design. Describe the new or revised organization in detail (e.g., C2 links, mission(s), capabilities, organization structure, limitations).

(d) DTLOMS impacts. Assess and clarify impacts in DTLOMS arena and in strategic mobility.

(e) Personnel. The personnel bill, bill payer methodology, etc.

FACT SHEET

XXX XXX XXXXX
ATZN-MP-COD/x 6483
DD MM YY

SUBJECT: Internment/Resettlement Battalion

FACTS:

1. Proponent: Military Police.

2. The Internment/Resettlement (I/R) organization design combines existing MP Confinement and EPW/CI battalion designs by placing common functions and personnel into three modular TOEs—a Bn HHC, EPW modules, and Confinement modules. This design also expands the mission capability to include support to dislocated civilians (DC).

3. Proposed designs provide maximum mission capability (DC, EPW/CI, U.S. prisoners), increased force packaging flexibility and improved deployability across all three environments (peace, conflict, war). The I/R battalion can support 4000 EPW/CI or 8000 DC with four EPW modules, or 1500 prisoners with three confinement modules.

4. The design also advocates the establishment of a new MOS (95I) for I/R personnel, converting 95B and 95C personnel in EPW and Confinement units to 95I. The MP School will develop exportable and resident training packages and current 95B/95Cs will be grandfathered until retraining is accomplished.

Figure H-1. Example fact sheet

(f) Equipment. The equipment bill, bill payer methodology, etc.

(g) Recommendation. State the recommended course of action.

(h) Point of contact. Include name, title, and addresses, phone, fax, and e-mail numbers.

(3) Briefing slides. Provide slide presentation for issue briefing. Figure H-3, at the end of this appendix, provides slide content and other pertinent information.

(4) URS. If applicable to the organization design, a URS is provided (see para 10-5c and TRADOC Reg 71-17). Any organization structure change requires a URS.

(5) Organization design paper. Same format as the information paper, however, this is an even more detailed analysis of new or revised organization. Remember, the fact sheet and information paper provide basic information. The organization design paper will enable the ATCD-F AO and others to adequately understand and brief the issue to the DCSOPS, VCSA, and CSA. There is no limit on the number of pages. Note: The organization design must demonstrate feasibility before it is approved.

(6) A guide for evaluation of the FDU issue package for that feasibility is in figure H-4, at the end of this appendix.

d. FDU Issue Review Board (see fig H-5). Attendees for this session are: (1) ATCD-F (Director, FDU AO, and ATCD-F SMEs as required); (2) representatives from DCSDOC, DCST, TWVRMO,

FORSCOM, NGB, OCAR, CASCOM, DAMO-FD, and RDD; and (3) issue proponent action officers and organizational integrators. The purpose of the Review Board is to thoroughly analyze each proposed issue relating to total force, training base, doctrine, CSS, and resource impacts. A side benefit of the session is to provide a heads-up notification to end users or players in the decision cycle. The final outcome of the session is a determination by the Director, ATCD-F if any proposed issue is ready for field staffing; ready but requires minor modification prior to field staffing; or not ready and requires further work and is delayed until the next FDU cycle. Depending on the total number of issues and the availability of required participants, it may be necessary to hold more than one Review Board to cover all of the issues within an FDU cycle.

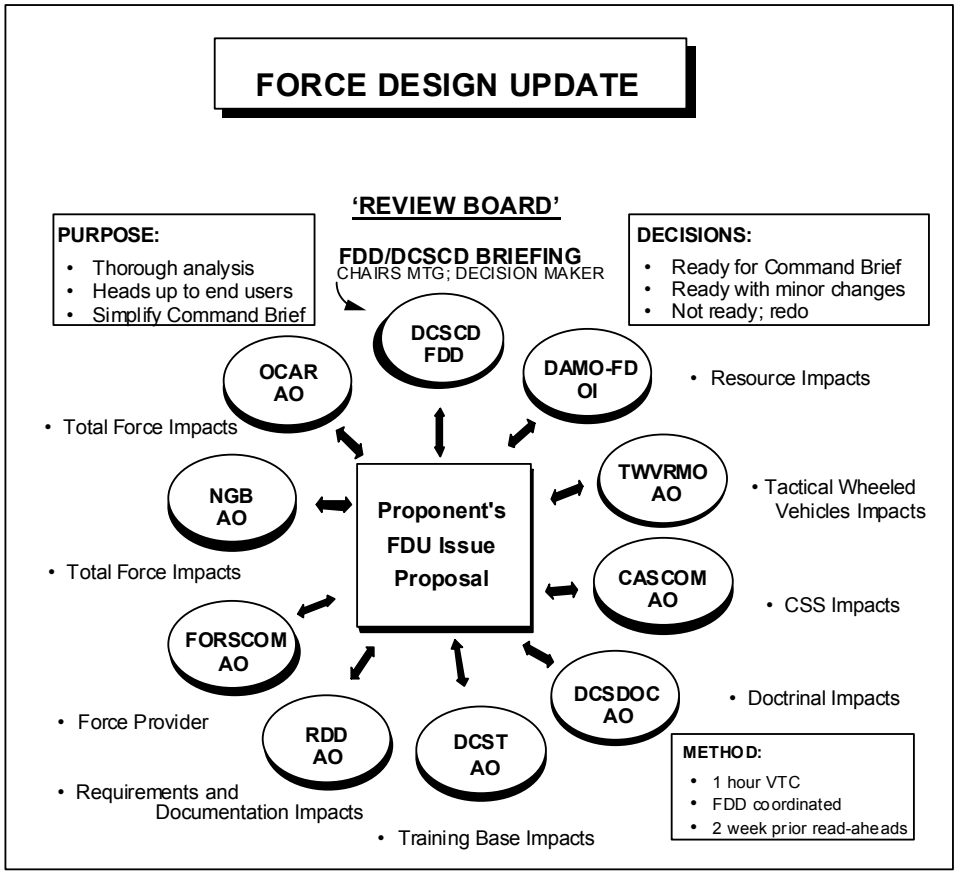


Figure H-5. Issue package review ('Review Board')

e. Following the Review Board and once all due-outs concerning issues are complete, the FDD obtains the approval of the TRADOC ADCSCD to release the issues for field staffing to MACOMs and CINCs.

f. Field comments. FDD posts the issue package for download on a HQ TRADOC Internet FTP site by joint commands, Army MACOMs, and other appropriate commands or agencies. The FDD AO for the FDU cycle transmits record message traffic and e-mail notification of the FTP site address. The FTP site contains an executive summary of all the issues in the FDU cycle and a detailed presentation on each issue IAW the briefing slide format provided later in this appendix. The field normally has two months to provide a concurrence or nonconcurrence.

g. FDD reviews the field comments and formulates an abbreviated briefing on each issue that contains the essential information concerning the proposal. This includes a summary of the field comments and a recommendation on each issue. FDD then briefs the TRADOC ADCSCD for a decision on each issue or for approval to proceed to the next level, which is the DCG, TRADOC (see para H-4).

h. Briefing to DCG, TRADOC. This briefing by ATCD-F obtains DCG, TRADOC decisions on issues within his authority and obtains DCG, TRADOC approval to present FDU issues with TRADOC recommendations to HQDA for decisions.

i. Briefing to Director, Force Programs. ATCD-F (FDU AO) briefs the Director, Force Programs to obtain a recommended DA position on requirements and resources for each issue.

j. Briefing to DCSOPS. ATCD-F schedules a decision brief to the DCSOPS, and DAMO-FDF arranges the HQDA organizational integrator's (OI's) pre-brief to the DCSOPS. The DCSOPS may make decisions based on the OI pre-brief and forgo the brief by ATCD-F, or may require both briefings to make a decision. The DCSOPS may approve some or all of the issues or may defer them to the VCSA/CSA.

k. Briefing to VCSA/CSA. Generally, issues are presented to the VCSA/CSA in one of three ways: (1) the DAMO-FDF prepares a decision memo from the DCSOPS, (2) the DCSOPS or Director of Force Programs handles a particularly sensitive or critical issue directly with the VCSA/CSA or (3) the ATCD-F may brief the VCSA and/or CSA for final decision on requirements and resources for each issue.

l. Conclusion of cycle. Following HQDA decisions on FDU issues, ODCSOPS (DAMO-FDZ) publishes a message that announces the results of the decision. ATCD-F maintains the decision documents along with any associated directives or guidance on file for future reference. Staff work continues until decisions are implemented by TOE documentation and/or TAA competition. ATCD-F (FDU AO) coordinates with USAFMSA RDD and the TRADOC proponent to ensure that new designs are incorporated into the Consolidated TOE Update (CTU) schedule and that the TOE developers have sufficient information (i.e., URS) to produce a TOE that reflects the approved designs. ATCD-F maintains the documentation and decision trail for issues within the completed cycle. Proponents retain FDU issue documents that address DTLOMS review, alternative considerations, minutes of all decision meetings, an audit trail of how personnel and equipment requirements were determined, and an audit trail for any costs and savings estimates. This documentation may be required to support any subsequent inquiry or audit. These documents should be retained for a minimum of two years after the FDU issue is approved/disapproved and the resulting TOE change approved.

H-4. Personnel Resourcing.

a. In the issue packages and at the Review Board, issue proponents must identify any personnel growth, grade increases, changes to standards of grade, and changes to MOSs that will result from implementation of the new or changed design. Proponents must also coordinate with branch MOS proponents and HQDA ODCSPER for an assessment of the feasibility and supportability of these

changes and be prepared to address these personnel issues at the Review Board. Proponents must submit requests for any changes to standards of grade regulations prior to the Review Board.

b. Issue proponents are expected to propose bill payers to offset any personnel growth or rank increases. The Review Board may determine that select, compelling issues may proceed through the FDU cycle, even if they lack prospective bill payers. In such cases, the personnel resourcing of the issue becomes part of the prioritized TRADOC "1-N" list of outstanding FDU issues and MARC studies that do not have a resourcing resolution. DA ODCSOPS submits the issues on this TRADOC "1-N" list to the quarterly Force Feasibility Review (FFR) for exploration of resourcing options. The FFR makes one of three recommendations: (1) implement the design, (2) return the issue to TRADOC for further study, or (3) direct the issue to TAA as a discrete initiative.

H-5. Summary. The proponent is responsible for developing an issue proposal for the FDU cycle and coordinating the issue with other TRADOC proponents and DA agencies as required prior to submitting the issue to ATCD-F for consideration. The Review Board provides the opportunity for critical analysis of the issue by major force design players and contributors to identify strong and weak points, possible fixes, and, most importantly, an early awareness in the FDU cycle of potential issues. The decision making process is streamlined for efficiency and provides the opportunity for intermediate decision makers to use set criteria to decide an issue, thereby reducing time the issue spends in cycle. Finally, some proponent developed FDU issues may not necessarily be tied to a specific cycle, however, this process is still adaptable for these out-of-cycle or special issues.

INFORMATION PAPER

ATZN-MP-COD 1 February 1996

MEMORANDUM FOR Commander, U.S. Army Training and Doctrine Command, ATTN: Director, Force Design Directorate, ATCD-F, Fort Leavenworth, KS 66027-5300

SUBJECT: Military Police Issue for Force Design Update (FDU) 96-1 - Internment/ Resettlement Organizational Design

1. Purpose. Provide information on the redesign/restructure of Military Police Confinement and Enemy Prisoner of War/Civilian Internee (EPW/CI) battalions. Meets doctrinal requirement for EPW and U.S. prisoner confinement units in theater of operations. Addresses requirement for organization to handle anticipated large numbers of Civilian Internees (CI) during future operations (war or stability and support).

2. Background. The Army has separate special-purpose units for U.S. military prisoner confinement and EPW/CI internment. Confinement unit MP are MOS 95C; MP in EPW units and Guard companies are MOS 95B, although they perform duties similar to those of confinement units. Both organizations shelter, sustain, guard, protect and account for people. Current and future Army operations require greater capability for these functions across the three states of the environment (peace, conflict and war).

3. Organization design. The I/R design combines the confinement and EPW missions, renames them internment operations, and expands them to include support to dislocated civilians in operations other than war. These operations are collectively addressed as internment/resettlement (I/R) operations. Internment/resettlement organizations will shelter, sustain, guard, protect, and account for people across the full range of operations. In peace and conflict, dislocated civilians are sheltered, sustained, accounted for, and other detainees guarded. The primary function performed for dislocated civilians is to protect and shelter them from harm by natural forces or hostile persons. In war, internment functions are performed for EPW/CI and for U.S. military prisoners, with primary emphasis placed on preventing escape and maintaining accountability. The intent is to provide a versatile force with the capability for improved force tailoring, adaptive force packaging, and enhanced deployability. The expansion of MP capabilities will be accomplished by:

a. Developing a new I/R Battalion Table of Organization and Equipment (TOE). Functions common to the current EPW/CI and Confinement Battalions were integrated into a base I/R Bn HHC. The design includes the command section, company headquarters, S1 with a core Personnel and Admin section, S2, S3, S4 with core Supply and Food Service sections and the Repair and Utility section, a Medical Team and Preventive Medicine Section, and the Unit Ministry Team. Two modular TOE teams—one with EPW/CI-unique personnel capable of handling 1,000 EPW/CI (or 2,000 dislocated civilians), and one with confinement-unique personnel capable of handling 500 U.S. military prisoners—will also be developed. The Bn HHC with one to four modular teams will be capable of sheltering, sustaining, guarding, protecting, and accounting for people: 1,000-4,000 EPW/CI in war; 500-1,500 U.S. military prisoners in peace, conflict and war; and 2,000-8,000 dislocated civilians in peace and conflict.

b. Creating a new MOS-95I, that combines current EPW/CI and Confinement duties. All 95B and 95C personnel from EPW and Confinement units will be converted to MOS 95I; MOS 95B will be restructured, MOS 95C will be disestablished. These personnel will be trained in all aspects of internment and resettlement operations. An exportable training package will be developed for personnel in affected 95B and 95C positions. They will be "grandfathered" into MOS 95I until retraining is accomplished. A new resident training program will also be instituted for MOS 95I.

c. This redesign document supports initiative outlined in TRADOC Pam 525-5 and FOCs in TRADOC Pam525-66.

Figure H-2. Example FDU information paper

4. Force structure.

a. The I/R Battalion HHC has 11 officers, 1, WO, 64 enlisted; total 76

b. The I/R (EPW) Module has 18 enlisted.

c. The I/R (Conf) Module has 3 officers, 23 enlisted; total 26

d. Based on TAA03:	OFF	WO	ENL	AGG
Current requirement	186	14	2162	2362
I/R concept	194	16	2154	2364
Delta	+8	+2	-8	+2

5. Equipment. There will be no changes to currently documented equipment. Based on TAA03 there will be an equipment savings of $782,328.

6. Recommendation. That the internment/resettlement operational concept and redesign of supporting force structure be approved.

7. Point of Contact. XXX XXX XXXXX, USAMPS, ATZN-MP-COD, e-mail: XXXXX@mcclellan-blsd.army.mil, DSN 865-6483.

//signed//
DAVID W. FOLEY
BG, USA
Commandant

Figure H-2. Example FDU information paper (cont)

FDU Issue Briefing Slides

1. The FDU briefing includes the following slides:

a. A title slide stating the FDU issue title.

b. A purpose slide stating the purpose of the briefing (e.g., GAIN TRADOC COMMANDER APPROVAL FOR EPW BRIGADE LIAISON DETACHMENT).

c. A requirement slide stating the requirement that the proposed design satisfies.

d. One to two background slides listing the facts that relate to why this issue is important. Include such references as studies, issue history, evaluations, and prior briefings. Clearly identify whether this is a new requirement that calls for a new organization or whether it is a long-standing requirement for which an existing organizational design has proven inadequate. What is the problem? What brought the problem or requirement to light (e.g., TRAC analysis, warfighting experiments, or lessons learned from CTCs or operational missions)? Why is an organizational solution the answer to the problem rather than a doctrinal, TTP, or materiel solution?

e. One to five organizational design slides describing proposed organization or design. Discuss mission(s), doctrine, capabilities, and limitations. Provide a side-by-side comparison of the current design to the proposed design to illustrate the changes. Includes bullets that highlight and amplify "how" and "why" the design has changed and how it solves the problem or meets warfighting requirements. Identifies the future operational concepts and future operational capabilities (FOCs) to which the new design correlates based on TRADOC Pams 525-5, 525-66, and proponent manuals of the 525-series.

f. A DTLOMS impact slide assessing impacts in DTLOMS arena. Include strategic mobility impacts as last bullet. Rate impacts as NONE, MINIMAL, MODERATE, or SIGNIFICANT. Provide a clarification statement or bullet for each rating except NONE (optional). Chapter 10 of this pamphlet contains an overview that defines the areas to consider when assessing the impact on each of the DTLOMS domains.

g. A personnel slide addressing total Army personnel impact. Must clearly state the number of personnel requirements that increase or decrease on the affected TOEs and the personnel authorizations bill or savings that the new or changed TOE will generate in the MTOE force. Include a breakdown of how the change affects each Component—1 (AC), 2 (ARNG), and 3 (USAR).

h. A grade change recap chart that details changes in grade of rank and MOS between the current and proposed designs. Indicate changes only. Do not include lines on the chart for grades where the proposed design has no changes from the current design. If a particular grade has changes in several MOSs, include one line per MOS for that grade.

i. An equipment slide addressing total Army equipment impact. If appropriate, list major items and quantities of equipment required for the new design. If the new design changes the requirement for the number or type of tactical wheeled vehicles, then the briefing must identify the increase. Also, the briefing must provide an estimated dollar cost for new equipment requirements and a breakdown of how the change affects each Component—1 (AC), 2 (ARNG), and 3 (USAR).

j. A recommendation slide stating the recommended course of action (e.g., TRADOC COMMANDER APPROVE THE EPW BRIGADE LIAISON DETACHMENT DESIGN).

2. FDU issue briefing slide formats.

a. General. Titles should be in all capital letters. Text may be in all capital letters or upper- and lower-case, whichever style the proponent judges best to achieve effective visual presentation. The font is Arial. Use of ATCD-F border and master slide format on all slides is desirable, however, proponents may use organization logos for initial briefs. ATCD-F will change or modify slides to fit ATCD-F master slide format for General Officer briefings and field comments. Issue title is on top right of all slides with the exception of title slide (see sample of title slide and issue slides).

b. Title slide. Font size - 28 point bold.

c. All other slides. Issue title is 18 point bold located in upper right of slide. Title of slide is 18 point bold and underlined (e.g., **PURPOSE**, etc). Preferred text is either 18 or 16 point bold. Smaller text size is hard to read during VTC briefings.

Figure H-3. FDU issue briefing slides.

INTERNMENT / RESETTLEMENT
OPERATIONS FORCE
REDESIGN

Slide 1. Title slide

I/R OPNS FORCE REDESIGN

PURPOSE

- TO OBTAIN CSA APPROVAL OF THE INTERNMENT RESETTLEMENT (I/R) OPERATIONS FORCE REDESIGN.

REQUIREMENT

- TO PROVIDE COMMANDERS A MODULAR, TAILORABLE FORCE TO SUPPORT OPERATIONS THAT REQUIRE SHELTERING, SUSTAINING, GUARDING, PROTECTING AND ACCOUNTING PERSONNEL (EPW/CI, US MILITARY PRISONERS, DISLOCATED CIVILIANS).

Slide 2. Purpose and requirement slide

Figure H-3. FDU issue briefing slides (cont)

I/R OPNS FORCE REDESIGN

BACKGROUND

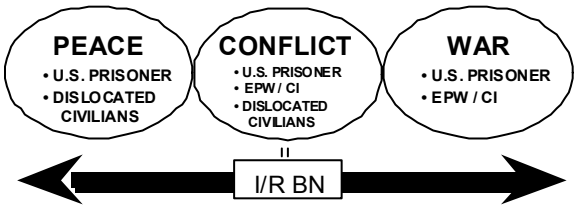
- THE ARMY HAS SEPARATE SPECIAL-PURPOSE UNITS FOR US MILITARY PRISONER CONFINEMENT AND EPW/CI INTERNMENT — BOTH PERFORM SIMILAR FUNCTIONS.
- THE ARMY HAS REDUNDANT CONFINEMENT STRUCTURES—AC TDA, AC TOE AND RC TOE, AS WELL AS AC AND RC EPW/CI FORCES.
- CONFINEMENT UNIT MPs ARE MOS 95C, EPW UNITS AND GUARD COMPANY MPs ARE 95B - BOTH PERFORM SIMILAR DUTIES.
- ARMY OPERATIONS REQUIRE GREATER CAPABILITY TO SHELTER, SUSTAIN, GUARD, PROTECT AND ACCOUNT FOR US PRISONERS, EPW, AND DISPLACED CIVILIANS IN WAR, PEACE, AND CONFLICT.

Slide 3. Background slide

I/R OPNS FORCE REDESIGN

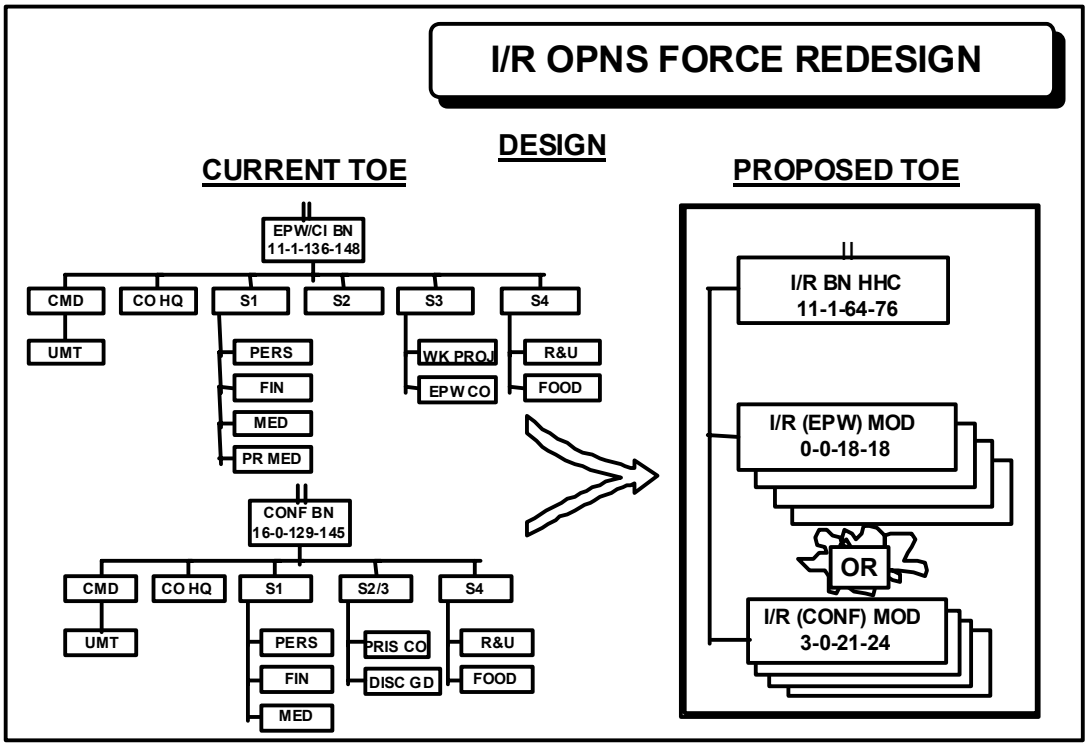
DESIGN

- EPW AND CONFINEMENT TOE - REDESIGNED INTO ONE I/R BN HHC.
- NEW 95I MOS DEVELOPED COMBINING:
  - 95B MOS FROM EPW/CI BN/BDE/CMD, PWIC, GUARD CO, AND CELLULAR TEAMS.
  - 95C MOS FROM THE CONFINEMENT BN AND CELLULAR TEAM TOEs.
- TITLES AND SECTION I OF AFFECTED TOE WILL BE CHANGED TO REFLECT THE I/R MISSION.

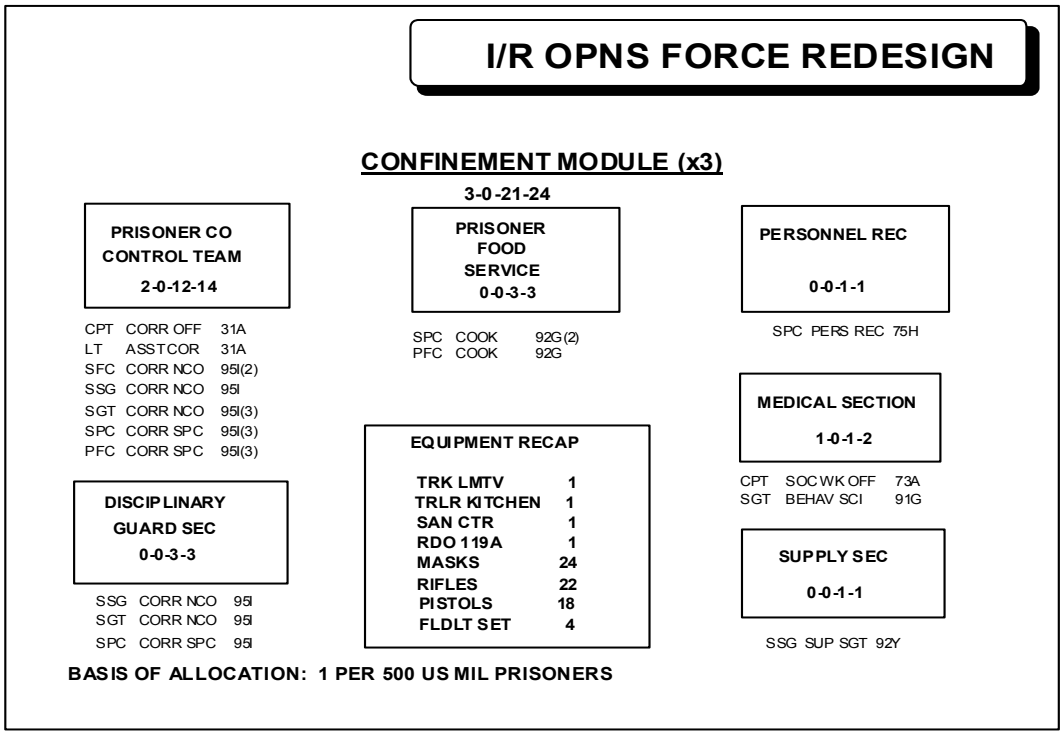


Slide 4. Design slide

Figure H-3. FDU issue briefing slides (cont)



Slide 5. Design slide



Slide 6. Design slide

Figure H-3. FDU issue briefing slides (cont)

I/R OPNS FORCE REDESIGN

I/R (EPW) MODULE (X4)

0-0-18-18

PERSONNEL RECORDS
0-0-1-1
SPC PERS REC 75H

WORK PROJECTS
0-0-2-2
SGT EPW/CI SUPV 95I
SPC EPW/CI SUPV 95I

I/R COMPANY CONTROL TEAM (2)
0-0-6-6
SFC CMPD NCOIC 95I
SSG CMPD ANCOIC 95I
SGT CMPD GUARD 95I
SPC CMPD GUARD 95I(2)
PFC CMPD GUARD 95I

SUPPLY SEC
0-0-3-3
SSG SUP SGT 92Y(2)
PFC COOK 92G

EQUIPMENT RECAP

CUCV 5/4T	1
RIFLES	18
PISTOLS	14
RDO 119A	2
MASKS	18
FLDLT SET	4

BASIS OF ALLOCATION: 1 PER 1000 EPW / CI

Slide 7. Design slide

I/R OPNS FORCE REDESIGN

FUTURE OPERATIONAL CAPABILITIES (FOCs) SUPPORT

THIS DESIGN INITIATIVE SUPPORTS
TRADOC PAM 525-5 FORCE FXXI OPERATIONS
TRADOC PAM 525-66 FOCs
TRADOC PAM 525-XX MP OPERATIONS

Slide 8. FOC support

Figure H-3. FDU issue briefing slides (cont)

I/R OPNS FORCE REDESIGN

DTLOMS IMPACTS

DOCTRINE	**MODERATE**. UPDATE MP FMS TO REFLECT I/R MISSION AND EMPLOYMENT OF THESE UNITS.
TRAINING	**SIGNIFICANT**. DEVELOP AN EXPORTABLE TRAINING PACKAGE FOR AFFECTED 95B AND 95C, AND CHANGES TO RESIDENT TRAINING.
LEADER DEVELOPMENT	**MINIMAL**. EXPAND BATTALION STAFF FUNCTIONS, TO INCLUDE INTERNMENT OF EPW/CI, US MILITARY PRISONERS, AND DISLOCATED CIVILIANS.
ORGANIZATION	**SIGNIFICANT**. IMPLEMENT NEW I/R BN TOE WITH TWO MODULES (CONF & EPW). CONVERT 95B AND C AUTHORIZAITONS TO MOS 95I.
MATERIEL	**NONE**. EQUIPMENT CURRENTLY DOCUMENTED WILL NOT CHANGE.
SOLDIER	**SIGNIFICANT**. ESTABLISH MOS 95I; DISESTABLISH MOS 95C, AND RESTRUCTURE MOS 95B.
STRAT MOB	**SIGNIFICANT**. NO ADDITIONAL LIFT REQUIREMENTS, HOWEVER, DEPLOYMENT OF APPROPRIATE NUMBER AND TYPE OF MODULES WILL GREATLY INCREASE FLEXIBILITY.

Slide 9. DTLOMS impacts

I/R OPNS FORCE REDESIGN

PERSONNEL IMPACTS

- ESTABLISH MOS 95I
  - CONVERT 95B IN EPW/CI UNITS AND GUARD CO (EXCEPT ESCORT GUARD)
  - CONVERT 95C IN CONFINEMENT UNITS
- NEW MOS WILL PROVIDE STANDARDIZED I/R MOS, ADDED FLEXIBILITY AND CROSS-UTILIZATION OF EPW/CONFINEMENT PERSONNEL.
- DEVELOP EXPORTABLE TRAINING DEVELOPMENT PACKAGE FOR AFFECTED 95B/95C.
- DEVELOP NEW RESIDENT TRAINING FOR 95I PERSONNEL.
- ENSURE CURRENT 95B/95C ARE "GRANDFATHERED" UNTIL ALL PERSONNEL ARE TRAINED.
- BASED ON TAA 03:

	OFF	WO	ENL	AGG
– CURRENT REQUIREMENT:	186	14	2162	2362
– I/R DESIGN:	194	16	2158	2368
DELTA:	**+8**	**+2**	**-4**	**+6**

Slide 10. Personnel impacts

Figure H-3. FDU issue briefing slides (cont)

GRADE CHANGE RECAP

OFFICERS

GRADE	AOC	CURRENT	PROPOSED	CHANGE
O6				
O5				
O4				
O3				
O2				
TOTAL OFFICER				

NCOs

GRADE	MOS	CURRENT	PROPOSED	CHANGE
E9				
E8				
E7				
E6				
E5				
TOTAL NCO				

WARRANT OFFICERS

GRADE	AOC	CURRENT	PROPOSED	CHANGE
W5				
W4				
W3				
W2				
W1				
TOTAL WARRANT				

SOLDIERS

GRADE	MOS	CURRENT	PROPOSED	CHANGE
E4				
E3				
TOTAL EM				

Slide 11. Grade Change Recap

I/R OPNS FORCE REDESIGN

EQUIPMENT IMPACTS

- MINIMAL EQUIPMENT IMPACT.
- NO NEW EQUIPMENT WILL BE DOCUMENTED.
- BASED ON TAA 03:
  - CURRENT REQUIREMENTS: $29,853,188
  - I/R DESIGN: $29,061,800
  - DELTA: - $791,388

Slide 12. Equipment impacts

Figure H-3. FDU issue briefing slides (cont)

I/R OPNS FORCE REDESIGN

RECOMMENDATION

THAT THE CSA APPROVE FOR IMPLEMENTATION THE INTERNMENT/RESETTLEMENT ORGANIZATION CONCEPT AND SUPPORTING FORCE REDESIGN.

Slide 13. Recommendation slide

Figure H-3. FDU issue briefing slides (cont)

Issue Package Evaluation Guide

1. DTLOMS questions.

a. Doctrine.

(1) Doctrinal change for proponent?

(a) Simplifies, consolidates or elaborates?

(b) Updates procedures?

(c) Incorporates joint procedures?

(d) Incorporates lessons learned?

(e) Develops new approach and methods?

(f) Affects fundamental design of a unit(s) on more than one echelon?

(g) Changes TTPs?

(2) Improves unit's operations in the areas of:

(a) Versatility

(b) Adaptability

(c) Modularity

(d) Interoperability

(e) Agility

(f) Deployability

(3) Digitization impacts?

(4) Force projection.

(a) Effects on strategic mobility?

(b) Equipment deployability issues?

(c) Special tools/personnel issues for deployment?

(5) Application in spectrum of conflict?

(a) Support and sustainment operations?

(b) Peacekeeping, peace-enforcement?

(c) Contingency operations?

(d) Medium intensity conflict/high intensity conflict?

b. Training.

(1) Active Army issues?

Figure H-4. FDU issue package evaluation guide

(2) Reserve Component issues?

(3) Stationing for training issues?

(4) Low-density training issues?

(5) Equipment for training issues?

(6) Environmental and/or safety issues?

(7) NTC/JRTC/Combat Maneuver Training Center training issues?

(8) Simulation training issues?

(9) Initial entry training issues?

(10) Unit training issues?

(11) Distributed and/or multi-media training issues?

(12) NCOES, CAS3, CGSC, War College issues?

(13) Advanced schooling issues?

c. Leadership. Issues pertaining to:

(1) Junior and senior non-commissioned officer?

(2) WO/technicians?

(3) Junior officers?

(4) Senior officers?

(5) Staff organization?

(6) Joint and/or combined leader development?

d. Organization.

(1) Unit, sub-unit, staff designs are consistent with other similar unit/staff designs?

(2) Are there implications for applying this unit/staff design on other units/staffs?

(3) Are there intermediate or partial solutions possible?

(4) Capabilities are packaged as modules?

(5) Modules are self-sufficient for leaders, mission equipment, communications?

(6) Affect on CSS MARC allocations for personnel/equipment?

e. Materiel.

(1) Dependency on equipment to realize the design?

(2) Equipment cost issues?

Figure H-4. FDU issue package evaluation guide (cont)

(3) Modernization issues?

(4) Required equipment programmed in current MODPLAN for this unit?

(5) Reasonable expectation of acquiring required equipment?

(6) Equipment could be procured off the shelf?

(7) Requires R&D?

(8) Equipment timelines affect reorganization?

f. Soldier.

(1) Operational tempo or personnel tempo issues?

(2) Retention issues?

(3) Joint or combined issues?

(4) Military/civilian issues?

(5) MOS/career pattern issues?

2. Staff work completed?

a. Clear problem statement?

b. Shortfall is valid and well-documented?

c. Clear statement of new requirement?

d. Viable courses of action are proposed and considered?

e. Recommendation satisfies the problem statement?

f. Evidence of prior coordination?

3. Support in hand.

a. MARC study?

b. RDD TOE Review Board already completed?

c. Analytical studies?

d. Field exercises, tests, experiments?

e. Supported by field commanders?

f. Supported in a previous FDU cycle (but required re-do)?

g. Supported by proponent GO?

h. Supported by MACOM GO?

i. Supported by DA GO?

Figure H-4. FDU issue package evaluation guide (cont)

Appendix I
Materiel Requirement Document (MRD) Formats

I-1. Capstone Requirements Document (CRD) format. (Extracted and amplified from CJCSI 3170.01.)

Paragraph 1: General description of operational capability. Describe the overall mission area, the type of capability proposed, and the anticipated operational and support concepts in sufficient detail for program, logistics, and other support planning. This must be a concise statement of how, what, when, and where the system fits on the battlefield. As such, the description should outline typical mission events/tasks, operational and sustainment interfaces, expected accomplishments related to overall force, and organizational impacts on employing, parent, and supporting organizations. Include a brief summary of the mission need. If a documented mission need did not precede the CRD, explain the process that investigated alternatives for satisfying the mission need and developing operational requirements.

Paragraph 2: Threat. Summarize the threat to be countered and the projected threat environment. This threat information should reference DIA or Service Technical Intelligence Center-approved documents and be validated by the Service Intelligence Director. For major defense acquisition programs (ACAT I), reference the DIA-validated threat assessment. In some non-warfighting systems, the threat may be listed as not applicable.

Paragraph 3: Shortcomings of existing systems. Describe why existing systems cannot meet current or projected requirements (do not describe a proposed system).

Paragraph 4: Capabilities required. Identify operational performance parameters (capabilities and characteristics) required. Articulate requirements in operational, output-oriented, and measurable terms. Specify each performance parameter in terms of a minimum acceptable value (threshold) required to satisfy the mission need. Objectives, if stated, should represent a measurable, beneficial increase in capability or operations and support above the threshold. If an objective is not stated, it is assumed to be the same as the threshold. Give rationale for each requirement, and place it with the requirement in the body of the CRD. The rationale must be stated in operational terms.

a. System performance. Describe mission scenarios (wartime and peacetime, if different) in terms of mission profiles, employment tactics, countermeasures, and environmental conditions (all inclusive: natural and man-made, e.g., weather, ocean acoustics, information warfare).

b. Identify system performance parameters such as range, accuracy, payload, speed, and mission reliability. Recommend which parameter should be considered a key performance parameter (KPP).

I-2. Mission Need Statement (MNS) format. (Extracted and amplified from CJCSI 3170.01.)

Paragraph 1: Defense Planning Guidance (DPG) element. Identify the major program planning objective or section of the DPG to which this need responds. Also reference Joint Intelligence Guidance and DOD or military department long-range investment plans, if applicable. State the approved TRADOC FOC that the MNS is supporting. For MAIS programs, also describe how the mission need

relates to the OSD Principal Staff Assistant's (PSA's), DOD Chief Information Officers,' and the DOD component's strategic planning.

Paragraph 2: Mission and threat analyses. Clearly identify and describe the mission need or deficiency. Define the need in terms of mission, objectives, and general capabilities. Do not discuss the need in terms of equipment or system-specific performance characteristics. Discuss the DIA-validated threat to be countered as well as the projected threat environment. This threat information should be drawn from the DIA documents and be approved by the DCSINT/SIO. For some non-warfighting systems, the threat may be listed as not applicable. The DCSINT/SIO will make final determination on the necessity for a validated threat assessment. Discuss the shortfalls of existing capabilities or systems in meeting these threats. Comment on the timing of the need and the general priority of this need relative to others in this mission area. For MAIS programs, also describe the functional area or activity the MNS supports, and the functional area or activity's current organization and operational environment, with emphasis on existing functional processes, including the concept of operation of the existing functional processes, procedures, and capabilities. Describes the shortfalls of existing capabilities.

Paragraph 3: Non-materiel alternatives. Discuss the results of the DTLOMS determination analysis. Identify any changes in U.S. or allied doctrine, concepts, tactics, organization, and training that were considered in the context of satisfying the deficiency. Describe why such changes were judged to be inadequate.

Paragraph 4: Potential materiel alternatives. Identify known systems or programs which the market survey identified as addressing similar needs and are deployed or are in development or production by any of the Services or allied nations. Discuss the potential for inter-Service or allied cooperation. Indicate potential areas of study for concept exploration including the use of existing U.S. or allied military or commercial systems or product improvements of existing systems. Do not evaluate these alternatives.

Paragraph 5: Constraints. Describe, as applicable, key boundary conditions related to infrastructure support that may impact on satisfying the need: logistics support; transportation; global geospatial information and Services (e.g., mapping, charting, and geodesy) support; manpower, personnel, and training constraints; environmental protection requirements; C3, intelligence, or other interfaces; security; and standardization or interoperability within DOD components, North Atlantic Treaty Organization (NATO), and other allies and friendly nations. Address the operational environments (including conventional; initial nuclear weapon effects; nuclear, biological, and chemical contamination (NBCC); Information Assurance; environmental protection; electronic; and natural) in which the mission is expected to be accomplished. Define the level of desired mission capability in these environments. For MAIS programs, also identify the classification level(s) and level of assurance required for the system; describe the anticipated system security interface(s) and interoperability requirements, if known; and include information warfare in the discussion of operational environments in which the mission is expected to be accomplished.

Paragraph 6: Joint Potential Designator (JPD). Indicate the JPD established through the validation process (joint, joint interest, independent; see para 11-14).

I-3. Operational Requirement Document (ORD) format. (Extracted and amplified from DOD Reg 5000.2-R.)

Paragraph 1: General description of operational capability. This paragraph is one of the most critical elements of the ORD. Describe the overall mission area, the type of system proposed, and the anticipated operations and support concepts (how the system will be employed and supported) in sufficient detail for program and logistics support planning. This must be a concise statement of how, what, when, and where the system fits on the battlefield. This statement must include consideration/explanation of joint and coalition interoperability (not RSI). As such, the description should outline typical mission events/tasks, operational and sustainment interfaces, expected accomplishments related to overall force, and organizational impacts on employing, parent, and supporting organizations. The operations and support concept must be linked to an approved concept appropriate to the time of fielding (almost never current doctrine). If applicable, address the requirement for split-based operations of units and the corresponding resource and logistics planning requirements. State the approved TRADOC FOC(s) that this requirement is supporting. Include a brief summary of the mission need, state if the need is mission critical, and include a sentence stating: "A DTLOMS determination analysis was completed and non-materiel alternatives were judged to be inadequate. (Discuss and evaluate the results of the DTLOMS determination analysis.)". Identify known systems or programs which the market survey identified as addressing similar needs and are deployed or are in production by any of the Services or allied nations. Discuss the potential for inter-Service or allied cooperation.

Paragraph 2: Threat. Summarize the threat to be countered and the projected threat environment. This threat information should reference DIA or Service Technical Intelligence Center-approved documents and be validated by the Service Intelligence Director. For major defense acquisition programs (ACAT I), reference the DIA-validated threat assessment. In some non-warfighting systems, the threat may be listed as not applicable.

Paragraph 3: Shortcomings of existing systems. Describe why existing systems cannot meet current or projected requirements (do not describe a proposed system).

Paragraph 4: Capabilities required. Identify operational performance parameters (capabilities and characteristics) required. Operational performance parameters include performance of machine with soldier operators, crews, and leaders performing missions in an operational environment. Articulate requirements in operational, output-oriented, and measurable terms. Specify each performance parameter in terms of a minimum acceptable value (threshold) required to satisfy the mission need. Objectives, if stated, should represent a measurable, beneficial increase in capability or operations and support above the threshold. Give rationale separately for every requirement and include that in the body of the ORD immediately following the requirement it supports (e.g., "The system requires X. Rationale: The system must be able to operate ..."). If objectives are stated, provide rationale that justifies the objective as well as the threshold. State rationale in operational language providing a credible audit trail explaining the operational significance of each requirement. The rationale should not refer to Army regulations, military standards, or military specifications.

Paragraph 4a: System performance. Describe mission scenarios (wartime and peacetime, if different) in terms of mission profiles, employment tactics, countermeasures, and environmental

conditions (all inclusive: natural and man-made, e.g., weather, ocean acoustics, information warfare). Identify system performance parameters such as range, accuracy, payload, speed, and mission reliability. Recommend which parameter should be considered a KPP and identify it with an asterisk. Soldiers must be able to operate the system to the required operational performance for mission accomplishment.

Paragraph 4b: Logistics and readiness. Include measures for mission-capable rate, operational availability, frequency and duration of preventive or scheduled maintenance actions. Describe the measures in terms of mission requirements considering both wartime and peacetime logistics operations. Identify combat support requirements including battle damage repair capability, mobility requirements, expected maintenance levels, and surge and mobilization objectives and capabilities. Use Built-In Test or Built-In Test Equipment (BIT/BITE) to unambiguously fault isolate to the single LRU at the unit level and single SRU at DS/GS level of maintenance.

Paragraph 4c: Other system characteristics. This is a special category of characteristics that tend to be design, cost, and risk drivers. Address electronic attack (EA), information assurance, and wartime reserve mode (WARM) requirements for smart/brilliant weapons system field reprogrammability; conventional, initial nuclear weapons effects, and NBCC survivability (see appendix S for additional information); natural environmental factors (such as climatic, terrain, and oceanographic factors); unplanned stimuli (for munition systems or systems which include munitions, add the statement, "Munitions used by this system will be developed to withstand unplanned stimuli identified in a lifecycle system threat hazard assessment."); electromagnetic environmental effects (E3) and spectrum certification and supportability for systems and equipment; and parachute static line, freefall, slingload, or aerial delivery requirements. Field reprogramming must be accomplished by the maintenance support unit using organic personnel without augmentation and without removing system components. Identify characteristics (confidentiality, integrity, accuracy, timeliness, and availability) to defend against and survive information warfare attack. Define the expected mission capability (e.g., full, percent degraded) in the various environments. Include applicable safety parameters such as those related to system, nuclear, explosive, and flight safety. Identify communications, information, and physical and operational security needs to include protection of organic platform electronics from computer network attacks (CNA) directed against platform information/communications systems.

Paragraph 5: Program support. Establish support objectives for initial and full operational capability. Discuss interfacing systems (at the system/subsystem, platform, and force levels), specifically those related to C4I, transportation and basing, and standardization and interoperability. Identify companion ORDs and other Services that may have similar requirements. Assign a JPD (joint, joint interest, or independent).

Paragraph 5a: Maintenance planning. Identify maintenance tasks to be accomplished and time phasing for all levels of maintenance. Include programmed maintenance and surveillance inspections such as nuclear hardness and structural integrity. Describe the envisioned planning approach for contract versus organic repair.

Paragraph 5b: Support equipment. Define the standard support equipment to be used by the system. Describe the test and fault isolation capabilities desired of automatic test equipment at all levels, expressed in terms of realistic and affordable probabilities and confidence levels. Consider the use of Embedded Diagnostics in all systems development. A weapon system should be designed for

testability and embedded diagnostics employment where feasible (see app U). Specify the capability of on-board diagnostics and give the location and purpose of sensors.

Paragraph 5c: Human Systems Integration/MANPRINT. Address each HSI/MANPRINT domain:

(1) Establish broad, manpower constraints for operators, maintainers, and support personnel. Identify requirements for manpower factors that impact system design (utilization rates, pilot-to-seat ratios, maintenance ratios).

(2) Establish broad cognitive, physical, and sensory requirements for the operators, maintainers, or support personnel who contribute to, or constrain, total system performance, including training constraints.

(3) Establish requirements for human performance that will achieve effective human-system interfaces.

(4) Identify requirements for combining, modifying, or establishing new MOSs.

(5) Describe the training concept. State how individuals, units, and crews will be trained to operate, maintain, and manage the system for both Active and Reserve Components. Describe the new equipment training (NET) concept to initially transfer knowledge about the system to the gaining unit. The goal is for NET to be self-taught or taught by a small NET Team using distance-learning media when it is cost- and training-effective. The system Training Support Package (TSP) uses Interactive Multimedia Instruction (IMI) and is designed for multipurpose use in support of institutional training, NET, and unit sustainment training. State TSP requirements in terms of need, rationale, and projected quantities for each type of training product required to support training the system. Include requirements for Training Aids, Devices, Simulators, and Simulations (TADSS), targetry, training ammunition, and the logistical concept to support the TADSS. State what training capabilities are to be embedded in terms of functional requirements and category of embedded training. If no embedded capability is required, so state. State CTC instrumentation and interface requirements.

(6) Include safety or health and critical errors that reduce job performance or system effectiveness given the operational environment.

(7) Provide soldier survivability operational requirements to reduce detectability by the enemy, reduce fratricide, facilitate cover and concealment, minimize the likelihood and extent of injuries if engaged, and minimize physical and mental fatigue.

(8) Determine objectives and thresholds for the above requirements, as appropriate. Generally, routine priority HSI/MANPRINT requirements are placed in paragraph 5c. When the ORD developer believes that any particular HSI/MANPRINT requirement is essential to system performance, that requirement should be included in paragraph 4a. When a requirement is essential for logistics and readiness, it should be included in paragraph 4b. When a requirement describes an essential system characteristic, it should be included in paragraph 4c. When an HSI/MANPRINT consideration is vital to a requirement and it satisfies the tests for a KPP, include it in paragraph 4a.

Paragraph 5d: Computer resources. Identify computer resource constraints (examples include language, computer, database, architecture, or interoperability constraints). Address all mission critical and support computer resources, including automated test equipment. Describe the capabilities desired for integrated computer resources support. Identify any unique user interface requirements, documentation needs, and special software certifications. Additionally, provide, as appropriate, operational architecture input. All technical manuals must be Interactive Electronic Technical Manuals (IETM) for - 20 and above level of maintenance.

Paragraph 5e: Other logistics considerations. Describe the provisioning strategy for the system. Specify any unique facility, shelter, or environmental compliance requirements. Identify special packaging, handling, and transportation considerations. Define unique data requirements such as engineering data for depot support and technical orders for the system and depot. Identify dedicated facilities or facility enhancements required to support training.

Paragraph 5f: Command, control, communications, and intelligence (C4I). Using the operational architecture approach, describe how the system will be integrated into the C4I architecture that is forecast to exist at the time the system will be fielded. Include data fusion requirements and type of data (data, voice, video), frequency of data, computer network support/protection, and antijam requirements. Identify unique intelligence information requirements, including intelligence interfaces, communications, and database support pertaining to target and mission planning activities, and threat data. All IT systems must include a statement that the system will be Joint Technical Architecture - Army (JTA-A) compliant.

Paragraph 5g: Transportation and basing. Describe how the system will be moved either to or within the theater to include any lift constraints. Consider requiring transport by commercial air, sea, or intermodal transport either as a threshold or objective requirement. Detail the basing requirements (main and forward operating bases) and associated facilities needed for training.

Paragraph 5h: Standardization, interoperability, and commonality. Describe considerations for joint use, NATO cross-servicing, etc. Identify procedural and technical interfaces, and communications, protocols, and standards required to be incorporated to ensure compatibility and interoperability with other Service, joint Service, and allied systems. Identify systems requiring interoperability with the system and any special considerations (e.g., computer to computer and magnetic media). Systems should be interoperable with Army Battle Command Systems (ABCS) to include FBCB2. They must be compliant with the Army Software Reuse Policy, Joint Technical Architecture, Defense Information Instruction Common Operating Environment, and ABCS CRD. Address energy standardization and efficiency needs for both fuels and electrical power, as applicable. The overarching goal of electric power management is to reduce electrical power requirements and consumption/drain. Requests for more effective, power-conserving software, and more energy-efficient circuitry/components. facilitates efforts toward power consumption reduction through deliberate power management. Additionally, developers must be concerned with improved and innovative means of delivering electrical power with the goal of minimizing or eliminating the performance encumbering logistical support tails. Communications/Electronics systems powered by batteries must use standard, either military or commercial off-the-shelf, batteries and be capable of operation with rechargeable

batteries during training. When developing future operational mission profiles, the user must anticipate the increasing integration of rechargeable batteries with primary (nonrechargeable) batteries.

Paragraph 5i: Mapping, charting, and geodesy support.

(1) Identify cartographic materials, digital topographic data, and geodetic data needed for system employment. Whenever possible, National Imagery and Mapping Agency (NIMA) Foundation Data Sets should be used. If the NIMA Foundation Data Set will not suffice, Mission Specific Data Sets (MSDS) should be requested. When MSDS is required, the ORD must include a detailed requirement for an MSDS by providing the following information:

(a) Impact on development, test, and evaluation or operational commitment if the product or Service is not provided as requested. Express the impact in terms of the OPLAN, CONPLAN, training requirement, or other mission essential requirement that will be supported by the request.

(b) Content and accuracy requirements, correlated with the technical characteristics and accuracy of the system or activity that the product or Service will support.

(c) Initial area of coverage.

(2) An information briefing on Foundation Data and MSDS can be accessed on the Internet at http://www.wood.army.mil/TPIO-TD. A template to assist in the development of geospatial requirements can be found at the same website.

Paragraph 5j: Environmental support. Identify the standard and unique weather, oceanographic, and astrogeophysical support required. Include data accuracy and forecast requirements.

Paragraph 6: Force structure. Estimate the number of systems or subsystems needed, including spares and training units. Identify units or platforms and quantities of these platforms (including other Services or government agencies if appropriate) that will employ the systems or subsystems being developed and procured to satisfy this ORD. Also identify materiel end items planned or programmed for training (over and above force structure requirements), e.g., at the institution.

Paragraph 7: Schedule considerations. Define what actions, when complete, will constitute attainment of initial and full operational capability (leave these flexible so they can be revised as the program is progressively defined and trade-off studies are completed). Clearly specify the operational capability or level of performance necessary to declare initial and full operational capability. Include the number of operational systems, operational and support personnel, facilities, and organizational, direct support, general support, and depot maintenance elements (renamed field and sustain maintenance in emerging Force XXI doctrine) that must be in place. If availability in a specific timeframe is important, specify an objective for initial operational capability. Describe the impact if this objective is not achieved and identify a window of acceptability, if appropriate.

Appendix J
Operational Mode Summary/Mission Profile (OMS/MP) Development Procedures

J-1. Purpose. The OMS/MP describes how a system or training device will be used in wartime or peacetime at the time it is fielded with focus on the future. Information in an OMS/MP presents a structured, quantitative picture of annual equipment usage.

J-2. General.

a. The OMS/MP is a source document for many agencies during the materiel acquisition process, including the logisticians, testers and evaluators, materiel requirements generators, organization documentors, analysts, trainers, operational planners, and manpower resources.

b. It is the genesis of the future usage profiles which are used to develop the force structure in the TAA process. The OMS/MP also is a source document used to build the congressionally mandated Manpower Estimate Report (MER).

c. An OMS/MP is required to support the development of materiel requirements documents. The value of this type information to the materiel acquisition community was recognized by DOD with the publication of the referenced DOD 5000 series. The OMS/MP is developed and staffed at the same time as the ORD in accordance with ORD staffing procedures. The level of detail in the OMS/MP is normally more specific for the ORD to support the MS II decision than for MS I because all potential mission profiles may not be identified at MS I.

d. An OMS/MP describes the anticipated mix of ways units, by unit or mission task mix, will use equipment during a typical year in peacetime and during national conflict in wartime. It provides the basis for the essential characteristics described in the ORD. As such, the rationale for those characteristics must be supported by the OMS/MP. It covers all missions and profiles for each mission. The OMS shows the relative frequency of the various missions. It also includes the percentage of time the materiel will be exposed to each type of environmental condition during the life of the system. The OMS does not specify unscheduled downtime. The OMS must address special conditions of use, such as wartime usage surge rates, operations other than war (OOTW) or high-intensity peacetime usage, when appropriate. An MP is a time-phased description of the operational events (equipment usage) and environments (natural and man-made) an item experiences from the beginning to end of a specific mission. It identifies sequentially the tasks, events, duration, and operating conditions of the system for each phase of a mission.

J-3. Procedures.

a. The TRADOC proponent that writes an ORD also writes the OMS/MP. Information in an OMS/MP is normally based on, and derived from, approved TRADOC standard scenarios. Other official Army documentation sources upon which an OMS/MP may be based include, but are not limited to: DPG; ARTEPs; existing doctrine; emerging doctrine based on new or changed concepts; tactics, techniques, and procedures; lessons learned, operational plans; models or simulators, e.g., Warfighters' Simulation (WARSIM), combined arms tactical trainer (CATT), close combat tactical trainer (CCTT), DIS; or OMS/MPs or the wartime usage rate database for existing similar equipment, e.g., M60 tank for

the M1 tank. Wartime usage rates (WUR) (commonly referred to as equipment usage profile (EUP)) consist of one or more of the following elements: EUP, wartime flying hours (WFH), and ammunition consumption rates (ACR). If other than a standard scenario is used as the basis, that basis is identified and the rationale for its use is provided. The information in an OMS/MP is used to build and maintain the EUP database for future systems. This is currently done by CASCOM at Fort Lee, Virginia. This mission will migrate to USAFMSA as part of the VCSA-approved restructuring of the organization documentation community.

b. Normally multiple scenarios are used to capture the full range of mission profiles the equipment must accomplish in each unit type. Sources for scenarios are HQ TRAC (ATRC-TD), school combat developments elements, and the DTIC.

c. Profiles for each mission quantitatively state specific amounts of operation, e.g., hours, rounds, miles, or cycles, for functions within each mission. Actual operational data, training exercises, and virtual, constructive, and live simulations results are sources for these specific amounts. The information can be provided in a table supported by a narrative summarization.

d. The OMS/MP shows the expected range of environmental conditions into which the entire fleet of systems can be expected to be deployed and operated. Environmental conditions also include factors the system will be subjected to while being stored, transported, or strategically deployed. Environmental conditions (AR 70-38) are natural environmental factors such as climate and terrain, as well as man-made factors, which include but are not limited to, NBCC, electronic countermeasures (ECM), urban terrain/areas, and smoke.

e. The OMS/MP states the operating and alert times associated with each mission, when appropriate. Additionally, the OMS states the standby and down times. Operating time (OT) is the time that the equipment is executing a given mission. If any one of the subsystems (e.g., radios, sensors, auxiliary power units) is operating, a system is considered to be operating. Alert time (AT) is time that the system is operable, manned, and committed to the accomplishment of a specific mission, but is not actually executing that mission. Standby time (ST) is the time when a system is operationally capable, but is neither committed nor operating, e.g., parked in a motor pool and unmanned. Down time (DT), in operational terms, is when the system is not operationally commitable. Included in DT are scheduled maintenance and transport time when the system cannot be operated, e.g., transport by truck, rail, ship, or aircraft.

f. The OMS/MP addresses both wartime and peacetime usage. Peacetime usage includes training and OOTW.

g. There is no standard format or length for an OMS/MP that fits all types of equipment. Each OMS/MP is, therefore, unique. OMS/MP content and length is tailored to fit the system. Content, however, must be complete enough to provide the acquisition community users the information they need to develop their products. Sequencing of information can be standardized. The OMS is the first part and the various MPs are the second. The OMS introductory information elements, in order, are: a description of the concept of employment; the type missions that apply to the system; and the methodology and references used to develop the OMS/MP. The following is a series of OMS/MP

appendix examples selected to assist OMS/MP authors develop quality documents. The examples include either whole or selected parts of actual OMS/MP.

(1) The Future Scout Vehicle (FSV) OMS/MP (see fig J-l, at the end of this app) is a good overall example. It has a good description of the concept of employment, mission summary, methodology used to derive (reference to scenario), and operational environment. It contains a good mix of narrative and tables.

(2) The Up-Armored High-Mobility Multipurpose Wheeled Vehicle (HMMWV) OMS/MP (see fig J-2, at the end of this app) is also a good overall example for the same reasons. It provides a clean audit trail as to how the OMS/MP was built by including a complete reference list to include an EUP. The AT is a combination of standby and AT as described above.

(3) The Gun Laying and Positioning System (GLPS) OMS/MP (see fig J-3, at the end of this app) extract is a good example of coverage of a subsystem on multiple operational systems.

(4) The Improved Cargo Helicopter (CH-47X) OMS/MP (see fig J-4, at the end of this app) is a good example because it is concise and uses notes to explain the tables.

(5) The NBC Reconnaissance System (NBCRS) OMS/MP (see fig J-5, at the end of the app) has a good OMS description. It also is a good example of different mission profiles with the same tasks.

(6) The Mounted Water Ration Heater (MWRH) OMS/MP (see fig J-6, at the end of this app) is a good example of an OMS/MP that is based on the OMS/MPs for systems on which the MWRH will be a component.

(7) An OMS/MP for a CSS production system or a training device is typically based on a single calendar day, as the activities of each day are basically the same. The MP for training devices is normally the same in wartime and peacetime. The difference is in frequency of use occurrences. The containerized kitchen (CK) OMS/MP (see fig J-7, at the end of this app) and the MlA2 Conduct-of-Fire Trainer (COFT) OMS/MP (see fig J-8, at the end of this app) are good examples of this type OMS/MP. Additionally, the CK OMS/MP contains a good example of how to depict DT.

(8) One time use equipment (e.g., ammunition, some missiles) has an OMS, but may not have a discrete MP. Parachutes and some training devices may be considered as one time use equipment in a given mission profile, however, they may be reused in subsequent missions. The frequency of use by unit and by mission is essential. An example is the Training Smoke Pot OMS (see fig J-9, at the end of this app).

Future Scout Vehicle (FSV) Operational Mode Summary/Mission Profile (OMS/MP)

1. Concept of employment. The Future Scout Vehicle (FSV) will be the principal ground reconnaissance vehicle in battalion and brigade scout elements, divisional cavalry squadrons, light cavalry regiments, and armored cavalry regiments. The FSV will be a configurable system; allowing it to perform missions requiring firepower and survivability, as well as missions requiring stealth and advanced detection and acquisition capabilities. The roles and missions of the FSV will vary based on the mission profile of the organization it is assigned to. This Operational Mode Summary/Mission Profile (OMS/MP) describes the performance of the FSV in both of these configurations.

a. The Future Scout Vehicle-Cavalry (FSV-C) will be employed in cavalry organizations. Its more lethal armament will allow it to fight when required. Security operations normally require cavalry units to fight to destroy enemy reconnaissance forces, protect a friendly force, and/or defeat initial enemy attacks. During reconnaissance operations, cavalry forces must defeat enemy counter reconnaissance forces. At times, cavalry units will be used to fight to obtain information; fighting can be the only method of determining an enemy's intentions. Operations of this nature are described in the FSV-C OMS/MP.

b. The Future Scout Vehicle-Scout (FSV-S) will be employed in scout and reconnaissance organizations. In these units, FSVs will perform primarily stealthy reconnaissance and surveillance. The success of their missions will depend upon their ability to detect at long ranges and remain undetected and unengaged. FSV-S equipped organizations will depend upon indirect fires for their lethality. Operations requiring this type of capability are described in the FSV-S OMS/MP.

2. Missions. The FSV, in its common configurations, will perform the following missions in support of the various organizations listed above:

a. Offense.

(1) Conduct long range reconnaissance, surveillance, acquisition, and targeting operations.

(2) Conduct close reconnaissance to obtain information about enemy forces and terrain.

(3) Conduct security operations to protect main body forces from observation or attack by threat forces and to destroy threat reconnaissance forces and harass and destroy combat units (within the capability of the cavalry unit).

(4) Conduct offensive operations in an economy of force role.

b. Defense.

(1) Conduct long range reconnaissance, surveillance, acquisition, and targeting operations.

(2) Conduct close reconnaissance to obtain information about enemy forces and terrain.

(3) Conduct security operations to protect main body forces from observation or attack by threat forces and to destroy threat reconnaissance forces; harass and destroy combat units (within the capability of the cavalry unit).

(4) Conduct defensive operations in an economy of force role.

Figure J-1. FSV OMS/MP example

3. OMS/MP methodology. The FSV OMS/MP is derived from the operations of a light cavalry regiment portrayed in the TRADOC Southwest Asia (SWA) Standard Low Resolution Scenario (LRS) 3.0. SWA LRS 3.0 depicts 38 days of battle followed by 101 days of reconstitution. The scenario portrays the four stages of AirLand Operations:

1. Detection/Preparation
2. Establishing the Conditions for Decisive Operations
3. Decisive Operations
4. Force Reconstitution

a. The 96 hour OMS for both the FSV-C and FSV-S was based on the missions the light cavalry regiment performed during the 38 days of battle (the first three stages of the battle). The missions, their length, and frequency were used to develop the resulting 96 hour OMS. This methodology provides a proportional representation of the activities of both configurations of the FSV.

b. To obtain the greater resolution necessary for development of the MP, two High Resolution Scenarios (HRS) based on SWA LRS 3.0 were used. These were developed by TRAC: Air Ground Motorized Cavalry l.0, Light Cavalry Squadron - Guard; Air Ground Motorized Cavalry 2.0, Light Cavalry Squadron - Screen. These two scenarios provided increased resolution of the missions, disposition, and movements of the light cavalry units equipped with the FSV.

c. The annual OMS/MP is based on the Armored Systems Modernization OMS/MP Methodology. The annual OMS/MP consists of 30 12-day periods. During the 12-day period, FSV-equipped forces fight the 96-hour scenario and then spend eight days resting, refitting, and preparing for the next operation. Thirty iterations of this generate an annual (360 day) OMS/MP.

d. Where applicable, insights obtained from Operation Desert Storm have been used.

4. Operational environment.

a. Threats to FSV-equipped forces.

	Joint Battle Area	**Shaping and Close Battle Areas**	**Dispersal, Staging, and Logistics Areas**
Small Arms	X	X	X
Artillery	X	X	X
Mortars	X	X	X
Tanks	X	X	X
Infantry Fighting Vehicles	X	X	X
Anti-Tank Rockets/Guided Missiles	X	X	X
Armed Helicopters	X	X	X
Mines	X	X	X
Directed Energy Weapons	X	X	X
NBC Weapons	X	X	X
Fixed Wing Aircraft	X	X	X
Lightly Armored Vehicles	X	X	X

Figure J-1. FSV OMS/MP example (cont)

Note: The following comparisons can be made roughly: the Joint Battle Area is similar to the Deep Area, the Shaping and Close Areas are similar to the Covering Force and Main Battle Areas and the Dispersal, Staging and Logistics Areas. See TRADOC Pam 525-5 for exact definitions.

b. Visibility. Fifty to 80% of operations will be conducted in limited visibility (darkness, fog, haze, rain, blowing sand, smoke, and other artificial obscurants).

c. Movement.

	Cross-Country	Secondary Roads	Primary Roads
FSV-C	81%	19%	0%
FSV-S	89%	11%	0%

d. Climatic design types:

Hot	- 40%
Basic	- 50%
Cold	- 5%
Extreme	- 5%

5. FSV OMS/MP - Wartime.

a. Mission definitions. The mission definitions are summarized from FM 17-95 or are descriptions of the missions as they occurred in SWA LRS 3.0. These definitions should be applied to the FSV OMS and MP that follow:

(1) Reconnaissance. A mission undertaken to obtain information about the enemy and terrain. Three types of reconnaissance are performed by cavalry: route, zone, and area. Scout elements employ stealth, infiltration, movement and observation, and special equipment to obtain information. If required, cavalry units fight to gain information to support the mission.

(2) Screen. A security mission to maintain surveillance and provide early warning by maintaining contact with enemy forces encountered. Without becoming decisively engaged, a screening force impedes and harasses the enemy with organic or supporting fires and destroys or repels enemy reconnaissance elements.

(3) Guard. A security mission to protect the main body from enemy ground observation, direct fire, and surprise attack. The guard force provides early warning, reaction time, and maneuver space. The guard force will destroy enemy reconnaissance units, and force the enemy to deploy for one or more attacks and destroy enemy combat elements. A guard force for a moving main body systematically advances to a series of battle positions, moving parallel to the main body's axis of advance. It also involves more reconnaissance oriented activity.

(4) Reserve. To be withheld from action at the beginning of an engagement so it will be available for commitment at a decisive moment.

(5) Operational, relocating, and unengaged. To remain in an operational status as the unit transitions from one mission to the next. It involves reaction to warning orders, repositioning, preparation for future operations, reconnaissance, surveillance, and other activities that require the unit to remain fully combat capable.

(6) Deep reconnaissance, surveillance, and target acquisition. A mission undertaken in the Joint Battle Area and/or Shaping Area to obtain information about the enemy and terrain, and provide human confirmation of information provided by sensors. The reconnaissance/surveillance function is normally focused on named areas of interest, targeted areas of interest, and/or decision points supporting deep fires or decisive maneuver.

Figure J-1. FSV OMS/MP example (cont)

b. FSV-C OMS/MP – Wartime

(1) FSV-C OMS.

96 Hours

			Operational Time (Hrs)		
Mission	**Mission Duration (Hrs)**	**Missions Per Time Period**	**Per MSN**	**Total**	**Total Mission Hours**
Reconnaissance	11	1	9.1	9.1	11
Screen	20	2	15.9	31.8	40
Guard	20	1	15.2	15.2	20
Reserve	18	1	13.4	13.4	18
Operational Repositioning and Unengaged	1:75*	4	1:75	7	7

* Average Time Spent

Annual (96 Hours x 30)

			Operational Time (Hrs)		
Mission	**Mission Duration (Hrs)**	**Missions Per Time Period**	**Per MSN**	**Total**	**Total Mission Hours**
Reconnaissance	11	30	9.1	273	330
Screen	20	60	15.9	954	1200
Guard	20	30	15.2	456	600
Reserve	18	3-0	13.4	402	540
Operational Repositioning and Unengaged	1:45	120	1:45	210	210

(2) FSV-C MP.

96 Hours

	Recon	**Screen**	**Guard**	**Reserve**	**Operational, Relocating & Unengaged**	**Total**
Move Distance Average	145 km	99 km	74 km	98 km	28 km	444 km
Maximum	180 km	120 km	90 km	130 km	40 km	560 km
Engine Idle Average Duration in Minutes	150 min	996 min	558 min	39 min	60 min	1803 min
Engage Tgts Average Cannon Rounds	350	400	4000	50	0	4800
Missiles	1	10	16	1	0	28

Figure J-1. FSV OMS/MP example (cont)

Annual (96 Hours x 30)

	Recon	Screen	Guard	Reserve	Operational, Relocating and Unengaged	Total
Move Distance Average	4,350 km	2,970 km	2,220 km	2,940 km	840 km	13,320 km
Maximum	5,400 km	3,600 km	2,700 km	3,900 km	1,200 km	16,800 km
Engine Idle Average Duration in Minutes	4,500 min	29,880 min	16,740 min	1,170 min	1,800 min	54,090 min
Engage Tgts Average Cannon Rounds	12,000	12,000	120,000	0	0	144,000
Missiles	30	300	480	30	0	840

c. FSV-S OMS/MP – Wartime.

(1) OMS.

96 Hours

			Operational Time (Hrs)		
Mission	Mission Duration (Hrs)	Missions Per Time Period	Per MSN	Total	Total Mission Hours
Operational Relocating and Unengaged	9	1	9.0	9.0	9
Reconnaissance	5	1	4.5	4.5	5
Deep Recon, Surveillance & Target Acqn	57	1	48.9	48.9	57
Reserve Incl Repositioning	25	1	21.2	21.2	25

Annual (96 hours x 30)

			Operational Time (Hrs)		
Mission	Mission Duration (Hrs)	Missions Per Time Period	Per MSN	Total	Total Mission Hours
Operational Relocating and Unengaged	9	30	9	270	270
Reconnaissance	5	30	4.5	135	150
Deep Recon, Surveillance & Target Acqn	57	30	48.9	1467	1710
Reserve Incl Repositioning	25	30	21.2	636	750

Figure J-1. FSV OMS/MP example (cont)

(2) FSV-S MP.

96 Hours

	Recon	Deep Recon Surveil & Tgt Acqn	Reserve Reconstitute	Operational, Relocating & Unengaged	Total
Move Distance					
Average	43 km	179 km	203 km	132 km	557 km
Maximum	50 km	192 km	215 km	160 km	617 km
Engine Idle					
Average Duration in Minutes	12	1,860	90	84	2,046
Engage Tgts					
Average Dew Shots	15	175	0	0	190

Annual (96 hours x 30)

	Recon	Deep Recon Surveil & Tgt Acqn	Reserve Reconstitute	Operational, Relocating & Unengaged	Total
Move Distance					
Average	1,290 km	5,370 km	6,090 km	3,960 km	16,710 km
Maximum	1,500 km	5,760 km	6,450 km	4,800 km	18,510 km
Engine Idle					
Average Duration in Minutes	360	55,800	2,700	2,520	61,380
Engage Tgts					
Average Dew Shots	450	5,250	0	0	5,700

6. FSV OMS/MP - Peacetime (Annual).

a. The peacetime OMS/MP is based on OPTEMPO resourcing of FY 1999 cavalry squadron training projections using the Combined Arms Training Strategy (CATS). The training strategy assumes use of currently projected training devices to be fielded prior to or during FY99.

Figure J-1. FSV OMS/MP example (cont)

b. Peacetime OMS/MP projections are applicable to both the FSV-C and FSV-S configurations of the system.

		Ammunition*		
Event**	**Miles**	**Gun**	**Small Arms**	**Missiles**
Collective Training				
Bn FTX	121		195	2
Bn FCX	2			1
Bn CFX	30			
Co FTX	163		741	16
Co FCX	2			1
Plt FTX	137		1054	24
Deploy Alerts	39			
Adv Gun Tbls	105	344	571	
CALFEX	22	45	185	2
EXEVAL	121		195	2
Crew/Individual Training				
Basic Gun Tbls	105			32
Int Gun Tbls	91	769	2629	18
Maintenance	35			
Totals	973	1158	5570	98

*FSV-C only
**Mission Descriptions:
FTX-Field Training Exercise
FCX-Field Command Exercise
CFX-Command Field Exercise
Adv Gun Tbls-Advanced Gunnery Tables
Basic Gun Tbls-Basic Gunnery Tables
Int Gun Tbls-Intermediate Gunnery Tables

Reference:
DA Pam 350-38, Standards in Weapons Training, 15 Feb 93, USAARMS Cavalry Squadron Training Strategy (1999)

Figure J-1. FSV OMS/MP example (cont)

Up-Armored HMMWV Operational Mode Summary/Mission Profile (OMS/MP)

1. Concept of employment.

a. The Up-Armored HMMWV will be designed to conduct reconnaissance and security operations as its primary function. Up-Armored HMMWVs will be organic to the scout platoons of the armored, infantry, and mechanized infantry battalions. Up-Armored HMMWV-mounted scouts will enhance the capability of scout platoons to provide accurate and timely information about the enemy and the area of operations.

b. During reconnaissance operations, the scouts provide the commander with a mobile reconnaissance platform to perform detailed route, zone, and area reconnaissance; prevent surprise by enemy forces; and help retain the freedom to maneuver. The speed, mobility, and stealth of the Up-Armored HMMWV also allows the scout to extend the depth of his reconnaissance, providing increased security and additional time and maneuver space for the commander. Due to its small signature relative to the Cavalry Fighting Vehicle (M3), the Up-Armored HMMWV provides the stealth necessary to conduct detailed reconnaissance in areas where contact with the enemy is possible. This information is rapidly reported to higher headquarters through secure radio means or by physical delivery (particularly during periods of reduced electronic communications).

c. Security operations will also be significantly enhanced by Up-Armored HMMWV-mounted scouts. In screen missions, scouts operating independently, or in conjunction with other reconnaissance elements, will be used to establish observation posts to the front or flank of the maneuver force, patrol between observation posts, and cover gaps between forces. In rear areas, Up-Armored HMMWV-mounted scouts will enhance security by patrolling primary lines of communication, providing threat early warning to rear area units, and reconnoitering potential threat landing and drop zones.

2. Missions. The scout platoon's primary missions are reconnaissance and screening in support of its parent unit. The Up-Armored HMMWV will enable scout platoons to perform these missions, which are defined below.

a. Reconnaissance. A mission undertaken to obtain information about the enemy and terrain. Three types of reconnaissance are performed by scouts: route, zone, and area. Scout elements employ stealth, infiltration, movement and observation, and special equipment to obtain information.

b. Screen. A security mission to maintain surveillance and provide early warning by maintaining contact with enemy forces encountered. Without becoming decisively engaged, a screening force impedes and harasses the enemy with organic or supporting fires and destroys or repels enemy reconnaissance elements.

c. Reserve. To be withheld from action at the beginning of an engagement so it will be available for commitment at a decisive moment.

d. Unengaged. Units remain in an operational status as they transition from one mission to the next. The transition involves reaction to warning orders, repositioning, preparation for future operations, reconnaissance, surveillance, and other activities that require a unit to remain fully combat capable.

3. Operational environment.

a. Threats to Up-Armored HMMWV-equipped forces.

	Deep Area	Close Areas	Rear Area
Artillery		x	x
Mortars		X	
Tanks	X	X	
Infantry Fighting Vehicles	X	X	
Anti-Tank Rockets/Guided Missiles			
Armed Helicopters	X	X	X
Mines		X	X
Directed Energy Weapons	X	X	
NBC Weapons		X	X
Fixed Wing Aircraft			
Lightly Armored Vehicles	X	X	

b. Visibility. Fifty to 80% of operations will be conducted in limited visibility (darkness, fog, haze, rain, blowing sand, smoke, and other artificial obscurants).

Figure J-2. Up-Armored HMMWV OMS/MP example

c. Movement.

	Cross-Country	Secondary Roads	Primary Roads
Wartime	68%	32%	0%
Peacetime/Training Use	65%	25%	10%

d. Climatic design types.

Hot - 40%
Basic - 50%
Cold - 10%

4. OMS/MP methodology.

a. General. There are four principal components to this OMS/MP. They are:

(1) Wartime Operational Mode Summary- (96 hour and annual).

(2) Wartime Mission Profile (96 hour and annual).

(3) Peacetime Operational Mode Summary (annual).

(4) Peacetime Mission Profile (annual). The description of the methodology and the actual OMS/MP will be addressed in this order.

b. Scenarios.

(1) The wartime portions of the Up-Armored HMMWV Operational Mode Summary are derived from the Equipment Usage Profile (EUP) Study, dated 31 March 1992, conducted by Potomac Systems Engineering, Inc. (PSE) for the Combined Arms Command Combat Developments Agency (CACDA). The length and frequency of the missions performed by the Scout platoon of an armor battalion during the four days of battle covered in the Southwest Asia (SWA) EUP were used to develop the resulting 96 hour OMS. The intent is to provide a proportional representation of the activities of the Up-Armored HMMWVs that would be organic to the scout platoon of the armor battalion. The actual Usage Profile used Cavalry Fighting Vehicles (CFV) as the scout platoon vehicle.

(2) Scenarios were not needed for the development of the peacetime components of the OMS/MP; these components were based on the USAARMS annual training strategies found in FM 17-12-7, 30 Sep 91.

c. Assumptions. The following assumptions were applied throughout the development of the OMS/MP: an OMS/MP for Up-Armored HMMWV employment in the scout platoon of an armor battalion in Southwest Asia will be an upper bound on Up-Armored HMMWV wartime requirements. It is also assumed that this OMS/MP will be representative of Up-Armored HMMWV employment in the scout platoons of infantry and mechanized infantry battalions.

d. OMS/MP terms.

(1) Operating time (OT) is that amount of time the system is actually functioning.

(2) Alert time (AT) is that time which the system must be ready on short notice to perform its function, but is not.

(3) Down time (DT) is any time the system is not in OT or AT. It is the time allotted for the system to be inoperable to perform maintenance, make repairs, etc.

(4) Calendar time (CT) represents the total amount of time spent conducting a mission, i.e., CT=OT+AT+DT.

e. Computation of Wartime Operational Mode Summary (OMS). The wartime OMS for the Up-Armored HMMWV was developed using the following procedure:

Figure J-2. Up-Armored HMMWV OMS/MP example (cont)

(1) The calendar time (CT) for each mission was taken from the EUP by summing all time figures for a given mission across the 96-hour period. Subject Matter Expert (SME) judgment further broke the battalion missions into the scout platoon missions of screen, reconnaissance, reserve, and unengaged.

(2) OT is calculated by adding the OPNL/IDLE, XCH, SRH, and PRH columns of the EUP for a given mission. These columns represent the time the system is in some state of operation during the 96-hour period.

(3) The AT for the 96-hour period was determined by allotting 4-5 hours of operator rest per 24-hour period. This is based on a study conducted by the Army Research Institute which concluded that soldiers require 4-5 hours of rest per 24-hour period to maintain combat operations.

(4) DT is computed as DT=CT-OT-AT. All time not accounted for in the other areas of the OMS is assumed to be down time.

(5) The wartime annual OMS/MP is based on the Armored Systems Modernization OMS/MP Methodology. The annual OMS/MP consists of 30 12-day periods. During the 12-day period, Up-Armored HMMWV-equipped scout platoons fight the 96-hour scenario and then spend eight days resting, refitting, and preparing for the next operation. Thirty iterations of this generate an annual (360 day) OMS/MP. As a result, the annual wartime OMS is 30 times the 96-hour OMS.

f. Computation of Wartime Mission Profile.

(1) The distances traveled by Cavalry Fighting Vehicles (CFV) for each mission were brought forward from the appropriate columns of the EUP.

(2) The annual mission profile is 30 times the 96-hour profile, for reasons stated above for the computation of the wartime OMS.

g. Computation of Peacetime Operational Mode Summary.

(1) The peacetime OMS/MP is based on OPTEMPO Resourcing of FY 1999 Scout Platoon training projections using the Combined Arms Training Strategy (CATS). The training strategy assumes use of currently projected training devices to be fielded prior to or during FY99. Training days in the training strategy are converted to training hours to develop calendar time (CT) for each type of training event.

(2) Operating time (OT) is determined using Subject Matter Expert judgment on the calendar time remaining after the alert time is computed.

(3) Alert time (AT) is assumed to be seven hours of sleep per 24-hour period and one hour per meal (x3 meals). Preventive maintenance is assumed to be performed during the time allotted for meals.

(4) Down time (DT) is computed as DT=CT-OT-AT. All time not accounted for in the other areas of the OMS is assumed to be down time.

h. Computation of Peacetime Annual Mission Profile.

(1) OPTEMPO distances for M3 Cavalry Fighting Vehicles are taken from the annual training strategy for each training.

(2) The operational time from the peacetime OMS is proportionally divided based on movement rates and percentage of travel on each surface type (primary road, secondary road, cross-country).

5. Up-Armored HMMWV OMS/MP - Wartime.

a. OMS - Wartime.

Figure J-2. Up-Armored HMMWV OMS/MP example (cont)

96 Hours
Annual (96 Hours x 30)

Mission*	OT	AT	OT+AT	DT	CT
Reconnaissance	909	120	1029	6	1035
Screen	51	27	78	81	159
Reserve	39	39	78	162	240
Unengaged	276	840	1116	330	1446
Total	1275	1026	2301	579	2880

b. MP - Wartime.

96 Hours

		Move (Hours)			Distance Traveled (km)		
Mission*	Engine Idle	Primary	Secondary	X-Country	Primary	Secondary	X-Country
Reconnaissance	21.0	0	1.4	7.9	0	49.5	198.3
Screen	1.6	0	0.1	0.1	0	2.1	2.1
Reserve	1.2	0	0.1	0.1	0	1.4	0.6
Unengaged	7.1	0	1.5	0.5	0	46.8	13.3
Total	30.9	0	3.1	8.6	0	99.8	214.3

Annual Mission Profile

		Move (Hours)			Distance Traveled (km)		
Mission*	Engine Idle	Primary	Secondary	X-Country	Primary	Secondary	X-Country
Reconnaissance	630	0	42	237	0	1485	5949
Screen	48	0	3	3	0	63	63
Reserve	36	0	3	3	0	42	18
Unengaged	213	0	45	15	0	1404	399
Total	927	0	93	258	0	2994	6429

6. Up-Armored HMMWV OMS/MP - Peacetime (Annual).

a. OMS.

Mission*	OT	AT	OT+AT	DT	CT
Bn FTX	65.9	48	113.9	6.1	120
Bn FCX	11.9	11	22.9	1.1	24
Bn CFX	42.1	26	68.1	3.9	72
Co FTX	155.5	118	273.5	14.5	288
Co FCX	23.8	22	45.8	2.2	48
Plt FTX	126.2	78	204.2	11.8	216
DEPEX	47.6	44	91.6	4.4	96
EXEVAL	65.9	48	113.9	6.1	120
CALFEX	54	37	91.0	5.0	96
Driver Tng	18.3	4	22.3	1.7	24
Total	1275	436	1047.2	56.8	1104

Figure J-2. Up-Armored HMMWV OMS/MP example (cont)

b. MP.

		Move (Hours)			Distance Traveled (km)		
Mission*	Engine Idle	Primary	Secondary	X-Country	Primary	Secondary	X-Country
Bn FTX	54.7	0.7	1.9	8.6	34.5	57.5	138
Bn FCX	11.1	0.1	0.1	0.6	2.0	3.8	9.2
Bn CFX	30.9	0.7	1.9	8.6	34.5	57.5	138
Co FTX	139.6	1.0	2.7	12.2	49.4	81.6	195.5
Co FCX	23.0	0.1	0.1	0.6	2.0	3.8	9.2
Plt FTX	112.0	0.9	2.4	10.9	43.7	72.4	173.6
DEPEX	44.0	0.2	0.6	2.8	11.2	18.7	44.8
EXEVAL	54.9	0.7	1.9	8.4	33.4	56.4	134.6
CALFEX	51.8	00.1	0.4	1.7	6.9	11.5	27.6
Driver Tng	13.2	0.2	0.8	4.1	10	25	65
Total	535.2	5.3	12.8	58.5	227.6	388.2	935.5

*Mission Descriptions: FTX—Field Training Exercise//FCX—Field Command Exercise//CFX—Command Field Exercise

7. References:

a. DA Pam 350-38, Standards in Weapons Training, 15 Feb 93
b. USAARMS, 1999, Cavalry Squadron Training Strategy
c. FM 17-95, Cavalry Operations, Jan 91
d. FM 17-98, Scout Platoon, Oct 87
e. ARTEP 17-57-10, 1 Dec 88, MTP Mission Training Plan for the Scout Platoon
f. Equipment Usage Profile Study, 31 Mar 92, Potomac Systems Engineering, Inc.

Figure J-2. Up-Armored HMMWV OMS/MP example (cont)

Gun Laying and Positioning System (GLPS) Operational Mode Summary/Mission Profile (OMS/MP) (Extract)

2.2.1 GLPS OMS in support of Towed 155mm units (per 24-hour wartime day):

Task	Number of Occurrences	Duration (Hrs)	% of Time	Total Movement Distance
March Order	8	0.533	2.22	
Movement	8	0.816	3.40	17 km
Derive Position/ Deflection	8	1.200	5.00	
Operator PMCS	1	1.000	4.17	
Non-Operational		20.451	85.21	

2.2.2 GLPS OMS in support of Towed 105mm units (per 24-hour wartime day):

Task	Number of Occurrences	Duration (Hrs)	% of Time	Total Movement Distance
March Order	13	0.867	3.61	
Movement	13	1.296	5.40	27 km
Derive Position/ Deflection	13	2.167	9.03	
Operator PMCS	1	1.000	4.17	
Non-Operational	1	18.237	77.79	

2.2.3 GLPS OMS in support of M109A2/3 units (per 24-hour wartime day):

Task	Number of Occurrences	Duration (Hrs)	% of Time	Total Movement Distance
March Order	8	0.533	25.22	
Movement	8	0.528	2.20	11 km
Derive Position/ Deflection	8	1.200	5.00	
Operator PMCS	1	1.000	4.17	
Non-Operational		20.739	86.41	

Figure J-3. GLPS OMS/MP example

CH-47 Cargo Helicopter (CH-47X) Operational Mode Summary/Mission Profile (OMS/MP)

1. Introduction. The Improved CH-47 Cargo Helicopter (CH-47X) will be employed in accordance with AirLand Battle Concepts. Continuous operations in all types of terrain, night (night vision goggles)/adverse weather operations, and battlefield environments will be the norm. The CH-47X provides a flexible addition to existing logistical transportation systems by providing speed and mobility in the resupply, reconstitution, and movement of time sensitive cargo to areas not located near airfields or normal lines of communication (LOC). The CH-47X will sustain forward and deep attack forces in addition to its normal combat support (CS)/combat Service support (CSS) roles. In the force structure, CH-47 companies are organized in battalion-sized units at theater (echelons above corps), corps, and the air assault division. Company and platoon-sized CH-47 units support the theater defense structure. Current/proposed operational concepts of deploying less than company-sized elements for contingency operations make it necessary to restructure the logistical support normally allocated to a CH-47 company. This less than company sized unit deployment concept must be provided the capability for self-supportability and sustainability logistically.

2. Wartime OMS/MP. The wartime OMS for the Improved CH-47 Cargo Helicopter is provided in Table 1. The MPs corresponding to this OMS are provided in Tables 2 through 6.

3. Peacetime OMS/MP. The peacetime flight hours for aircraft are 240 flight hours per year. The peacetime OMS is provided in Table 7.

4. Environmental conditions. The CH-47X will be operated in climatic conditions as shown in Table 8.

TABLE 1
Wartime Operational Mode Summary (OMS) for the Improved CH-47 Cargo Helicopter
Southwest Asia Scenario

	OT	OT+AT	CT	No. of Missions	Total OT	Total OT+AT	Total CT
Mission							
Combat Resupply Class I, II, IV, and IX	2.93	21.02	6.4	123	360.42	587.23	247.2
Air Assault, Move Combat Troops and High Mobility Multipurpose Wheeled Vehicles (HMMWVs)	8.58	61.97	7.3	17	145.91	52.31	314.1
Move Artillery and Ammunition	3.60	25.73	2.2	49	176.41	259.31	577.8
Transport Ammunition to Forward Arming and Refueling Point (FARP)	2.80	20.22	5.0	56	156.81	131.81	400.0
Total Scenario					976.65	2009.87	1762.7

OT - Operating time in hours (time for one mission)
AT - Alert time in hours (system is required to be operable, but is not being operated)
CT - Calendar time in hours (all the time from the beginning of a mission to its end—includes maintenance time)

TABLE 2
Mission Profile (MP) for the Improved CH-47 Cargo Helicopter
Resupply a Maneuver Brigade—Southwest Asia

Mission Tasks	Number of Occurrences	Operating Time for Each Task	Total Operating Time
Ground Run Time	1	10.0	10.0
Low-Level Flight	6	3.2, 1.6, 33.3, 33.5, 19.4, 39.9	130.9
Contour Flight	2	5.7, 4.9	10.6
Hover Out-of-Ground Effect (HOGE)	2	3.0, 1.0	4.0
Load/Unload	2	10.0	20.0
Total Minutes			175.5
Total Hours			2.93

Figure J-4. CH-47X OMS/MP example

TABLE 3
Mission Profile (MP) for the Improved CH-47 Cargo Helicopter
Air Assault—Move Combat Troops and HMMWVs—Southwest Asia

Mission Tasks	Number of Occurrences	Operating Time for Each Task	Total Operating Time
Ground Run Time	4	1 @ 10.0 3 @ 5	25.0
Low-Level Flight	9	4.7, 55.9, 50.5, 32.4, 69.1, 60.6, 58.7, 32.1, 69.4	433.4
Contour Flight	5	7.7, 6.9, 2.4, 7.7, 6.9	31.6
Unload with aircraft running	1	5.0	5.0
Load/Unload with aircraft shutdown	3	20.0, 90.0, 30.0	140.0 *
Refuel	1	20.0	20.0
Total Minutes			515.0
Total Hours			5.58

NOTES:
1. The chart above represents an aircraft that carries two internal loads from the pickup zone (PZ) to the landing zone (LZ).
2. Load/Unload time designated with an asterisk (*) is not included in flight time.

TABLE 4
Mission Profile (MP) for the Improved CH-47 Cargo Helicopter
Move Artillery (M198 Howitzer) and Ammunition—Southwest Asia

Mission Tasks	Number of Occurrences	Operating Time for Each Task	Total Operating Time
Ground Run Time	2	10.0, 5.0	15.0
Low-Level Flight	5	5.1, 29.9, 24.5, 29.9, 29.3	118.7
Contour Flight	5	5.2, 5.3, 2.0, 5.3, 5.3	23.1
Load/Unload	4	3, 2, 14, 10	29.0
Hover In-Ground Effect (HIGE)	4	2, 1, 2, 1	6.0
HOGE	4	1, 1, 1, 1	4.0
Refuel	1	20.0	20.0
Total Minutes			215.8
Total Hours			3.60

TABLE 5
Mission Profile (MP) for the Improved CH-47 Cargo Helicopter
Transport Ammunition to an Attack Helicopter Battalion FARP—Southwest Asia

Mission Tasks	Number of Occurrences	Operating Time for Each Task	Total Operating Time
Ground Run Time	1	10.0	10.0
Low-Level Flight	3	4.8, 61.9, 57.7	124.4
Contour Flight	2	6.1	12.2
Load/Unload	2	20, 10	30.0
HIGE	2	1.0	2.0
Total Minutes			178.6
Total Hours			2.98

NOTE: This chart shows time for a CH-47 that carries an internal load of ammunition. It could be hauled externally, although the cube is large if the missiles are left in the protective packaging containers.

Figure J-4. CH-47X OMS/MP example (cont)

TABLE 6
Mission Profile (MP) for the Improved CH-47 Cargo Helicopter
Transport Aviation Fuel to an Attack Helicopter Battalion FARP–Southwest Asia

Mission Tasks	Number of Occurrences	Operating Time for Each Task	Total Operating Time
Ground Run Time	4	10, 2, 2, 2	16.0
Low-Level Flight	5	4.8, 34.8, 33.6, 57.7, 4.8	135.7
Contour Flight	2	6.1	12.2
HIGE	2	1.0	2.0
HOGE	2	1.0	2.0
Total Minutes			167.9
Total Hours			2.80

NOTE: This chart shows time for a CH-47 that carries an external load of four 500-gallon fuel blivets. The time for a FAT COW aircraft would be different because of the time spent on the ground in the FARP doing refueling operations.

TABLE 7
Peacetime Operational Mode Summary (OMS) for the Improved CH-47 Cargo Helicopter

	OT	OT+AT	CT	No. of MSNS	Total OT	Total OT+AT	Total CT
Mission							
Aviator Evaluation*	1.70	10.7	4.2	10	17.0	107.0	142.0
Training for Army Training and Evaluation Program (ARTEP)	3.81	23.4	1.2	9	34.3	210.6	280.8
Unit ARTEP**	3.81	20.2	6.9	3	11.4	60.6	80.7
Mission Support for Field Training Exercises (FTXs)**	3.81	23.9	1.9	44	167.7	51.61	403.6
Maintenance Test Flights	1.20	9.5	2.6	8	9.6	76.0	100.8
Total Scenario					240.0	505.8	1007.9

OT - Operating time in hours (time for one mission)
AT - Alert time in hours (system is required to be operable, but is not being operated)
CT - Calendar time in hours (all the time from the beginning of a mission to its end—includes maintenance time)
MSNS - Missions
*Evaluation flights are described in the Air-Crew Training Manual.
**Training for the ARTEP, unit ARTEP, and mission support will be the same as missions listed in the OMS for combat. The weighted average duration of those missions (OT) is 3.81 hours.
***Represents 251 work days at approximately 8 hours per day.

TABLE 8
Climatic Environment for the Improved CH-47 Cargo Helicopter (AR 70-38)

	Percent of Use	
Climatic Design Type	**Wartime**	**Peacetime**
Hot	38%	1%
Basic	46%	96%
Cold	15%	2%
Severe	1%	1%

Figure J-4. CH-47X OMS/MP example (cont)

The NBC Reconnaissance System (NBCRS) Operational Mode Summary/Mission Profile (OMS/MP)

1. Objective system description. The NBC Reconnaissance System (NBCRS) is a system that will detect and identify nuclear and chemical contamination, mark the contaminated area, and report this information to higher command levels. Additionally, the NBCRS will collect samples of unidentifiable agents and store these samples for further analysis. To accomplish the surveillance and reconnaissance missions, the NBCRS will consist of the following systems:

a. Mass Spectrometer

b. Handheld Chemical Monitor

c. Point Source Chemical Detector

d. Nuclear Detector

e. Navigation System

f. Sampling System

g. Marking System

h. Life Support System

i. Weapon

j. Vehicle

k. Communication System

l. Stand-off Chemical Detector

m. Data Processing System

n. Meteorological Sensor

2. Operational Mode Summary (OMS). The NBCRS will be used in route reconnaissance and area/zone reconnaissance missions to locate contaminated or uncontaminated terrain. The operational concepts for each of the two modes in a wartime and peacetime scenario are presented below.

2.1 Concept.

2.1.1 NBC defense encompasses three major functions: contamination avoidance, protection, and decontamination. Contamination avoidance is the concept of avoiding contamination whenever possible and is the focal point of our NBC defense doctrine. It enables units to operate without incurring the degradation caused by individual or collective protection and time, labor, and logistics intensive decontamination operations. When it is not possible to avoid contamination, the spread of contamination is limited so that it presents the minimum possible hazard to personnel, has the minimum impact on operations, and allows the rapid resumption of normal operations. Contamination avoidance explicitly includes NBC reconnaissance, detection, sampling, identification, and warning. The NBCRS is a key system used to perform these functions.

Figure J-5. NBCRS OMS/MP example

2.1.2 Units and soldiers must be aware of NBC hazards within their area of concern. Both the presence and absence of NBC hazards is of interest. When NBC hazards are located, they must be marked on a near-real time basis. This allows units to avoid the hazard, or to protect themselves in order to minimize casualties if they cannot avoid it. Commanders must also be made aware of the absence of NBC hazards in their areas of immediate operational concern. This allows them to lower their protective posture and minimize degradation. Samples of unidentified contaminants must be collected and evacuated for laboratory analysis in order to maintain a current understanding of enemy capabilities and their impact.

2.1.3 In the Main Battle Area, the NBCRS supports the forces behind the direct fire battle. In the direct fire battle, lines between forces are indistinct and change rapidly. The enemy is unlikely to employ NBC weapons in this area to avoid their effects on its own units, and the battle is too intense and fast-moving for NBC reconnaissance to be effective in detecting contamination from previous strikes. Additionally, lightly armored systems such as the NBCRS are not very survivable in this area, and a low density, high payoff system like the NBCRS should not be put at such a risk.

2.1.4 Immediately behind the direct fire battle, the NBCRS supports AirLand Battle doctrine by enabling the unhindered forward or lateral movement of reserve and counter-attack units, thus enhancing the force's agility, retaining depth, and preventing the disruption of synchronization. It gives the commander the ability to "see" the contaminated battlefield better than the enemy, providing him an advantage in seizing and keeping the initiative.

2.1.5 Further to the rear, the NBCRS supports the unhindered forward movement of reinforcing units, finds "clean" main supply routes, and supports the mobility of command and control and logistical organizations, further enhancing depth.

2.1.6 NBC contamination information collected by the NBCRS is provided to command and control systems in real time to aid in NBC battle management, allowing commanders to obtain the NBC picture and maintain the required operational tempo.

2.1.7 NBC reconnaissance applies to low-intensity conflict situations to reduce vulnerability to insurgent and/or terrorist use of chemical or biological weapons. Forces will be provided an NBC threat assessment for potential theaters of operations. Forces deploy with and use a tailored force protection package for NBC defense.

2.1.8 Surveillance/silent watch is conducted when the NBCRS locates at a given position for an extended period of time (hours) and uses its stand-off detection capabilities. In this role, the NBCRS is observing critical unoccupied terrain for evidence of NBC activity. Additionally, the NBCRS can augment existing detection capabilities and scan upwind of a unit, this is called unit defense. The objective of unit defense is to provide additional NBC warning time to high priority units. The emphasis is on the early detection of vapor hazards. During surveillance, such activities as sleeping, eating, and performing PMCS can be accomplished on a rotation basis between the crew.

2.2 Mission. The NBCRS detects and identifies nuclear and chemical contamination. It warns units of NBC contamination, reports the location of NBC hazards, marks areas of contamination, locates and marks clean bypass routes, and collects and transports samples of NBC materiel for later analysis. Tables 1 and 2 illustrate the operational mode summary for the NBCRS. The NBCRS accomplishes these functions by performing the following missions:

2.2.1 Route reconnaissance. Route reconnaissance obtains information as to the presence or absence of NBC contamination on a specified route and all adjacent terrain. The emphasis is on persistent NBC hazards along the route.

2.2.2 Area/zone reconnaissance.

(1) Area reconnaissance. Area reconnaissance is conducted when a commander needs information on the presence or absence of NBC hazards in a specified area, such as a proposed forward area rearming and refueling point for helicopters, or a proposed area for maneuver operations. The emphasis is on persistent NBC hazards within the area.

(2) Zone reconnaissance. Zone reconnaissance is a detailed, thorough, and time consuming NBC reconnaissance of all dominant terrain within specified boundaries. The emphasis is on persistent NBC hazards within the zone.

Figure J-5. NBCRS OMS/MP example (cont)

TABLE 1
OMS for the NBCRS (Wartime)

	OT	OT+AT	CT	No. of MSNS	Total OT	Total OT+AT	Total CT
Mission							
Route Recon	2.00	2.45	4.15	13	26	32	54
Area/Zone Recon	3.85	4.30	6.0	7	27	30	42
Total Hours					53	62	96

TABLE 2
OMS for the NBCRS (Peacetime)

	OT	OT+AT	CT	No. of MSNS	Total OT	Total OT+AT	Total CT
Mission							
FTX	35	69	144	5	175	345	720
Unit Tng	8	12	24	12	96	144	288
Total Annual Hours					281	490	1008

Where Alert Time (AT) is the time the equipment is powered up and in an operable state.

3. Mission Profile (MP). Five tasks are involved in accomplishing the two missions. These tasks all occur simultaneously during the mission. The mission profiles for war and peacetime are presented in Tables 3-6.

3.1 Detect/Identify/Mark (DIM). The NBCRS must continuously monitor the environment for contamination and identify and mark contamination when present.

3.2 Sample. When the nature of the contamination is unknown or when contamination verification is required, the NBCRS will take a sample.

3.3 Communicate. The NBCRS must report NBC data through higher communications nets as frequently as necessary.

3.4 Move. Generally, the NBCRS will move in 1000-meter intervals at an average speed of 20 KPH with short stops between moves.

3.5 Shoot. In some instances, the NBCRS will encounter enemy forces and must fire to cover its withdrawal. For each withdrawal, 30 rounds of 7.62 mm ammunition and/or 12 rounds of smoke grenades will be shot.

TABLE 3
MP for Route Reconnaissance (2 Hour Mission)

Tasks	Number of Occurrences	Operating Time	Total Operating Time
DIM	1	2 Hours	120 Minutes
Sample	4	8 Minutes	32 Minutes
Communicate	24	45 Seconds	18 Minutes
Move	39	3 Minutes	117 Minutes
Shoot	2	30 Seconds	1 Minute

TABLE 4
MP for Area/Zone Reconnaissance (3.85 Hour Mission)

Tasks	Number of Occurrences	Operating Time	Total Operating Time
DIM	1	3.85 Hours	231 Minutes
Sample	4	8.00 Minutes	32 Minutes
Communicate	24	45.00 Seconds	35 Minutes
Move	39	3.00 Minutes	93 Minutes
Shoot	2	30.00 Seconds	1 Minute

Figure J-5. NBCRS OMS/MP example (cont)

TABLE 5
MP for NBCRS Field Training (35 Hour Mission)

Tasks	Number of Occurrences	Operating Time	Total Operating Time
DIM	5	7 Hours	35.00 Hours
Sample	3	8 Minutes	0.40 Hours
Communicate	62	45 Seconds	0.78 Hours
Move	196	3 Minutes	9.80 Hours
Shoot	10	30 Seconds	0.08 Hours

TABLE 6
MP for NBCRS Unit Training (8 Hour Mission)

Tasks	Number of Occurrences	Operating Time	Total Operating Time
DIM	1	8 Hours	8.00 Hours
Sample	1	8 Minutes	0.13 Hours
Communicate	96	45 Seconds	1.20 Hours
Move	40	3 Minutes	2.00 Hours
Shoot	24	30 Seconds	0.20 Hours

4. Personnel requirements. The NBCRS will not require a new Military Occupational Specialty (MOS) operator. Total number of authorized operators, maintainers, and supporters will not increase. The NBCRS will be operated by a crew of three MOS 54B NBC Specialists. One SC 14A Chemical Officer or one 54B NBC Specialist (Platoon Sergeant) will be the fourth crew member in two of six vehicles. Fielding of the NBCRS will create no new operator or maintainer MOS. However, the skills necessary to operate the NBCRS may require the creation of a new additional skill identifier (ASI) or require the addition of these skills to existing programs of instruction (POI). Operation of the NBCRS will require not more than three soldiers. Maintenance of NBCRS subsystems (detectors, navigational devices, etc.) will not require more than one soldier. Maintenance tasks to be performed on the NBCRS chassis will not exceed those associated with similar vehicles currently fielded to NBC reconnaissance units.

5. Operational conditions.

5.1 Climatic types. The NBCRS will be used in the climatic design types listed in Table 7 for both peacetime and wartime usage.

TABLE 7
Climatic Design Types for the NBCRS

Climatic Design Types (AR 70-38)	% Exposure
Hot	30
Basic	70

5.2 Terrain types. Terrain movement types that the NBCRS will negotiate are listed below in Table 8.

TABLE 8
Terrain Movement Types

	Wartime	Peacetime
Primary/Secondary	65%	80%
Cross-Country	35%	20%

Figure J-5. NBCRS OMS/MP example (cont)

Mounted Water Ration Heater (MWRH) Operational Mode Summary/Mission Profile (OMS/MP)

1. Concept of employment. The Mounted Water Ration Heater (MWRH) will perform as a water and ration heater in track vehicles, such as the Ml, the M3, the MLRS, and other vehicles. The MWRH will use vehicle electrical power to heat rations and water for vehicle crews. The MWRH will be capable of mounting on virtually any U.S. Army vehicle, given the proper installation into the electrical system.

1.1 The MWRH will be employed in armor, mechanized infantry, field artillery, cavalry, and combat support units.

1.2 The MWRH will operate on 24 volts, drawing its power from the host vehicle. It will heat at least five Meal Ready to Eat (MRE) entrees and at least 40 ounces of water to 140-160°F in 45 minutes or less.

2. Missions. The MWRH, in its various installations on vehicles, will be used in the following ways: heat rations and water for consumption, and heat water for personal hygiene.

3. Methodology. The MWRH OMS/MP is based on the Armored Gun System (AGS) OMS/MP and the Armored Systems Modernization (M-1) OMS/MP methodology.

3.1 The AGS and M-1 OMS/MPs were reviewed to determine the average time available in a day for heating of water and rations. This information was used to determine required heating time for the MWRH.

3.2 The OMS/MPs were then reviewed to determine the frequency with which MREs and hot beverages were consumed. This information was used to compute the MWRH usage profiles for both the 96 hour and annual MWRH OMS/MP.

4. Operational environment.

4.1 Threat. The MWRH is threatened by all enemy weapon systems that are a threat to the host vehicle. Although the MWRH is unlikely to be specifically targeted, it could easily suffer damage from weapons directed against the host vehicle.

4.2 Visibility. The MWRH must be capable of operation in limited-visibility conditions. This includes being capable of operation without use of vehicle lights.

4.3 Movement. The MWRH must be capable of being securely mounted onto the host vehicle. It must be able to withstand sustained cross-country movement by the host vehicle.

4.4 Climate. The MWRH will be operated in basic, hot, cold, and severe cold climatic categories in the same percentages as the host vehicle. It must be considered that the MWRH will always be located inside the host vehicle.

5. MWRH OMS/MP- Wartime.

5.1 Mission definition. Heating of MRE entrees will occur when required, up to three times per day. Heating of water will be required from three up to approximately five times per day, to provide each crew member hot water for meals, hot beverages, and personal hygiene when possible. MWRH usage is highly dependent on crew size. Large crews (more than five personnel) may have to use the MWRH twice each time hot rations or water are required.

Figure J-6. MWRH OMS/MP example

5.2 MWRH OMS/MP-Wartime (96 hours). It is anticipated that during combat operations, Class I resupply will be limited to MREs. MRE consumption during reserve or unengaged periods would be limited to two MREs per day. Hot water consumption occurs at least twice per day, with additional consumption with each MRE meal. A review of the M-1 OMS/MP and the AGS OMS/MP indicates that 10 of the 12 meals during the 96-hour scenario will be MREs. Likewise, water heating would be required for the 10 MRE meals and on eight other occasions for a total of 18 iterations during the 96-hour scenario.

# Ration Heating Iterations	Total Qty Rations Heated	# Water Heating Iterations	Total Qty Water Heated (Ounces)	Operating Time (Hours)
10	30 – 90	18	432 – 1,296	9 – 27

5.3 MWRH OMS/MP-Wartime (annual). The annual OMS/MP consists of 30 12-day scenarios. During each scenario, MWRH-equipped forces fight the 96-hour mission profile, then spend 8 days resting, refitting, and preparing for the next operation. During the 8-day period out of contact, MRE heating will be required once per day.

# Ration Heating Iterations	Total Qty Rations Heated	# Water Heating Iterations	Total Qty Water Heated (Ounces)	Operating Time (Hours)
540	1,620 – 4,860	1,260	30,240 – 90,720	630 – 1,890

6. MWRH OMS/MP-Peacetime (annual). The amount of MWRH usage in peacetime depends on the training use of the host vehicle.

6.1 The peacetime OMS/MP is based on projections using the Combined Arms Training Strategy (CATS). It is assumed that during each day of training for the events listed below, the MWRH will be used once each day for ration heating, and twice each day for water heating. The training events for a tank battalion, in which the MWRH is likely to be used, are listed below:

Training Event (# of Iterations)	# of Days Training
BN FTX (2)	10
BN FCX (1)	3
BN CFX (1)	3
CO EXEVAL (1)	5
CO FTX (2)	5
CO FCX (1)	6
CO CFX (1)	3
PLT EXEVAL (1)	3
PLT STX (1)	3
Adv Gunnery Tables (1)	3
CALFEX (1)	3
EXEVAL (1)	5
Basic Gunnery Tables (2)	6
Intermediate Gunnery Tables (2)	6
Total	67

6.2 Based on the days of training listed above, the annual MWRH OMS/MP is:

# Ration Heating Iterations	Total Qty Rations Heated	# Water Heating Iterations	Total Qty Water Heated (Ounces)	Operating Time (Hours)
67	201 – 603	201	4,824 – 14.472	100.5 – 305.1

Figure J-6. MWRH OMS/MP example (cont)

Containerized Kitchen (CK) Operational Mode Summary/Mission Profile (OMS/MP)

1. System description. The CK will be a self-contained, high mobility, multi-fueled kitchen with multi-ration preparation capability. The CK components will have the on-board capability to store and dispense water for sanitation, food preparation, beverage preparation, and hand washing. The CK will have on-board cooking capability to perform roasting, grilling, boiling, frying, and baking. The CK will have on-board refrigeration storage capability for storage of perishable components of the A rations and an integral lighting and heating, ventilation, and air-conditioning (HVAC) system.

2. Wartime/contingency operations.

2.1 Operational Mode Summary/Mission Profile. The CK will be employed at meal preparation sites generally limited to battalion level, but may also be employed at selected units and remote locations. Food will be prepared and served from the CK at the preparation site and/or placed in insulated food containers for remote feeding. The CK will provide up to three hot meals per day (feeding 550 soldiers at each meal), when the tactical and logistical situation permits. Cooking methods by percentage used for preparing hot meals are shown below in Table 1. Note that T-rations are heated primarily by boiling.

TABLE 1

Cooking Method	Percentage of Time
Roasting	20%
Grilling	25%
Boiling	35%
Frying	15%
Baking	5%

The Army field feeding standard is two hot (i.e., A/B/T ration) and one operational meal per day (i.e., Meal Ready to Eat (MRE)). However, the tactical and logistical situation will dictate if the CK can meet or exceed this standard. Table 2 shows daily operating hours, by CK subsystem, expected when employed under a variety of tactical and logistical situations. Table 3 summarizes the setup/take-down, preventive maintenance checks and Services (PMCS), and movement characteristics of the CK. The CK will move once every three days depending on the METT-T.

TABLE 2
CK Daily Operating Time by Subsystem for Various Tactical and Logistical Situations

Subsystem	Situation 1 3 Hot Meals/Day (Best Tactical and Logistical Com Power)	Situation 2 2 Hot and 1 Operational Meals/Day (Army Standard)	Situation 3 1 Hot and 2 Operational Meals/Day (Movement Day)	Situation 4 0 Hot and 3 Operational Meals/Day (Worst Tac. and Log.)
Cooking Equipment	18 hours	12 hours	6 hours	3 hours (soup and beverage)
Refrigeration Equipment	24 hours	24 hours	20 hours	20 hours
Generator	0 hours	24 hours	20 hours	20 hours
HVAC and Lights	18 hours	12 hours	6 hours	3 hours
Water Pump	3 hours	2 hours	1 hour	1 hour

Figure J-7. CK OMS/MP example

TABLE 3
Setup/Take-Down, PMCS, and Movement*

Task	Time To Perform
Take-Down	0.5 Hours
Movement (30 Km Move Maximum)	3.0 Hours
Setup	0.5 Hours
PMCS	0.5 Hours

* Expect to move on average every 3 days.

3. Peacetime. The peacetime usage of the CK will reflect the wartime/contingency operations OMS/MP and will consist of exercises ranging in duration from 10 to 30 days.

4. Environmental conditions. The environmental conditions for both wartime and peacetime are shown in Table 4.

TABLE 4

Climatic Design Type	% of Time
Hot	10%
Basic	90%

5. Movement terrain. The movement terrain for both wartime and peacetime is shown in Table 5.

TABLE 5

Movement Terrain	% of Movement
Primary Road	30%
Secondary Road	65%
Cross-Country	5%

6. Situation frequencies. Situation frequencies are shown in Table 6.

TABLE 6

Situation 1	15%
Situation 2	50%
Situation 3	30%
Situation 4	5%

Figure J-7. CK OMS/MP example (cont)

MlA2 Conduct-of-Fire Trainer (COFT) Operational Mode Summary/Mission Profile (OMS/MP)

1. System description. The MlA2 COFT will be a system of computer-driven simulators replicating the gunner and tank commander positions and emulators representing terrain and other vehicles. The system creates a simulated battlefield and the illusion that the soldiers are moving and fighting over actual terrain, while riding in the vehicle and employing vehicle weapons.

2. Peacetime.

a. This system will provide initial and sustainment training for officers, noncommissioned officers, and junior enlisted soldiers in basic and advance combat gunnery skills.

b. This system will also provide training in fire control system management, target acquisition, identification, and engagement with the tank main gun and coaxial machine gun.

c. A typical training day will consist of 10 hours as follows: power up (20 minutes), a series of nine training sessions (50 minutes each), eight breaks (15 minutes each), and power down (10 minutes).

3. Wartime. Missions would remain unchanged but training requirements would increase dramatically. Training hours would increase to 20 hours per day (two 10-hour sessions, each session followed by a two-hour maintenance period), 363 days per year.

4. Environmental conditions. The MlA2 COFT will operate in an environment customarily associated with an instructional facility. The operating/nonoperating temperature and humidity ranges for the internal trainer hardware are:

Room Ambient Temperature: 65-85°F
Relative Humidity at 70°F: 20-70%

Figure J-8. M1A2 COFT OMS/MP example

Training Smoke Pot Operational Mode Summary (OMS)

1. System description. The Training Smoke Pot will be used to provide a realistic means to train and evaluate individuals, crews, and unit teams performing in a smoke environment. Individuals will wear appropriate protective masks during use of the Training Smoke Pots. The Training Smoke Pots will be used in several training modes. However, the function and number of Training Smoke Pots used will essentially be the same in each mode. Five Training Smoke Pots will be ignited each mission, at least four of which must function and produce smoke. Two operational scenarios are provided below. The OMS is presented in Tables 1 and 2.

2. Operational modes.

2.1 Individual/unit training. In this training mode, the Training Smoke Pot will be disseminated over terrain which a unit must traverse or defend. The unit will be evaluated in its ability to operate in a smoke environment.

2.2 Screening smoke unit movement training. The Training Smoke Pots will be disseminated over units while on the move to determine the units' ability to perform their mission in a smoke environment while on the move.

2.3 The Training Smoke Pot will be used only during the smoke portion of training exercises.

TABLE 1
Operational Mode Summary for Active Component

Mission	No. of Units	Missions per Unit	Pots per Mission	Total Yearly Use
Smoke Operations Training	1,983	5	5	49,575

TABLE 2
Operational Mode Summary for Reserve Component

Mission	No. of Units	Missions per Unit	Pots per Mission	Total Yearly Use
Smoke Operations Training	2,657	2	5	26,570

The U.S. Army Chemical School has a yearly use of 1,183 Training Smoke Pots for training.
Total Army Yearly Use - 77,328 Training Smoke Pots

3. Environmental conditions. Environmental conditions for the Training Smoke Pots will be hot, basic, and cold climatic types.

Figure J-9. Training Smoke Pot OMS example

Appendix K
Materiel Requirement Document (MRD) Processing

K-1. Staffing MRDs (see figs K-1 and K-2).

a. MRDs are staffed by the proponent to all the addresses on the core staffing list found on the DCSCD Internet Homepage at http://www.tradoc.army.mil/dcscd. The proponent expands the staffing to other commands and agencies based on the mission and interfaces of the proposed system. Addressees are given 60 calendar days to respond. The staffing memorandum announces the time and place the ICT will reconvene to prepare the final draft MRD (see fig L-1).

b. When one of the HQ TRADOC, DCSCD directorates receives a copy of an MRD from the proponent during staffing it conducts concurrent staffing of the MRD within HQ TRADOC. The

addressees below are given 45 calendar days to respond back to the DCSCD AO. The DCSCD AO returns the results of the staffing back to the proponent in time to meet the proponent's 60-day suspense date.

(1) Unclassified MRD draft recipients

From appropriate DCSCD directorate to:
DCSCD (ATCD-E, -G, -M, -S, -Q)
DCSDOC (ATDO-A)
DCST (ATIC-ATMR)
DCSINT (ATIN-I)
DCSSA (ATAN-A) for modeling and simulation MRDs

Copy furnished:
DCSSA (ATAN-A) for non-M&S MRDs
DCSBOS (ATBO-SO, -SE)
DCSCD (ATCD-B, -H, -R*)
*ATCD-R must be provided an electronic copy. ATCD-R initiates the Stage I review with J6 for C4I systems.

(2) Classified MRD draft recipients

(a) The DCSCD directorate conducts the same staffing as b(1) above (delete ATCD-R from staffing).

(b) For C4I systems, or systems with C4I subcomponents, the DCSCD directorate mails the MRD to J6 requesting a Stage I Interoperability Assessment to Joint Staff, ATTN: J6I (Room 1E833), Pentagon, Washington, D.C. 20318-6000 (30-day suspense).

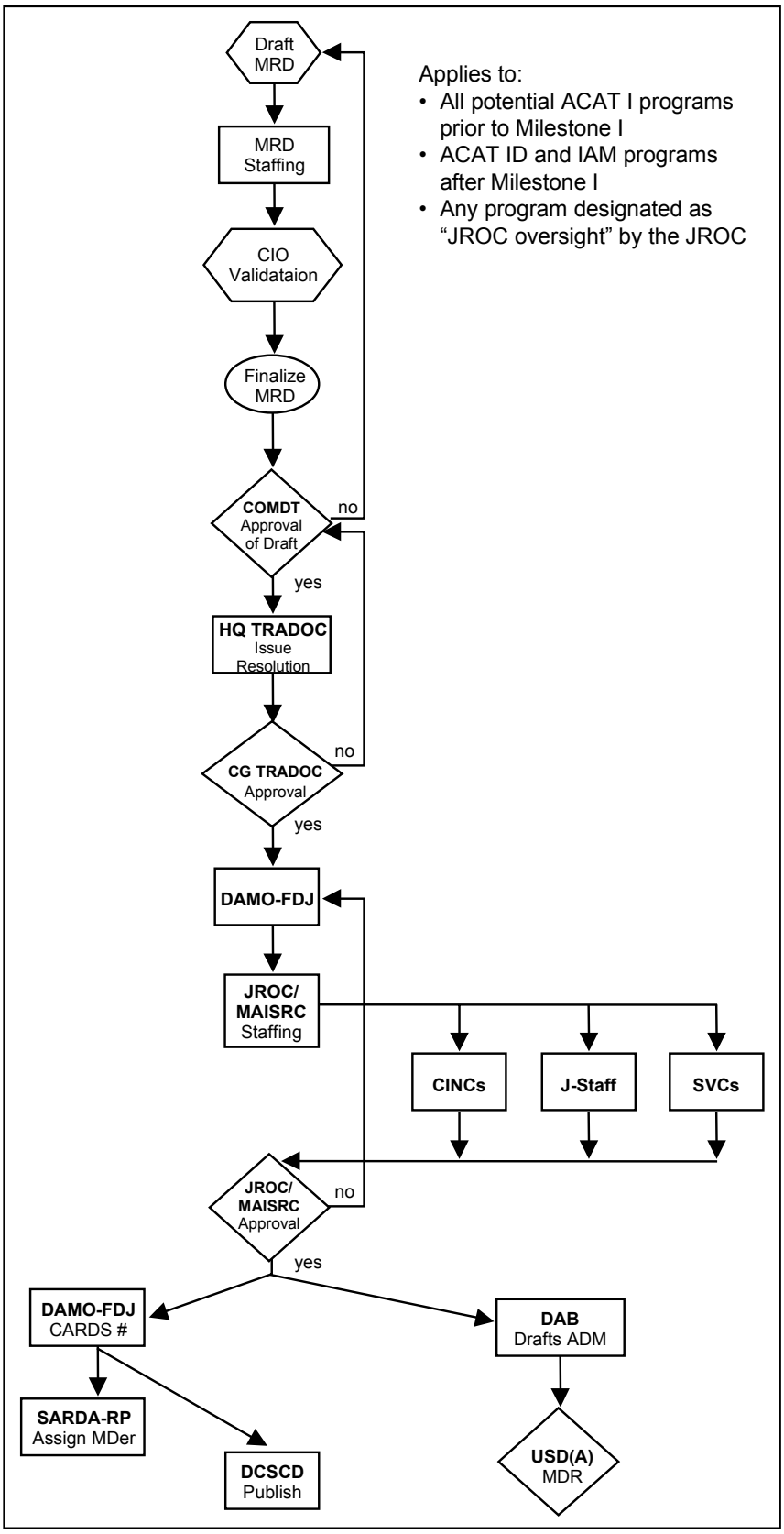


Figure K-1. MRD staffing process for JROC oversight programs

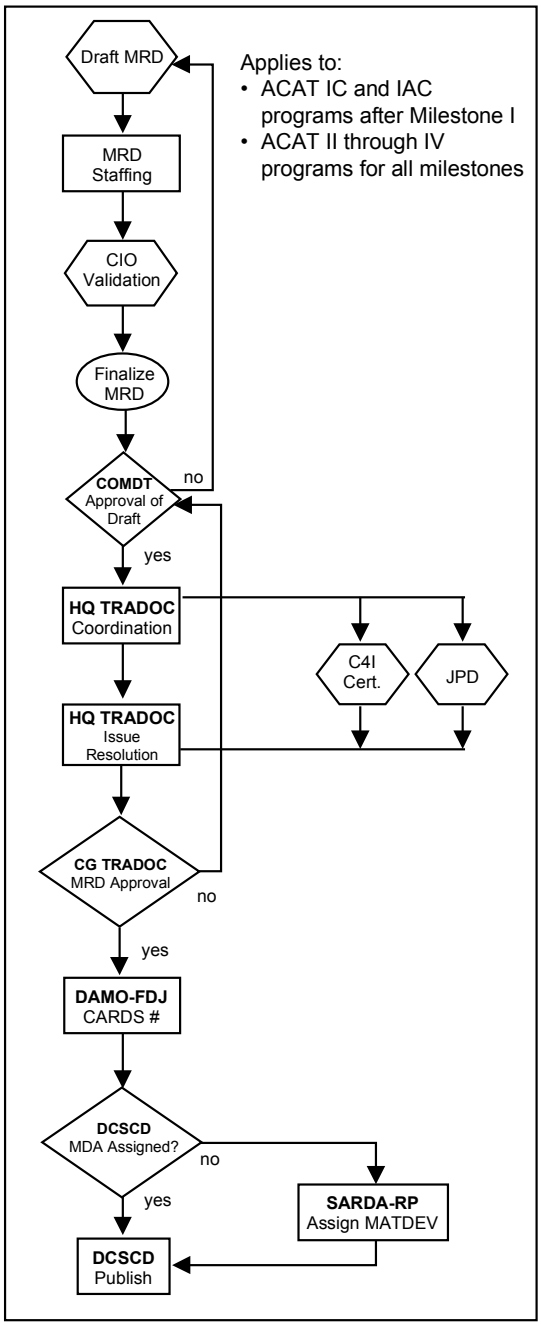


Figure K-2. MRD Staffing process for non-JROC oversight programs

K-2. Approving MRDs.

a. When the center CDR or school Comdt finalizes the draft MRD, it is forwarded to HQ TRADOC, ATCD-ZA for approval. The forwarding memorandum is at figure L-2. At the same time, the DCD e-mails a copy of the final draft to the appropriate DCSCD directorate to begin approval processing. If it is classified, mail on a 3.5" disk.

b. The DCSCD directorate completes the draft on (1) or (2) below based on whether the system is a JROC oversight system or a non-JROC oversight system (see para 11-4a).

(1) The program has JROC oversight (classified and unclassified).

(a) If issues are identified by the CDR/Comdt on the memorandum forwarding the MRD for approval, the DCSCD directorate convenes a HQ TRADOC Council of Colonels.

(b) The DCSCD directorate conducts final coordination with USANCA (survivability@usanca-smtp.army.mil), DCST ATIC-ATMR (ATICDMR@atsc.army.mil) and SMDC (FDIC@smdc.army.mil). Each office is given five working days to respond to unclassified MRDs. If the MRD is classified, mail it to the addresses found on the core staffing list and give them 21 days to respond.

(c) If no issues are identified by the CDR/Comdt, the appropriate DCSCD directorate forwards it to the DCSCD for approval. The format of HQ TRADOC Form 30 is at figure L-3, the format of the memorandum for DCSCD signature is at figure L-4 (for MNS) or figure L-5 (for ORD).

(2) The program does not have JROC oversight.

(a) If issues are identified by the CDR/Comdt, the DCSCD directorate convenes a HQ TRADOC Council of Colonels.

(b) J6 Stage II review (C3I Certification).

1. Unclassified. For those systems with C4I implications, the DCSCD directorate sends an electronic copy to DCSCD (ATCD-R). ATCD-R initiates the Stage II review for C4I certification. (J6 will be given 30 days to respond.)

2. Classified. For systems with C4I implications, the DCSCD directorate should mail the MRD to J6 and request a Stage II Interoperability Assessment (see para K-1b(2)(b)).

(c) InterService harmonization. The DCSCD directorate staffs the MRD directly with the USAF, USN, and the USMC (a copy is furnished to USASOC) asking for a Joint Potential Designator (JPD). The format for the staffing memorandum is at Figure L-8. Services will be given 30 days to respond.

(d) Conduct final coordination with USANCA, DCST and SMDC as outlined in paragraph K-2b(1)(b) above.

(e) After the completion of paragraphs K-2b(2)(a), (2)(b), (2)(c), and (2)(d), the DCSCD directorate forwards the MRD to the DCSCD (ACAT I and II programs) or to the ADCSCD (ACAT III and IV programs) for approval. The format of the HQ TRADOC Form 30 is at figure L-9 and the format of the memorandum for DCSCD or ADCSCD signature is at figures L-6 (for MNS) or L-7 (for ORD). The CARDS number on the memorandum left blank and filled in after DCSCD or ADCSCD approval (see para K-3b).

K-3. Post approval processing.

a. JROC oversight MRDs.

(1) After the CG, TRADOC approves of an MRD with JROC oversight, the DCSCD directorate forwards the MRD to DCSOPS for processing. (See figs L-4 or L-5 for a sample of a transmitted memorandum).

(2) ADCSOPS-FD conducts a final sanity check review of the MRD before forwarding it to the JROC. The DCSCD directorate represents TRADOC during this review. DCSOPS forwards the MRD to JROC for further action.

(3) JROC staffing. The JROC staffing includes the CINCs, other Services, and the Joint Staff. The final C4 certification comes from this Stage II review. The other Services provides input to the JROC for final determination of a Joint Potential Designator. (JPD) CJCSI 3170.01 provides details on the Joint Staff's MRD processing.

(4) JROC staffing includes an initial O-6 level review. Upon completion of this step, comments are compiled and forwarded back to DCSOPS. If necessary, DCSOPS returns the comments to HQ TRADOC DCSCD for review and possible incorporation into the MRD. DCSCD in turn, may task the MRD author (usually the TRADOC school) to incorporate, revise, and return it. The MRD author also prepares a matrix delineating the disposition of critical and substantive comments received during the O-6 level review. The MRD author forwards the revised MRD and matrix back through DCSCD to DCSOPS.

(5) JROC staffing also includes O-8 or flag-level review of the MRD subsequent to the O-6 review. Any issues must be resolved as described in paragraph K-3a(4) above.

(6) Following O-6 and O-8 reviews and actions, all MRDs must be briefed IAW CJCSI 3170.01.

(7) JROC validation. With validation, the JROC makes the final JPD determination and designates a lead Service, if necessary. The validated document is forwarded to the Defense Acquisition Board (DAB) for preparation for the ADM. DCSOPS is notified of the validation.

(8) Issue CARDS number. After the JROC has validated the MRD, DAMO-FDJ enters the MRD into the CARDS and issues the MRD a CARDS number. DCSOPS notifies HQ TRADOC (ATCD-RP) of the validation and issuance of the CARDS number.

(9) Assign a MATDEV. Although there is a MATDEV on the ICT, a materiel development office will not officially be assigned until after the MRD has been approved. After approval of the MRD, DCSOPS sends the MRD to the ASA(ALT) for assignment of a MATDEV.

(10) Publish approved MRD. The approval date will be printed onto the MRD before release. The DCSCD AO prepares the approval announcement memorandum (fig L-6 for MNS or fig L-7 for ORD) for release by the DCSCD. The document is sent, as a minimum, to the proponent, those on the core staffing list, and HQDA (DAMO-FDJ).

(11) For M&S MRDs, the TRADOC DCSSA determines the appropriate M&S domain and assigns the MRD to a domain agent (DCSCD for ACR, DCST for TEMO, HQ AMC DCG(A) for RDA). DCSSA staffs cross-domain MRDs or assigns a primary domain agent. The domain agent assigns an AO for staffing and integration.

b. Non-JROC oversight MRDs.

(1) After CG, TRADOC approval, the DCSCD functional directorate obtains a CARDS number by e-mailing the following information to the Program Management and Service Directorate (PMSD):

(a) Title (directly from MRD).

(b) Functional area.

(c) Type document (MNS/ORD).

(d) Predecessor document (give CARDS number).

(e) Date approved.

(f) CBTDEV (appropriate proponent school).

(g) MATDEV (appropriate command).

(h) Management level (ACAT of the system).

(2) PMSD then e-mails a request to DCSOPS for a CARDS number. After it's issued, PMSD forwards the CARDS number back to the DCSCD directorate.

(3) Assign MATDEV. If a MATDEV has not yet been assigned, the appropriate requirements directorate forwards the MRD with a cover letter to SARD-RP requesting an MDA be assigned (see fig L-10). This is normally required for the MNS, or the first ORD if there was not an MNS for the system.

(4) Publish approved MRD. Annotate the CARDS number and, if applicable, the materiel developer on the forwarding memorandum (see para K-2b(2)(e)). Ensure the forwarding memorandum and MRD are dated. Send the MRD to the proponent, materiel developer (if assigned), core staffing list organizations, and HQDA (DAMO-FDJ), as a minimum.

Appendix L
Materiel Requirement Documents (MRD) Transmittal Memorandum Samples

PROPONENT LETTERHEAD

S: (60 days from transmittal date)

(OFC SYM) (MARKS) DD MM YY

MEMORANDUM FOR SEE DISTRIBUTION

SUBJECT: Draft (MNS/CRD/ORD) for (name of system)

1. References:

a. DODD 5000.1, Defense Acquisition

b. DOD Reg 5000.2-R, Change 3, Mandatory Procedures for Major Defense Acquisition Programs (MDAPs) and Major Automated Information System (MAIS) Acquisition Programs

c. AR 71-9, Materiel Requirements

d. TRADOC Pam 71-9, Requirements Determination

2. Forwarded at Encl 1 is the draft (MNS/CRD/ORD) for (name of system).

3. The DOD members of the integrated concept team (ICT) will reconvene at (location) on (date) to finalize the draft (document). Any DOD office with special interest or issues may attend the ICT. You must give notice of your intention to attend the ICT with your comments to the enclosed draft (MNS/CRD/ORD). Your representative to the ICT must have authority to represent your organization to resolve any issues in developing the final draft.

4. Request action addressees provide comments by (date before the joint ICT). Copy furnished addressees provide comments if they choose.

5. The chairperson of the ICT is (name and phone number). The (materiel developer MSC, PEO/PM) is requested to provide the ICT joint work group vice-chairperson.

AUTHORITY LINE: (as appropriate)

3 Encls (PROPONENT DIRECTOR SIGNATURE BLOCK)
1. MNS, CRD or ORD
2. OMS/MP (only for ORD)
3. STRAP (only for ORD)

DISTRIBUTION:

Figure L-1. Sample draft MNS/ORD transmittal memorandum for staffing

PROPONENT LETTERHEAD

OFC SYM (MARKS) DD MM YY

MEMORANDUM FOR COMMANDER, U.S. ARMY TRAINING AND DOCTRINE COMMAND, ATTN: ATCD-ZA, 20 INGALLS ROAD, FORT MONROE, VA 23651-1061

SUBJECT: Draft (MNS/CRD/ORD) for (name of system)

1. References

a. DODD 5000.1, Defense Acquisition

b. DOD Reg 5000.2-R, Change 3, Mandatory Procedures for Major Defense Acquisition Programs (MDAPs) and Major Automated Information (MAIS) Acquisition Programs

c. AR 71-9, Materiel Requirements

d. TRADOC Pam 71-9, Requirements Determination

2. Request your approval of subject document (Encl).

3. This paragraph will contain a brief description of the operational need/system.

4. This MNS/CRD/ORD has been staffed with the prescribed "core staffing," and all comments and issues have been resolved through the ICT process. (If issues remain, summarize them here.)

5. This system should be an ACAT _____ program. (N/A for CRD)

6. The STRAP was approved by DCST on DD MM YY. (N/A for CRD)

7. The requirement document has been staffed with DISC4 and their comments have been incorporated.

8. The point of contact for this action is (TRADOC proponent's action officer's name, office symbol, phone number, and e-mail address).

AUTHORITY LINE: (as appropriate)

2 (or 3) Encls (CDR/Comdt SIGNATURE BLOCK)
1. MNS, CRD or ORD
2. STRAP (if ORD)
3. DTLOMS Determination Analysis Report (for potential ACAT I and II MNS) -or-
Requirements Analysis (for ACAT I and II ORDs; see para 9-5 for content guidance) -or-
N/A for CRD

Figure L-2. Sample memorandum forwarding final draft MNS/ORD to HQ TRADOC for approval

TRANSMITTAL, ACTION AND CONTROL

CONTROL:	SUSPENSE DATE:	CLASS:	DATE: **XX XX XX**

SUBJECT:
(MNS/CRD/ORD) for (Name of System)

ACTION OFFICE/SYMBOL: **ATCD-XX**	INFORMATION/ASSIST:	ACTION OFFICER/TELEPHONE: **XXXXXXXXXXXXX**

___SIGNATURE ___APPROVAL ___INFORMATION ___RESOURCE IMPACT(Y/N) ___RC IMPACT(Y/N)

___DCS ___ASGS ___SGS ___CSM ___ACS ___CS ___DCG(IET) ___DCG ___CG,XO ___ CG

PURPOSE: DCSCD approves the (MNS/CRD/ORD) for (name of system) and signs memorandum at TAB A forwarding to DA for validation. (Use Figure L-4 for MNS or CRD and Figure L-5 for ORD.)

SUMMARY:

1. (Subject Document) was forwarded to HQ TRADOC for approval on (date), see TAB B (place CDR's/Comdt's forwarding letter and MRD at TAB B). Place **brief** description of system here.

2. An ICT was conducted and there are no remaining issues. (OR if issues were identified by the CDR//Comdt, explain how they were resolved by the HQ TRADOC Council of Colonels.)

COORDINATION:
DCST (ATIC-ATMR):
USANCA:
SMDC:
J6 Stage I Review and DISC4 validation for IT completed on: (date)

APPROVAL/RELEASE

	NAME	INITIAL	DATE		NAME	INITIAL	DATE
BRANCH:				ADCS:			
DIRECTORATE:				DCS/OFC CHIEF:			

APPROVAL AUTHORITY USE ONLY **CG/DCG/DCG(IET)/COFS/DCS APPROVAL-DISAPPROVAL-NOTED**

Figure L-3. Sample HQ TRADOC Form 30 forwarding the MRD (JROC oversight systems) for approval

HQ TRADOC LETTERHEAD

ATCD-(XX) (MARKS) DD MM YY

MEMORANDUM FOR HQDA (DAMO-FDJ), 400 ARMY PENTAGON, WASHINGTON DC 20310-0400

SUBJECT: Mission Needs Statement (MNS) / Capstone Requirement Document (CRD) for (name of system)

1. References:

a. DODD 5000.1, Defense Acquisition

b. DOD Reg 5000.2-R, Change 3, Mandatory Procedures for Major Defense Acquisition Programs (MDAPs) and Major Automated Information System (MAIS) Acquisition Programs

c. AR 71-9, Materiel Requirements

d. TRADOC Pam 71-9, Requirements Determination

2. Subject proposed MNS/CRD (Encl) is submitted for JROC action. The proposed MNS/CRD was approved by Commander, TRADOC on (date).

3. The point of contact for this action is (HQ TRADOC CD action officer's name, office symbol, phone number, and e-mail address).

FOR THE COMMANDER:

Encl (DCSCD SIGNATURE BLOCK)

CF:
Commander/Commandant of Originating Command/Center/School

Figure L-4. Sample HQ TRADOC transmittal memorandum forwarding a potential ACAT I MNS or a designated JROC oversight CRD to HQDA for JROC action

HQ TRADOC LETTERHEAD

ATCD-(XX) (MARKS) DD MM YY

MEMORANDUM FOR HQDA (DAMO-FDJ), 400 ARMY PENTAGON, WASHINGTON DC 20310-0400

SUBJECT: Operational Requirements Document (ORD) for (name of system)

1. References:

a. DODD 5000.1, Defense Acquisition

b. DOD Reg 5000.2-R, Change 3, Mandatory Procedures for Major Defense Acquisition Programs (MDAPs) and Major Automated Information System (MAIS) Acquisition Programs

c. AR 71-9, Materiel Requirements

d. TRADOC Pam 71-9, Requirements Determination

2. Subject proposed ORD (Encl) is submitted for JROC action. The proposed ORD was approved by Commander, TRADOC, on (date).

3. The following recommendations are furnished:

a. Program Category: ACAT (XX).

b. Materiel Developer: PEO, PM, AMC Major Subordinate Command or other Service.

c. Combat Developer: TRADOC.

d. Training Developer: TRADOC.

e. Logistician: DCSLOG or other Service.

f. Operational Tester: ATEC or other Service.

4. The point of contact for this action is (HQ TRADOC CD action officer's name, office symbol, phone number, and e-mail address).

FOR THE COMMANDER:

Encl (DCSCD SIGNATURE BLOCK)

CF:
Commander/Commandant of Originating Command/Center/School

Figure L-5. Sample HQ TRADOC transmittal memorandum forwarding JROC oversight ORD to HQDA for JROC action

HQ TRADOC LETTERHEAD

ATCD-(XX) (MARKS) DD MM YY

MEMORANDUM FOR SEE DISTRIBUTION

SUBJECT: Mission Need Statement (MNS)/ Capstone Requirements Document (CRD) for (name of system)

1. References:

a. DODD 5000.1, Defense Acquisition

b. DOD Reg 5000.2-R, Change 3, Mandatory Procedures for Major Defense Acquisition Programs (MDAPs) and Major Automated Information System (MAIS) Acquisition Programs

c. AR 71-9, Materiel Requirements

d. TRADOC Pam 71-9, Requirements Determination

2. The approved subject MNS/CRD is at enclosure 1. The CARDS reference number is (provided by DAMO-FDJ).

3. The MNS/CRD is forwarded for information/action as necessary.

4. The point of contact for this action is (HQ TRADOC CD action officer's name, office symbol, phone number, and e-mail address).

FOR THE COMMANDER:

Encl

DCSCD Signature Block for ACAT I and II OR
ADCSCD Signature Block for ACAT III and IV

DISTRIBUTION:
COMMANDER, U.S. ARMY MATERIEL COMMAND, ATTN: AMCAQ-PM-TILO, 5001 EISENHOWER AVENUE, ALEXANDRIA VA 22333-0001
Commander/Commandant of Originating Command/Center/School
(As a minimum, distribution will be to all agencies that reviewed the draft.)

CF:
HQDA (DAMO-FDJ), 400 ARMY PENTAGON, WASHINGTON DC 20310-0400

(To be issued by HQ TRADOC after JROC action or after HQ TRADOC approval for non-JROC oversight MNS.)

Figure L-6. Sample MNS/CRD approval announcement memorandum

HQ TRADOC LETTERHEAD

ATCD-(XX) (MARKS) DD MM YY

MEMORANDUM FOR SEE DISTRIBUTION

SUBJECT: Operational Requirements Document (ORD) for (name of system)

1. References.

a. DODD 5000.1, Defense Acquisition

b. DOD Reg 5000.2-R, Change 3, Mandatory Procedures for Major Defense Acquisition Programs (MDAPs) and Major Automated Information System (MAIS) Acquisition Programs

c. AR 71-9, Materiel Requirements

d. TRADOC Pam 71-9, Requirements Determination

2. The approved subject ORD at enclosure 1 is forwarded for action/information as appropriate. The following information applies to this document:

a. System Designation: ACAT (XX) and has Congressional, DOD, or DA oversight.

b. Materiel Developer: PEO, PM, AMC Major Subordinate Command, or other Service.

c. Combat Developer: TRADOC.

d. Training Developer: TRADOC.

e. Logistician: DCSLOG or other Service.

f. Operational Tester: USAATEC or other Service.

g. CARDS Reference Number: (provided by DAMO-FDJ)

3. The POC for this action is (HQ TRADOC CD action officer's name, office symbol, phone number, and e-mail address).

FOR THE COMMANDER:

Encl

DCSCD Signature Block for ACAT I and II OR
ADCSCD Signature Block for ACAT III and IV

DISTRIBUTION:
COMMANDER, U.S. ARMY MATERIEL COMMAND, ATTN: AMCAQ-PM-TILO, 5001 EISENHOWER AVENUE, ALEXANDRIA, VA 22333-0001
Commander/Commandant of Originating Command/Center/School
(As a minimum, distribution will be to all agencies that reviewed the draft.)

CF:
HQDA (DAMO-FDJ), 400 ARMY PENTAGON, WASHINGTON DC 20310-0400

(To be issued by HQ TRADOC after JROC action or after HQ TRADOC approval (for non-JROC oversight ORDs).)

Figure L-7. Sample ORD approval announcement memorandum

HQ TRADOC LETTERHEAD

S: (30 Days from transmittal date)

ATCD-(XX) (MARKS) DD MM YY

MEMORANDUM FOR

COMMANDING GENERAL, U.S. MARINE CORPS COMBAT DEVELOPMENT COMMAND, ATTN: C 441 (MS. JOINES), 3300 RUSSELL ROAD, QUANTICO, VA 22134-5001
HQ USAF, ATTN: XORD, 1480 AIR FORCE PENTAGON, WASHINGTON DC 20330-1480
CHIEF OF NAVAL OPERATIONS, ATTN: N81, 2000 NAVY PENTAGON, WASHINGTON DC 20350-2000

SUBJECT: Harmonization of U.S. Army (ORD or MNS) (Title of MRD)

1. Subject (ORD or MNS) provided at Enclosure is forwarded for review and harmonization. Your comments, with rationale, will provide input to the Army approval process. Request, as a minimum, you address the following questions in your review/response.

a. Are there any initiatives under development that could satisfy the need?

b. Is there a potential for joint participation?

2. Request input be provided to this office NLT DD MM YY.

3. Request response include a recommended Joint Potential Designator and be provided in writing to (HQ TRADOC CD action officer's name, office symbol, phone number, and e-mail address).

FOR THE DCSCD:

Encl (DCSCD DIRECTOR SIGNATURE BLOCK)

CF:
COMMANDER IN CHIEF, U.S. SPECIAL OPERATIONS COMMAND, ATTN: SORR, 7701 TAMPA POINT BOULEVARD, MCDILL AIR FORCE BASE, FL 33621-5321
COMMANDER, U.S. ARMY SPECIAL OPERATIONS COMMAND, ATTN: AORI-SI, FORT BRAGG, NC 28307

Figure L-8. Sample draft MNS/ORD transmittal memorandum for interService harmonization

TRANSMITTAL, ACTION AND CONTROL

CONTROL:	SUSPENSE DATE:	CLASS:	DATE: XX XX XX

SUBJECT:
(MNS/CRD/ORD) for (Name of System)

ACTION OFFICE/SYMBOL: **ATCD-XX**	INFORMATION/ASSIST:	ACTION OFFICER/TELEPHONE: **XXXXXXXXXXXXX**

___SIGNATURE ___APPROVAL ___INFORMATION ___RESOURCE IMPACT(Y/N) ___RC IMPACT(Y/N)

___DCS ___ASGS ___SGS ___CSM ___ACS ___CS ___DCG(IET) ___DCG ___CG,XO ___ CG

PURPOSE: ADCSCD(R) approve (MNS or ORD) for (name of system) and sign distribution memorandum at TAB A*.

SUMMARY:
1. (Subject Document) was forwarded to HQ TRADOC for approval on (date), see TAB B (place CDR's /Comdt's forwarding letter and MRD at TAB B). Place **brief** description of system here.

2. An ICT was conducted and there are no remaining issues. (OR, if issues were identified by the CDR/Comdt, explain how they were resolved by the HQ TRADOC Council of Colonels.)

CERTIFICATIONS/DESIGNATIONS:

C4 Certification (from J6): date
InterService Harmonization:
USAF Joint Potential Designator:
USN Joint Potential Designator:
USMC Joint Potential Designator:

COORDINATION:
DCST (ATIC-ATMR):
USANCA:
SMDC:

APPROVAL/RELEASE

	NAME	INITIAL	DATE		NAME	INITIAL	DATE
BRANCH:				ADCS:			
DIRECTORATE:				DCS/OFC CHIEF:			

APPROVAL AUTHORITY USE ONLY **CG/DCG/DCG(IET)/COFS/DCS APPROVAL-DISAPPROVAL-NOTED**

*(NOTE: Use MRD example in fig L-6 or fig L-7 as TAB A.)

Figure L-9. Sample HQ TRADOC Form 30 forwarding the MRD (non-JROC oversight systems) for approval

HQ TRADOC LETTERHEAD

ATCD-(XX) (MARKS) DD MM YY

MEMORANDUM FOR ASSISTANT SECRETARY OF THE ARMY (RESEARCH, DEVELOPMENT AND ACQUISITION), ATTN: SARD-RP, 103 ARMY PENTAGON, WASHINGTON DC 20310-0103

SUBJECT: Request for a Milestone Decision Authority

1. Enclosed (MNS or ORD) for (name of system) has been approved by the CG, TRADOC on (date).

2. The Joint Potential Designator for this need is (Joint, Joint interest, or Independent).

3. The CARDS reference number is (provided by DCSOPS).

4. Request a Milestone Decision Authority (MDA) be assigned to accomplish the Milestone (0 or I) actions as defined in the DOD 5000 series. Upon assignment, request this office be notified. Programs resulting from this need are expected to be ACAT (XX) level.

5. The point of contact for this action is (HQ TRADOC CD action officer's name, office symbol, phone number, and e-mail address).

FOR THE DCSCD:

Encl (DCSCD DIR SIGNATURE BLOCK)

CF:
HQDA (DAMO-FDJ), 400 ARMY PENTAGON, WASHINGTON DC 20310-0400
COMMANDER, U.S. ARMY MATERIEL COMMAND, ATTN: AMCAQ-PM-TILO, 5001 EISENHOWER AVENUE, ALEXANDRIA VA 22333-0001
(if system has C4 implications) DIRECTOR OF INFORMATION SYSTEMS C4, ATTN: SAIS-PP, 107 ARMY PENTAGON, WASHINGTON DC 20310-0107

Figure L-10. Sample HQ TRADOC transmittal memorandum request for MDA

HQ TRADOC LETTERHEAD

ATCD-(XX) (MARKS) DD MM YY

MEMORANDUM FOR SEE DISTRIBUTION

SUBJECT: U.S. Army Adoption of (other Service) (title of MRD)

1. References:

a. DODD 5000.1, Defense Acquisition

b. DOD Reg 5000.2-R, Change 3, Mandatory Procedures for Major Defense Acquisition Programs (MDAPs) and Major Automated Information System (MAIS) Acquisition Programs

c. AR 71-9, Materiel Requirements

d. TRADOC Pam 71-9, Requirements Determination

2. The (title of MRD (Encl)) is approved as a valid U.S. Army requirement. The following information applies to this document.

a. System Designation: ACAT (XX) and has (congressional, DOD, or DA) oversight.

b. Materiel Developer: PEO, PM, AMC Major Subordinate Command, or other Service.

c. Combat Developer: TRADOC.

d. Training Developer: TRADOC.

e. Logistician: USAMSAA or other Service.

f. Operational Tester: USAATEC or other Service.

g. CARDS Reference Number: (provided by DAMO-FDJ).

h. U.S. Army Joint Potential Designator: (Joint or Joint interest).

3. The point of contact for this action is (HQ TRADOC CD action officer's name, office symbol, phone number, and e-mail address).

FOR THE COMMANDER:

Encl (DCSCD SIGNATURE BLOCK)

DISTRIBUTION:
(Core staffing and those who the MRD was staffed with for comment)
(Other Services)
(Use core staffing list posted on the DCSCD Internet Homepage.)

Figure L-11. Sample Army adoption of another Service MRD

Appendix M
Models and Simulations (M&S) Requirements Integration & Approval Process Procedures

M-1. Army M&S management.

a. In February 1996, the CSA designated the Army Model and Simulation Office (AMSO) under the DCSOPS as the Army's central management office for M&S. AMSO's mission is to provide the vision, strategy, oversight, and management of M&S across all domains (ACR, RDA, and TEMO), to better focus efforts and resources used to exploit M&S potential. AMSO works the domains' requirements in light of fiscal realities to make the Army M&S Investment Plan affordable and executable. The requirements process is critical to M&S management. There will be no new program starts without an appropriate requirement approval.

b. The domains provide the framework for Army leadership to coherently oversee the diversity of M&S in the Army. The missions of the domains are supported by M&S. The commonality of missions within a domain provides the basis for a vision and strategic planning as well as visibility of opportunities for leveraging efforts. In the TEMO domain, the leadership can better evaluate a requirement for a new training simulation in light of their knowledge of other current and planned training efforts. In contrast, the leadership in a MACOM would mainly focus on training efforts within the MACOM.

(1) The domain manager is the domain's advocate at HQDA and provides leadership specifically for the domain in areas of strategic vision and investment planning. The managers work the program evaluation groups (PEGs) to ensure the case for M&S is understood. The domain managers are ACR, DAMO-FD; RDA, SAAL-ZD; and TEMO, DAMO-TR.

(2) The domain agent is the domain advocate at the MACOM level and works to ensure requirements of the users are understood and supported. While located at the MACOM level, the domain agent functions across MACOMs as the Army M&S domain agent. The agent provides leadership for the domain requirements process and oversight of the execution of the investment plan. The domain agents are ACR, HQ TRADOC, DCSCD; RDA, HQ AMC, DCG(A); and TEMO, HQ TRADOC, DCST.

(3) Separate from the domains are the Army M&S Standards Category Coordinators. Subject matter experts from various organizations throughout the Army are appointed to serve as Standards Category Coordinators (SCCs) and lead Army-wide teams to develop standards within their functional area of expertise. Standards are nominated on-line, submitted to a review board, and ultimately approved by the Deputy Under Secretary of the Army (Operations Research) (DUSA(OR)). Every approved Army M&S standard is registered in the Army Standards Repository (ASTARS). For each entry, there is information about the standard and a point of contact. To the maximum extent practical, standards will be made available electronically. Information on all the aspects of M&S Standards, including contact information for each SCC, can be accessed on the Internet from the AMSO Home Page (http://www.amso.army.mil) and the Army Node of the Modeling and Simulation Resource Repository (MSRR) (http://www.msrr.army.mil).

c. The AMSEC provides overall management of M&S and resolves issues. The AMSEC has representatives from the MACOMs and HQDA staff and is jointly chaired by the DCSOPS, the

DUSA(OR) and the Military Deputy to the ASA(ALT). The RIWG and the Policy and Technology Working Group support the AMSEC by providing management review for M&S development, standards, and infrastructure. The Army Model and Simulation General Officer Steering Committee (AMS GOSC) provides strategic vision and program validation and approval. It is co-chaired by the VCSA and the AAE with limited membership from the HQDA staff and TRADOC (see fig M-1).

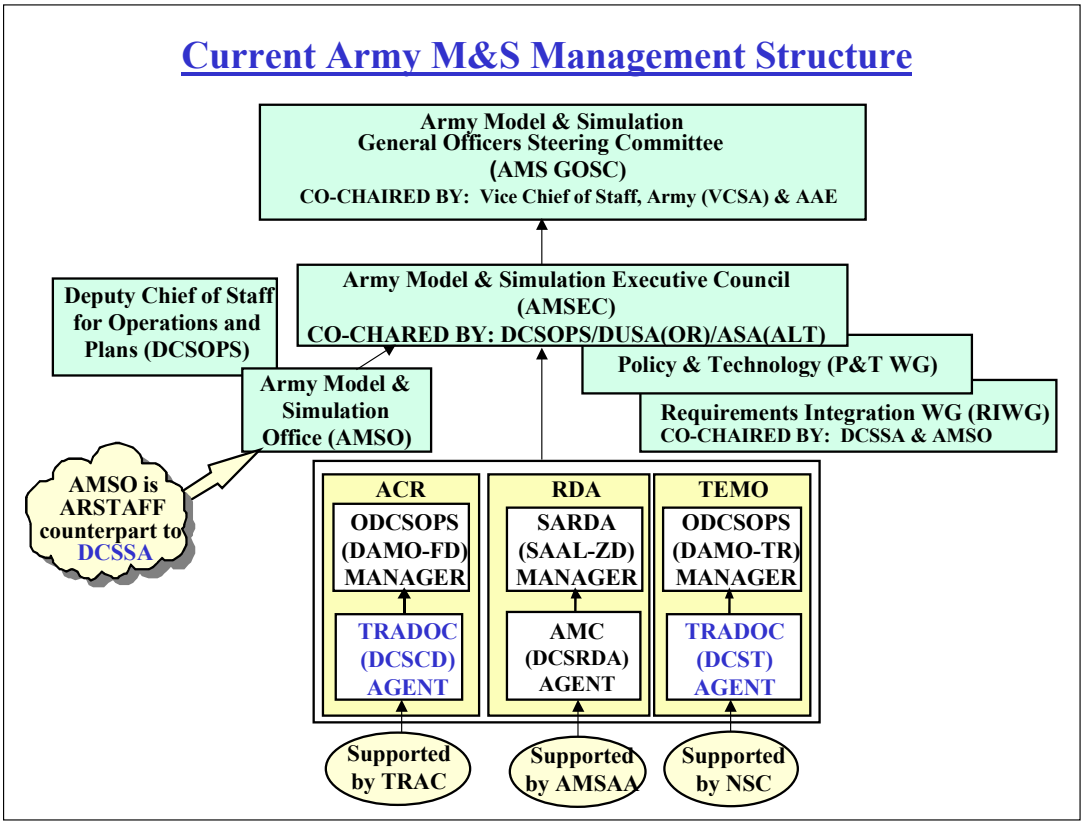


Figure M-1. Current Army M&S management structure

d. Requirements integration and approval is a key element of M&S management. TRADOC has the responsibility for M&S approval with the DCG acting on behalf of the CG. The RIWG, which is co-chaired by DCSSA and AMSO, provides the forum to work integration issues. The RIWG Charter provides further information on the RIWG mission (see fig M-2, at the end of this app). The Requirements Integration Council (RIC), which is chaired by the DCG, TRADOC, provides a senior leader review of integration issues from the RIWG. The RIC charter is at figure M-3, at the end of this appendix.

M-2. Resource Planning. AMSO is responsible for the Army's M&S Master Plan. Using the guidance and vision from the DOD M&S Master Plan, AMSO sets the vision, strategic plan, and objectives for the Army. Each domain in turn writes a domain management plan to explain its management organization and processes as well as provide its focus from the Army's M&S vision and objectives. The Army Investment Plan is an annex to the Master Plan. Its objectives are to optimize Army M&S investments, accurately reflect M&S resources embedded in all Management Decision Packages (MDEPs), invest in a new generation of M&S while maximizing leveraging and minimizing redundancy, and streamline and focus the M&S community efforts. The Army's Investment Plan is

derived from the investment plan each domain produces. Each domain uses the approved M&S requirements as the foundation for building its investment plan. These plans are annexes to the respective domain's management plan.

M-3. M&S requirements categories. (See table M-1)

Table M-1.
Examples of M&S requirements categories

Follow Traditional Acquisition Process	"Other M&S"	Part of Normal Sustaining Effort for M&S
OneSAF	M&S Enhancements to support Force XXI	PDSS
WARSIM	AMIP/SIMTECH projects	Network Controls
CATT	Soldier Station	Janus upgrades

a. There are those that will follow the traditional acquisition process with documentation in MNS/ORD (see chap 11).

b. Many M&S efforts fall outside the MNS/ORD process and can be placed into the categories described in chapter 12 as "other M&S." The requirements for other M&S will be documented in the M&S Requirements Document (MSRD). The format of the MSRD is at figure M-4, at the end of this appendix. An example of other M&S include those that when initially identified, the requirements may have "small" resource cost, but the impact could be larger. These may be requirements to add a new functionality to an existing model or simulation, develop a support tool (e.g., pre-processor, post-processor, AAR, a data base support system which aids M&S across the Army) and change network connectivity requirements. These efforts may have impact across several agencies and domains. These fall into the area of unmonitored efforts about which the HQDA M&S process action team, CSA, GAO, and DAIG raised a concern. The discipline of the M&S community is evidenced when the requirements are reported to and approved by a single process in support of a vision and goals.

c. The sustaining requirements would normally not be raised for consideration under the requirements integration and approval process. If the need for a significant change (funding, manpower, alteration in the model performance) occurs, the proponent domain or other user of the model or its output, could raise the need to approve the requirement.

M-4. Documentation considerations.

a. Connectivity is key to the usage of many M&S, but is often not considered in the requirements definition. To fully assess the M&S requirement, the network connectivity requirements must be defined. Information managers need to assess impact of M&S applications on networking and processing infrastructure to ensure required capabilities are operational. The required information which is listed in the MSRD format follows. MNS/ORD also have sections in which this same information can be provided.

(1) Impact of requirements on installations' communications environment. Include impact on geographic locations to be linked, network topology, transmission techniques, data transfer rates, gateways, required system use times, type and volume of data to be transmitted and received, time

boundaries for transmission, reception and response, peak volumes of data and diagnostic features, and security classification.

(2) Impact of proposed and approved modifications on installations' computer processing environment. Include impact on quantity, type and placement of processors, peripherals, and communications interface devices.

b. KPPs are required in MNS/ORD documentation. KPPs should be part of the MSRD if the requirement will be implemented by contract.

c. The use of Army M&S Standards is strongly encouraged and should be addressed in the MNS/ORD documentation or the MSRD.

d. Market surveys that look beyond the Army M&S community to other Services, industry, and academia are critical to sound requirements development. Conduct of market surveys must be reported in M&S requirements documentation.

M-5. Identifying an M&S need.

a. The commands, centers, schools, activities, and agencies provide their input to the domain agents. The domain agent and manager review the submissions to their domain and crosswalk new submissions with previously approved requirements and existing standards to identify opportunities for integration and leveraging of efforts (see fig 12-1). Requirements that are known to be cross-domain requirements when they are initially identified are submitted to DCSSA, which will act as the "domain agent" for cross-domain requirements. During the review process additional items may be added to this list.

b. The domain requirements are provided through DCSSA to the RIWG for review. The RIWG, whose members include representatives from all domain agents and managers, works to integrate, reconcile, and leverage M&S requirements across the domains. The RIWG co-chairs may charter ICTs to address and resolve integration issues. The M&S requirements database, which contains data on previously approved requirements as well as the input from the domains on potential new requirements, serves as a tool for the RIWG. The M&S Army Standards Repository, which contains information on approved M&S standards, also serves as a tool for the RIWG to ensure maximum use of M&S standards wherever possible. MNS/ORD requirements enter this process as part of the normal staffing for approval (see para 12-3b).

c. The RIWG provides cross-domain requirements, unresolved issues, and resolution of significant issues to the RIC. The RIC advises the DCG, TRADOC on the issues. MNSs/ORDs with no outstanding issues are sent back into staffing through the domain agents. Domain specific requirements are approved by the respective agents. DCSSA provides the cross-domain MSRDs and MNSs/ORDs to DCG, TRADOC for approval. The TRADOC Form 30 requesting domain agent or DCG, TRADOC approval and memorandum transmitting the approved MRD state that the requirement has been reviewed by the RIWG (and RIC if necessary). The TRADOC Form 30 states the RIWG (and RIC) recommendation. The possible recommendations are:

(1) There were no integration issues identified (i.e., it is a domain specific requirement). Therefore it is the domain agent's responsibility to approve the requirement.

(2) There were integration issues identified and they have been resolved with the recommendation that a single domain addresses the issues. The identified domain agent will approve the requirement.

(3) There were integration issues identified and it was determined that the requirement is a cross-domain requirement. The RIWG and RIC (if necessary) will endorse the requirement for DCG, TRADOC approval.

d. For those requirements approved by domain agents, their action offices provide a copy of the approval document to the members of the RIWG. For those cross-domain requirements approved by the DCG, TRADOC, DCSSA provides a copy of the approval document to the RIWG members.

e. Domain managers and agents use the approved requirements as the basis for the domain investment plan.

M-6. Adaptations to other processes.

a. Capstone Requirements Documents. When meeting an M&S requirement results in multiple M&S products over time, a CRD may be appropriate to document overall program approval. IAW with chapter 11, the individual M&S products should be documented and approved with an MRD. For M&S, this MRD is typically an MSRD.

b. Simulation Support Plans (SSPs)

(1) The intent of an SSP is to provide a tool to use in thinking through M&S requirements throughout the acquisition life cycle to reduce time, resources, and risk, as well as improve program implementation. SSPs are living documents, which will change as the concept or system matures. The SSP may take the place of an MSRD for development of a new M&S or major upgrade to existing M&S.

(2) SSPs should be developed in accordance with the Simulation Support Plan Guidelines published May 1997 by the Office of the Secretary of the Army for Acquisition, Logistics, and Technology OASA(ALT). A copy of the SSP guidelines is available on the OASA(ALT) Internet Homepage at http://www.sarda.army.mil. The guidelines are undergoing revision to expand the scope of the SSPs to begin with the concept exploration phase of system development. These revisions should be in place by January 2000. The SSP, if being used as a requirements document, should still contain the elements of the MSRD as described in figure M-4.

(3) In general, SSPs are developed and coordinated in accordance with guidelines from OASA(ALT). Initial SSPs are developed pre-MS 0 by the ICT team with representation from all domains (see chap 4 and app B). SSPs generated prior to MS I should be submitted to the ACR domain for review. All other SSPs should be submitted to the RDA domain for review. The SSP is then submitted to DCSSA for RIWG staffing to ensure all functional areas have the opportunity to review, incorporate, and integrate the concepts outlined in the SSP. Any comments identified during the

DCSSA staffing of SSPs are transmitted by HQ TRADOC to the originator, info ASA(ALT), for inclusion in the SSP. Staffing is for comment and coordination, not approval. SSPs generated prior to MS I are staffed along with the MNS/ORDs.

(4) DCSSA staffing of the SSP is intended to ensure communication and leveraging of ideas across all three M&S domains. The initial SSP developed during the ICT process will provide a building block for use by the MATDEV and PM. ICTs, PEOs, and PMs need to work very closely with TRADOC during the development and enhancement of the SSPs to ensure that appropriate simulation plans and logical partnerships across domains are established to support the concept or system in development. This early coordination should facilitate later execution of the work described in the SSP.

c. Geospatial Information System (GIS).

(1) GIS data is the foundation of most Army M&S. The TRADOC Program Integration Office for Terrain Data (TPIO-TD) collects, integrates, and submits all GIS requirements for the Army.

(2) GIS requirements for M&S are documented in a memorandum and forwarded to the TPIO-D (Commander, USAMANSCEN, ATTN: ATSE-TPIO, 427 Engineer Loop, Suite 2417, Fort Leonard Wood, MO 65473-8926). The memorandum should request the National Imagery and Mapping Agency (NIMA) Foundation Data Set. If the NIMA Foundation Data Set will not suffice, the memorandum can request a Mission Specific Data Set (MSDS). MSDS requests should include the following information:

(a) Description of the system or activity and definition of the type of geospatial product or support expected, including the related application of the expected support to specific operational concepts, weapon system support, planning, or other specified uses.

(b) Impact on development, test, evaluation or operational commitment if the product or Service is not providing the information as requested. Express the impact in terms of the OPLAN, CONPLAN, training requirement, or other mission essential requirement that will be supported by the request.

(c) Content and accuracy requirements, correlated with the technical characteristics and accuracy of the system or activity that the product or Service will support.

(d) Interrelationship, if any, of the intended use of the required item with the use or design of existing products.

(e) Initial area of coverage.

(f) Maintenance requirements and predicted life expectancy of the system.

(g) Urgency of the proposed product, proposed priority, and date required, with justification.

(h) Point of contact at the lowest appropriate level for technical coordination.

(3) An information briefing on Foundation Data and MSDS can be accessed on the Internet at http://www.wood.army.mil/TPIO-TD. A template to assist in the development of geospatial requirements can be found at the same web site.

d. Joint M&S requirements.

(1) Joint M&S have somewhat unique requirements approval processes. There is usually a Service lead and a Service proponent assigned to represent the other Services. Depending on the level of cost and the intended uses of the M&S, joint oversight for the program can be at the OSD level or the Joint Requirements Oversight Council (JROC). Army oversight can be at the M&S Domain Manager level or the AMSEC. When another Service is the lead for the program, the Army proponent ensures the requirements stated in the joint documents fulfill the Army's needs.

(2) If the joint M&S program is following the standard materiel acquisition process, then the proponent should follow the guidelines established in para 11-3. In the case of an MNS/ORD, each of the Services uses their own established processes for staffing and approval of requirements within their own Service.

(3) Regardless of Service lead, the Army proponent must still acquire TRADOC approval of the requirements document. TRADOC determines the Army position on approval of the mission need and associated requirements from an Army perspective. This is combined with the other Service positions for a joint determination of whether the requirement is valid or feasible.

(4) Coordination within the Army of joint M&S requirement documents is the responsibility of the designated Army proponent for the program. Coordination should include organizations from the core staffing list shown in app K. When the documents have been coordinated, the Army proponent should submit the documents, along with a cover letter endorsing the approval of the requirements, to the DCSSA.

(5) DCSSA submits the requirement to the RIWG for review and if there are no cross-domain issues, DCSSA forwards the recommendation package to the DCG, TRADOC for approval. If there are cross-domain issues, they will be raised to the Requirements Integration Council (RIC) level for resolution of the issues and recommendation to the DCG, TRADOC.

e. The National Ground Intelligence Center (NGIC) provides validated threat representations for M&S. A library in Defense Models and Simulation Office's (DMSO's) MSRR consists of validated threat representations and can be accessed on the Internet at: http://www.msrr.army.mil. Requests for new representations need to follow the DODIPP.

Charter for the Requirements Integration Working Group

1. Name of the Committee. The Requirements Integration Working Group (RIWG).

2 Date Established. 9 October 1996

3. Date to be Terminated. The RIWG will continue indefinitely with signatories revalidating the charter every two years.

4. Category and Type of Committee. Intra-Army

5. Mission and Purpose The RIWG will

a. Provide a forum to review and discuss current, new and potential Model and Simulation (M&S) requirements.

b. Review each M&S domain's (Advanced Concepts and Requirements (ACR); Research, Development, and Acquisition (RDA); and Training, Exercises, and Military Operations (TEMO)) proposed M&S requirements. Ensure new domain requirements (single or cross-domain) are documented and submitted to the RIWG for review. Appropriate documentation may be in the form of an ORD, MSRD, SSP, or other recognized requirements document. RIWG members must have access to each domain's requirements in order to conduct a thorough M&S requirements review to facilitate integration, consolidation, reconciliation, and leveraging across the domains. Ensure compliance with and identify voids in supporting the HQDA M&S vision and strategic plans. Develop position(s) on unresolved integration issue(s).

c. Provide integrated cross-domain requirements, significant integration decisions, and positions on unresolved issues to support the Requirements Integration Council (RIC) and TRADOC DCG's requirements approval mission.

d. Support the M&S policy and guidance set by co-chairs of the Army Model and Simulation Executive Council (AMSEC) - the Deputy Chief of Staff for Operations and Plans (DCSOPS), Deputy Under Secretary of the Army for Operations Research (DUSA(OR)), and the Military Deputy to the Assistant Secretary of Defense for Acquisition, Logistics, and Technology (MilDep ASA (ALT)) - concerning the prioritization and synchronization of M&S investments.

e. Recommend policy and program guidance to the DCSOPS, DUSA (OR), and MilDep ASA (ALT) concerning the processes for integration, approval, and prioritization of M&S requirements and the development of domain and Army investment plans.

Figure M-2. Charter for M&S RIWG, dated 30 Jul 99

f. Provide a forum to review and discuss current, new and potential Advanced Simulation Program (ASP) issues and requirements. Provide recommendations to the AMSEC regarding ASP vision, requirements, and funding.

6. Direction and Control

a. The RIWG is co-chaired by the HQDA Army Model and Simulation Office (AMSO) (Chief, Operations and Plans Division) and HQ TRADOC, Office of the Deputy Chief of Staff for Simulations and Analysis (ODCSSA) (Director, Simulations Directorate).

b. Membership (Colonel/GM-15) will include representatives from the three M&S domains and be designated by the following organizations:

(1) ACR Domain Manager - HQDA, DAMO-FD

(2) ACR Domain Agent - HQ TRADOC, DCSCD

(3) RDA Domain Manager - OASA (ALT), SAAL-ZD

(4) RDA Domain Agent - HQ AMC, DCSRDA

(5) TEMO Domain Manager - HQDA, DAMO-TR

(6) TEMO Domain Agent - HQ TRADOC, DCST

c. The co-chairs may invite representatives from other organizations to participate as observers on an as required basis at the RIWG meetings. Routinely invited observers will include:

(1) Director, Simulations Directorate, Space and Missile Defense Battle Lab, Space and Missile Defense Command

(2) Representative of the ASP Technical Manager, STRICOM

d. The RIWG will meet at least quarterly or at the call of the co-chairs.

e. Subcommittees. Subcommittees or Integrated Concept Teams (ICT) will be convened as required to address issues and recommend policy related to M&S requirements integration or investment prioritization.

(1) The co-chairs will approve the charter for the ICTs Participation of interested agencies and commands will be encouraged to ensure a wide range of expertise is available in accomplishing goals and objectives. AMSO and/or ODCSSA will provide a member to all subcommittees or ICTs convened by the RIWG.

Figure M-2. Charter for M&S RIWG, dated 30 Jul 99 (cont)

(2) The ASP Core Team will be a standing sub-committee of the RIWG. Members are representatives of the Functional Manager, Technical Manager, and AMSO.

7. Authority. AR 5-11, Army Model and Simulation Management (Aug 1997): TRADOC Pam 71-9, Requirements Determination (Aug 98)

8. Administrative Support and Staff Arrangement. AMSO and ODCSSA will provide all administrative support to the RIWG.

WALTER W. HOLLIS
Deputy Under Secretary
of the Army
(Operations Research)

THOMAS N. BURNETTE, JR.
Lieutenant General, GS
Deputy Chief of Staff
for Operations and Plans

PAUL J. KERN
Lieutenant General, GS
Military Deputy to the
Assistant Secretary of the
Army (Acquisition, Logistics,
and Technology)

RANDALL L. RIGBY
Lieutenant General, U.S. Army
Deputy Commanding General
USA TRADOC

3

Figure M-2. Charter for M&S RIWG, dated 30 Jul 99 (cont)

DEPARTMENT OF THE ARMY

HEADQUARTERS UNITED STATES ARMY TRAINING AND DOCTRINE COMMAND
FORT MONROE, VIRGINIA 23651-5000

REPLY TO
ATTENTION OF

Charter for the Model and Simulation
Requirements Integration Council

1. Name of the Committee. The Model and Simulation (M&S) Requirements Integration Council (RIC).

2. Date Established. February 1997.

3. Date to be Terminated. The M&S RIC will continue indefinitely with signatory revalidating the charter every 2 years.

4. Category and Type of Committee. Intra-Army

5. Mission and Purpose. The M&S RIC will:

a. Advise TRADOC DCG acting for TRADOC CG as the Army's approval authority for M&S requirements for the Army.

b. Receive and act upon recommendations from the Requirements Integration Working Group (RIWG) on issues related to M&S requirements integration and approval.

c. Based upon resolution of cross-domain issues from the RIWG endorse each M&S domain's (Advanced Concepts and Requirements (ACR); Research, Development, and Acquisition (RDA); and Training, Exercises, and Military Operations (TEMO)) proposed requirements as integrated with maximum leveraging among the domains.

d. Endorse the cross-domain M&S requirements as integrated, reconciled with maximum leveraging and minimum duplication, if any, across the domains.

e. Provide recommendations to HQDA on M&S requirements needed to support HQDA M&S vision and strategic plans.

f. Support requirements approval decisions of the TRADOC DCG as advocates of the requirements in staff actions and other forum.

6. Direction and Control.

a. The M&S RIC will be chaired by the TRADOC DCG.

b. Membership (General Officer or Senior Executive Service) will include representatives from the three M&S domains and designated by the following organizations:

(1) ACR Domain Manager - HQDA, DAMO-FD

(2) ACR Domain Agent - HQ TRADOC, DCSCD

(3) RDA Domain Manager - HQDA, ASA(ALT)

(4) RDA Domain Agent - HQ AMC

(5) TEMO Domain Manager - HQDA, DAMO-TR

(6) TEMO Domain Agent - HQ TRADOC, DCST

c. Assistant Deputy Chief of Staff for Operations and Plans, HQDA, and the Deputy Chief of Staff for Simulations and Analysis, HQ TRADOC, participate in the RIC as special advisors to the chair.

d. The chair may invite representatives from other organizations to participate as observers on an as-required basis at the RIC meetings.

e. The M&S RIC will meet at least annually or at the call of the chair.

f. Supporting committees and subcommittees.

(1) The RIWG supports the RIC by providing the integrated cross-domain requirements. The RIWG presents its positions on unresolved issues and significant integration decisions, if any.

Figure M-3. Charter for M&S RIC

(2) Subcommittees or Integrated Concept Teams (ICT) will be convened as required to address issues and recommend policy related to M&S requirements integration. The chair will approve the charter for the ICTs. Participation of interested agencies and commands will be encouraged to ensure a wide range of expertise being available in accomplishing goals and objectives. AMSO and/or ODCSSA will provide a member to all subcommittees or ICTs convened by the RIC.

7. Authority. AR 5-11, Army Model and Simulation Management (January 1997 draft); TRADOC Black Book 3, Requirements Determination; TRADOC Pam 71-XX (February 1997 draft)

8. Administrative Support and Staff Arrangement. ODCSSA will provide all administrative support to the RIC.

/signed/
WILLIAM W. HARTZOG
General, U.S. Army
Commanding
DATE: 29 Apr 97

Figure M-3. Charter for M&S RIC (cont)

Model and Simulation Requirements Document (MSRD)

Title:

POC/Organization Information:
Include telephone and email information for POCs.

Key Words:

Domain(s) Supported and Domain Activities Supported:
(Advanced Concepts and Requirements (ACR) includes force design, operational requirements, warfighting experiments. Research, Development, and Acquisition (RDA) includes basic applied research, weapons system development, and test and evaluation. Training, Exercises, and Military Operations (TEMO) includes individual and collective training, joint and combined exercises, mission rehearsal, and operations planning.)

Type of Requirement (M&S Development or Enhancement, M&S Support Applications, M&S Support Activities): Examples below.

a. Development and maintenance of M&S. This category includes the development/ significant enhancements and maintenance of M&S to include new start M&S and associated M&S specific hardware, data and terrain, communications support, contract support, instrumentation support, etc.

b. M&S Support Applications. M&S support applications are those M&S tools developed independently of a specific M&S (i.e., non-specific M&S support applications). Examples include an after action review capability, scenario generation tools, data or terrain, visualization enablers, standard data/terrain/algorithm/VV&A processes, interoperabilty enablers, etc.

c. M&S Support Activities. Efforts considered M&S support activities include long haul networking, M&S contract support (feasibility studies, proofs of principle, one-of-a-kind-buys, and contract logistics support), and new simulation facilities. (i.e., The proposed need to bring M&S, hardware, and other support items together in one place to create a specific simulation capability, not the construction of a building.)

Description (Capability Required):

Justification (Void/Deficiency/Shortfall):

Description of investigation to ensure capability does not already exist:
(Could show a list of programs considered with short statement of why it was not sufficient. Show a coordination POC. Report how Market Survey was conducted. Be sure to cite sources used in the search)

Description of investigation of integration opportunities or why integration is not an issue (List coordination):
(Should address the use of Army M&S Standards.)

Other impacts/constraints (communications/networks, equipment, users, etc.):
Examples of communications/network impacts include:

a. Impact of requirements on installations' communications environment. Include impact on geographic locations to be linked, network topology, transmission techniques, data transfer rates, gateways, required system use times, type and volume of data to be transmitted and received, time boundaries for transmission, reception and response, peak volumes of data and diagnostic features, and security classification.

b. Impact of proposed and approved modifications on installations' computer processing environment. Include impact on quantity, type and placement of processors, peripherals and communications interface devices.

Benefit/ROI/Impact if not approved:

Urgency statement if required (with rationale):

Estimated Funding by FY/Type of funds (OMA, OPA, RDTE development and maintenance costs)/Proposed source:

Expected approval level (Agency, Domain, DCG TRADOC):

Status of Review/Approval (To be updated as requirement is processed):

Figure M-4. MSRD format

Appendix N
Command, Control, Communications, and Computers Requirements Definition Program (C4RDP)

N-1. Program overview.

a. The C4RDP documents the Army's C4 requirements, information exchanges, and equipment. This program integrates the functionality of three previously separate efforts: operational facility (OPFAC), Army Battlefield Integration Concepts (ABIC), and the communications database (CDB). As one fully integrated program, C4RDP provides the Army with a common C4 vision.

b. The C4RDP provides TRADOC with a method of ensuring all battlefield information systems, architectures, and requirements are designed with full consideration for information flow requirements, information network and system protection, functional interfaces, and technical interoperability. The program's goal is to achieve the greatest return on information systems, while satisfying proponents' needs for information and maintaining a coherent, feasible, fully integrated information architecture. The C4RDP assists proponents in identifying and prioritizing information exchanges by required grade of Service, cost of failure associated with information exchanges, battlefield functions performed by the exchanges, etc. TRADOC prioritizes information requirements across functional areas. Prioritization provides appetite suppression for C4 equipment on the battlefield, as C4 is a limited, but vital, battlefield resource; and, it ensures the supporting system and technical architectures are designed to support information requirements by mission priority.

c. The C4RDP is fully automated, using the C4RDP support system (SS). The C4RDP SS enables proponents to develop their OPFACs, user interface requirements (UIRs), and information exchange requirements (IERs), which depict Army information architectures such as the ABCS and STAMIS in database and graphic form.

N-2. C4RDP guidance.

a. The C4RDP derives its regulatory base from AR 25-1 and TRADOC Pam 71-9.

b. The C4RDP Documentation Series, maintained by the Signal Center and distributed to the proponents, consists of:

(1) Volume I - C4RDP Executive Summary.

(2) Volume II - C4RDP Support System Operations Guide.

(3) Operational Facility (OPFAC) Rule Book (published bi-annually).

N-3. C4RDP products (see fig N-1).

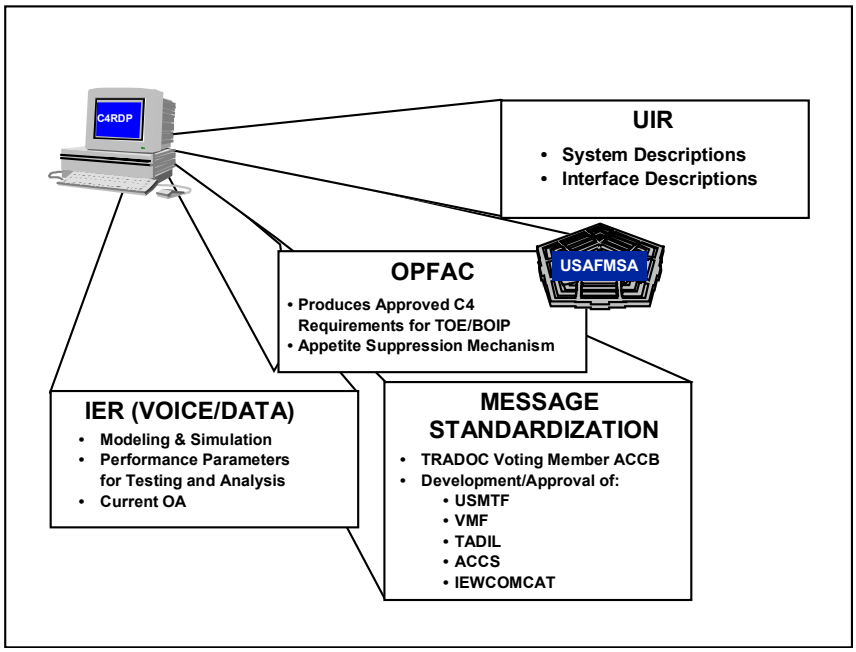


Figure N-1. C4RDP products

a. OPFAC. Before C4 requirements can be identified in TOE, each piece of equipment must have an associated OPFAC rule. The OPFAC process (see fig N-2) begins with the proponent combat developer. The proponent develops doctrine and force structures, and determines the need for C4 support equipment. The proponent also develops the required information exchanges, either for battlefield automated system (BAS) or non-BAS (e.g., voice or fax). Coordination with other proponents may be necessary in developing OPFAC requirements. Once developed, OPFAC rules are exported as issues to the C4RDP PM during the semi-annual OPFAC Board cycle. The C4RDP PM checks for correctness and compliance with approved doctrinal standards and architectures, verifies justification for the changes, and identifies and rectifies any anomalies. After C4RDP PM review, the issue is submitted to the OPFAC Board. Once board results have been approved by HQ TRADOC, a new OPFAC Rule Book is printed and distributed by the C4RDP PM. USAFMSA uses the OPFAC Board results to develop and/or modify TOEs and BOIPs. Refer to the C4RDP SS Operations Guide for specific details on the OPFAC process.

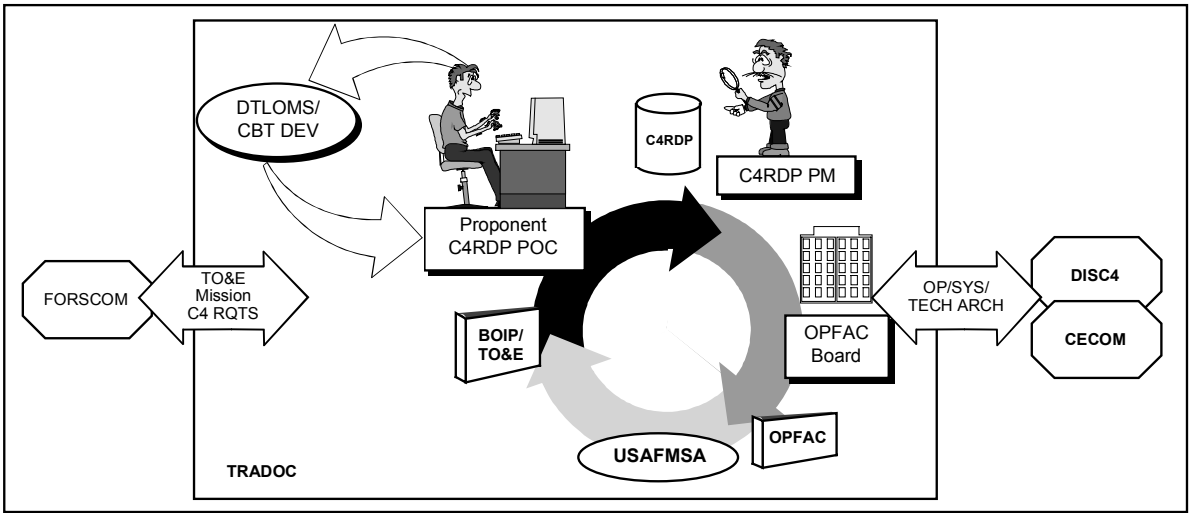


Figure N-2. OPFAC process

b. IERs. These requirements are normally expressed in voice and data needlines. These IERs identify the flow of information required to support operational missions at all levels. Identification of

the sources and users of this information, along with associated, relative message characteristics, and the purpose/function results in an architecture which portrays operational requirements for information exchanges (see fig N-3). There are several information exchange parameters used in the C4RDP SS to describe essential characteristics of information exchanges. Some of the parameters are inherent to all types of exchanges and some are specific to exchanges between BASs. Currently, the common parameters maintained in C4RDP system to describe IERs are: OPFAC rule; primary and alternate communications; unit relationship and force ratios; battlefield function; message identification; purpose; cost of failure; speed of Service required; message length; frequency of transmission; intensity of transmission; OPFAC activity and mobility; mode of transmission; broadcast requirements and message classification. The information exchange requirements maintained in the C4RDP represent the Army's only validated source of battle command information exchanges.

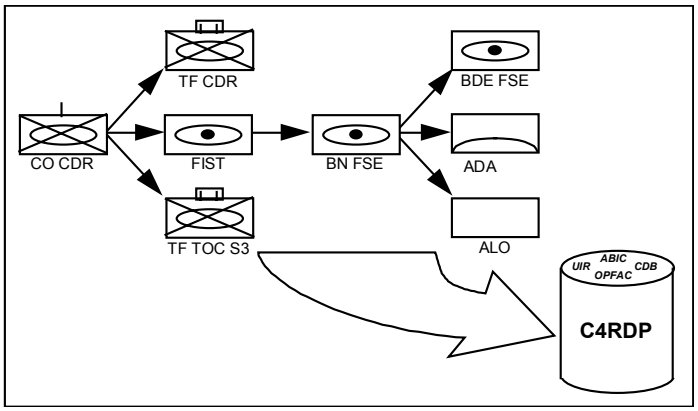


Figure N-3. Information exchange requirements (IERs)

c. M&S support. C4RDP C4 equipment distribution requirements and IERs are used to model and simulate communications network requirements. The C4RDP serves as a validated source of network traffic that can be used to model new technologies in support of concept and system development throughout the Army.

d. Standards process. The C4RDP supports the goals of the JTA-A by managing the types of equipment, messages (U.S. message text format (USMTF), variable message format (VMF), tactical automated data information link (TADIL), Army Command and Control System (ACCS), intelligence and electronic warfare communications catalog (IEW COMCAT), and interfaces that are utilized by BAS. Proponents submit ICPs to the Army Configuration Control Board (ACCB). The ACCB reviews, analyzes, and evaluates the ICPs for incorporation into message standards baselines and/or management documentation. As TRADOC's executive agent for this program, the TRADOC voting member to the ACCB resides at the Signal Center.

e. User interface requirement (UIR). The Army Battlefield Integration Concepts (ABIC) (AR 25-1) was the legacy tool used to describe the interface between automated systems. The C4RDP incorporated the many parts of ABIC (the system description, interface description, information exchange requirements, and architecture graphics) into one program. (see fig N-4). Interfaces between automated systems must be described in sufficient detail for use by the materiel developer for system, interface, and protection design and engineering. Because the UIR is required to support the materiel acquisition cycle, it is imperative that the UIR is developed in a timely manner and coincides with the end of the demonstration-validation phase at MS II.

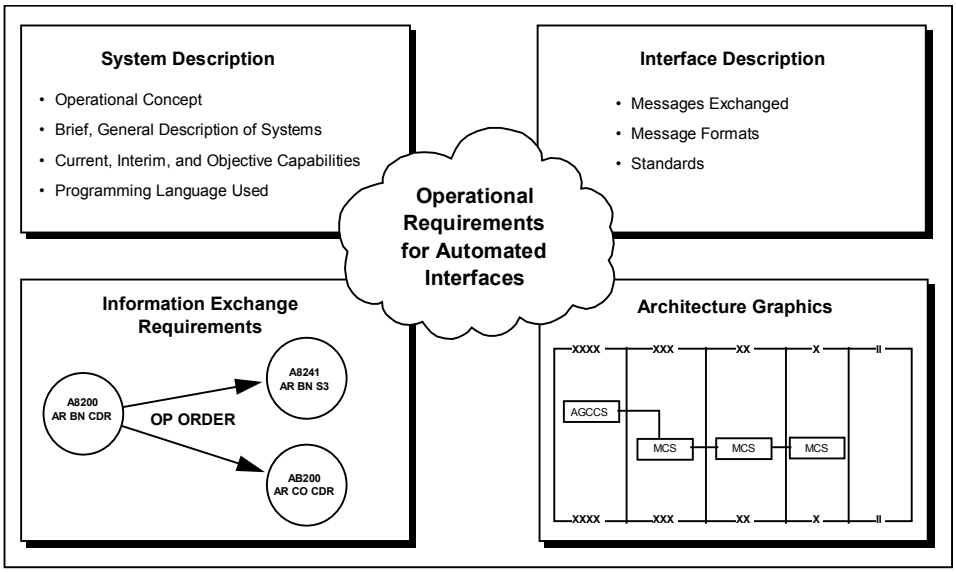


Figure N-4. User interface requirements (UIRs)

(1) Refer to chapter 4 and app B of the C4RDP SS Operations Guide for the specific format for developing a UIR.

(2) The CBTDEV at proponent schools and centers initiates UIR development in coordination with the U.S. Communications and Electronics Command (CECOM) and the appropriate PM. The Signal Center ensures the timely review of all UIRs and affects proper coordination between the proponent, the Signal Center (for technical analysis), and HQ TRADOC. The Signal Center performs a technical analysis with concentration on communication systems hardware requirements, both present and future, and performs an architecture review to ensure doctrinal integrity is not compromised. The C4RDP PM office collects all comments and coordinates unresolved issues between battlefield functional areas (BFAs) and the UIR proponent. Unresolved issues are forwarded to HQ TRADOC for resolution. Once the UIR is approved by HQ TRADOC, it is forwarded to the MATDEV.

(3) UIR change proposal (UCP). The purpose of a UCP is to change an already approved UIR. Prepared by the lead proponent, it is a stand-alone document that itemizes and specifies the proposed changes. A UCP may be developed to supersede an existing UIR or just portions of a previous UCP, using page changes. Refer to the C4RDP SS Operations Guide for specific detail on UCPs.

(4) UIR annual review. Lead proponents review their UIRs on an annual basis. They perform this review during the month indicated in figure N-5, and submit the annual review report to the C4RDP PM office no later than the last working day of that month.

Maneuver	January
Fire Support	February
Intelligence & Electronic Warfare	March
Air Defense	April
Combat Service Support	May

Figure N-5. Annual UIR reviews

Appendix O
Users' Functional Description (UFD)

O-1. Introduction. A UFD is a document prepared as a follow-on to the ORD to specifically address requirements related to IT.

O-2. Procedures. CBTDEVs write the UFD to refine the operational requirements for IT capabilities that were approved in the ORD. The UFD is approved by the proponent school commandant. Authority may be delegated. The CBTDEV forwards the UFD to the MATDEV, software developer, and operational tester. Additionally, a copy is provided to HQ TRADOC DCSCD.

a. Determining the need for UFD. CBTDEVs determine the need for a UFD based on the anticipated degree to which the system will use IT. CBTDEVs may decide not to write and maintain a separate UFD if their input into the MATDEV's IT system documentation provides sufficient operational information. CBTDEVs consult with the MATDEV and operational tester and evaluator regarding the utility of a UFD for a particular system, but the CBTDEV ultimately decides whether the UFD is necessary.

b. Coordination. The UFD undergoes a more limited coordination process than the MNS and ORD. The UFD does not change or add requirements to the MNS and ORD. It clarifies and amplifies operational requirements for the system's automated capabilities. CBTDEVs ensure appropriate coordination with the user organizations. The extent will vary according to characteristics of the system, e.g., its density and diversity of units and theaters. The UFD is also coordinated with the assigned independent operational tester and evaluator, proponents of related systems, and USACAC, and HQ TRADOC DSCT for training review. Throughout production of the UFD, the CBTDEV coordinates with the development community including the MATDEV, Software Support Activity (SSA), and PM. Prior to initial UFD approval, the CBTDEV formally coordinates it with the responsible MATDEV/PM and resolves comments as necessary. Mutual agreement is essential for success since the UFD is the basis for further requirements engineering by the MATDEV.

c. When to write the UFD. The UFD amplifies requirements approved in the ORD. Therefore, the initial UFD cannot be approved prior to the ORD. For some materiel systems, the utility of a UFD will be apparent from the start of the program. In such cases, CBTDEVs can write the UFD concurrently with the ORD. For other systems, it is possible that the utility of a UFD may not become apparent until after MS I. Then, the ICT continues to assess the need for a UFD with the MATDEV and operational tester and evaluator. The CBTDEV coordinates with the MATDEV to ensure the delivery of a system's UFD is synchronized with preparation of its specifications for IT. Figure O-1 depicts the iterative timing of UFD development as more information becomes available from users and developers.

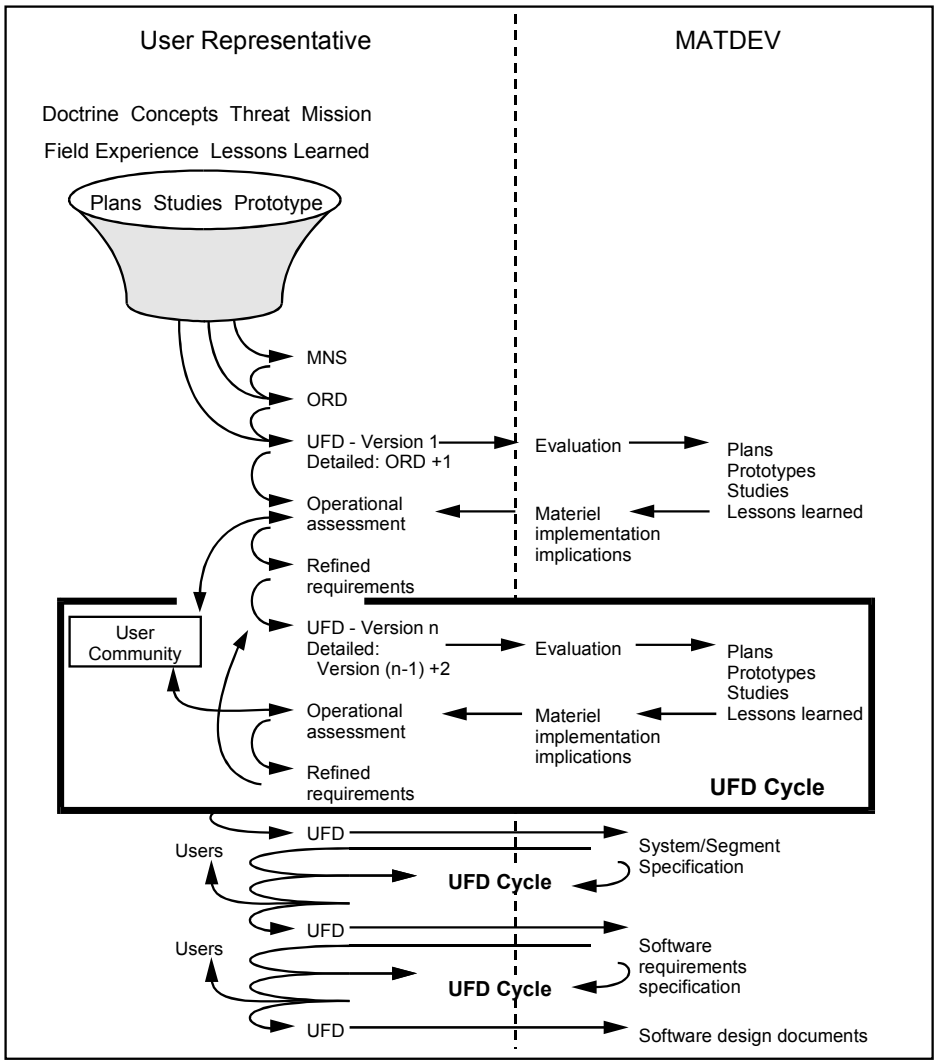


Figure O-1. UFD cycle

O-3. Writing guidelines. The UFD contains the minimum set of operational requirements that describes the external behavior and characteristics of a system's IT capabilities. It does not address the internal design of computer resources. The CBTDEV includes in the UFD information that is necessary to convey the position of the user community about the IT capabilities required, and to provide direction on choices about which the MATDEV needs user input. If the rationale for a capability cannot be based on the users' viewpoint, then it should not be stated in the UFD.

a. The type of system will affect the level of detail needed in the UFD. For example, a UFD for a C3I system requires more detailed operational information than a UFD for a munition communicating its course to a guidance system. A C3I system's functional requirements are complicated by doctrinal implications, by the different viewpoints of operators with various missions and at various echelons, and by the variety of modes in which it will be used. A guided munition on the other hand, has many system requirements, but its basic operational requirement, to hit the target identified by the soldier, does not require as extensive an explanation.

b. Do what is feasible. Writing a UFD is not a trivial task. It could consume more time and resources than are available to the CBTDEV if a full battery of analytical techniques are used. CBTDEVs must write the UFD within available resources and expertise. See figure O-2 for a hierarchy of priorities for the UFD. All of the information figure O-2 describes may appear in a UFD, but it is more important that the CBTDEV address the higher tiers well, than all tiers poorly.

- Describe operational requirements in natural language.
- Describe operational requirements using a formal logic, e.g., object oriented analysis.
- Describe operational requirements using formal notations, e.g., IDEF0 or IDEF3.
- Conduct business process reengineering (BPR) analysis of the system's mission area and relate it to the operational requirements for this system.
- Describe information requirements to support operational requirements, analyzed to the data element level, using IDEFIX.

Figure O-2. Hierarchy of priorities for UFD

O-4. Format. The following is a description of each paragraph of the UFD. Figure O-3 displays the table of contents for a UFD. The CBTDEV may modify the UFD organization. The CBTDEV's emphasis must be on providing all of the functional information described below rather than on their particular format.

a. Section 1.0, General. Provide general information necessary as background for understanding the UFD.

(1) Paragraph 1.1, Purpose. Describe the purpose of the UFD. For example: This UFD provides the operational requirements for IT capabilities to be satisfied by (system name). It will serve as a basis for mutual understanding between the users and the developer regarding the operational requirements and user impacts of the system's IT, and as a basis for development of system tests.

(2) Paragraph 1.2, Project references. Cite references applicable to the history of the project by author or source, reference number, title, date, and security classification.

(a) System initiation documents (e.g., System Decision Paper, MNS, ORD, OMS/MP). Include copies as appendices, when appropriate.

Users' Functional Description

Section 1.0	General
1.1	Purpose
1.2	Project references
1.3	Terms and abbreviations
Section 2.0	System summary
2.1	Background
2.2	Objectives
2.3	Existing methods & procedures
2.4	Proposed methods & procedures
2.5	Assumptions & constraints
Section 3.0	Detailed characteristics
3.1	Performance requirements
3.2	Functional requirements
3.3	Inputs/outputs (data requirements)
3.4	Failure contingencies
Section 4.0	Operational mode summary/mission profile
Section 5.0	External environments
5.1	Physical environment
5.2	System architecture
5.3	Organizational environment
5.4	Threat environment
Section 6.0	Security
6.1	Background information
6.2	Control points, vulnerabilities, and safeguards
Section 7.0	System development
Section 8.0	Domain impacts
8.1	Doctrine
8.2	Training and leader development
8.3	Organizations
8.4	Materiel
8.5	Soldier

Figure O-3. Table of contents for the UFD

(b) Previously developed technical documentation relating to the project (e.g., concepts, doctrine, operational architecture data).

(3) Paragraph 1.3, Terms and abbreviations. Define here (or include in an appendix) terms and acronyms unique to this document and subject to interpretation by the reader.

b. Section 2.0, System summary. Summarize in the paragraphs of this section the major operational requirements for automated capabilities.

(1) Paragraph 2.1, Background. Provide information on the missions and functionality of the system. The description should emphasize the system's IT capabilities and characteristics. For example, if the system is an armored vehicle, address the vehicle's automated control system rather than its armor, armament, or tracks. Describe the relationship between this project and others being developed concurrently.

(2) Paragraph 2.2, Objectives. State the key objectives for IT capabilities. These statements should be concise and quantitative when possible.

(3) Paragraph 2.3, Existing methods and procedures. Describe the current methods and procedures being employed to satisfy the mission. If useful, include a chart such as an IDEF0 "as-is" process model to depict the existing procedures and information flow. "As is" process models depict the current situation as opposed to the "to be," or required, process model.

(4) Paragraph 2.4, Proposed methods and procedures. Describe the proposed (or desired) automated methods and procedures to be employed. Write the description in mission oriented, not computer oriented, language and explain how the proposed system will interact with functional processes. Identify products from other systems that will be used with or become part of the proposed system. Include the IDEF0 "to-be" model if available.

(5) Paragraph 2.5, Assumptions and constraints. Describe user assumptions and constraints that will affect development and operation of the system's IT. Operational constraints on design must have a solid operational basis. For example, to reduce the logistics trail and training time, CBTDEVs may require use of a standard computer or a standard memory loader. Analysis in areas such as human factors, transportability, and training may generate further constraints.

c. Section 3.0, Detailed characteristics. Provide in the paragraphs of this section a detailed description of the operational requirements for IT capabilities. The paragraphs in this section discuss the three kinds of operational requirements: functional, performance, and data. The suggested organization of paragraphs in the description that follows may not be optimal for all systems or all analytical techniques. Modification is permissible. For example, if an object-oriented approach is used, merging prescribed paragraphs for functional and data requirements may be useful. That way, the UFD organization focuses on objects, with the attributes and Services being described as part of the objects. The emphasis in producing the UFD is not to observe a particular format, but to provide all the operational information necessary for the developed product to meet user requirements.

(1) Paragraph 3.1, Performance requirements. Describe the qualitative performance aspects of IT capabilities, e.g., how fast, how long, how well. Optionally, describe performance requirements related to specific functions, data, or degraded operations in paragraphs 3.2, 3.3, and 3.4. Information on performance requirements helps establish stress limits for the IT used during the system's operational testing. Include a quantitative presentation of requirements, such as the number of events or devices that must be handled, the accuracy of data or calculations, recovery time from computer crashes, and maximum response times for information requests. If appropriate, provide performance requirements for various modes of operation (e.g., combat, training, degraded performance).

(2) Paragraph 3.2, Functional requirements. Describe the functions users need the IT to perform. This includes not only functions unique to the system's mission area (e.g., chemical detection and warning or property book management), but also such common functions as diagnostic capabilities, embedded training, and generic capabilities of the man-machine interface (MMI). To support the detailed description of required functions, diagrams and IDEF process models that build on those given in Section 2.0 may be useful. Cite the paragraph in the ORD, if applicable, that is supported by each functional requirement described. For anything but trivial systems, the functional requirements will be extensive. Therefore, CBTDEVs should carefully consider how to organize this paragraph for clarity. There is no one optimal organizational style. The most common organizational schemes are by the processes the system must automate, the data it must generate and store, and the modes it must assume given certain trigger events.

(3) Paragraph 3.3, Inputs/outputs (data requirements). Describe data requirements which, from the operational perspective, are necessary to satisfy functional requirements described in paragraph 3.2. Include requirements only for data that is externally accessible, i.e., by the operator or by another system. If not already described in paragraphs 3.1 or 3.2, include performance requirements associated with particular data outputs (e.g., how fast, how accurate, how often, how much). If you are using the IDEF 1X data modeling technique, consider including the entity relationship charts, key based data models, or attributed data models (see fig O-4), depending on which level of analysis the modeling will reach.

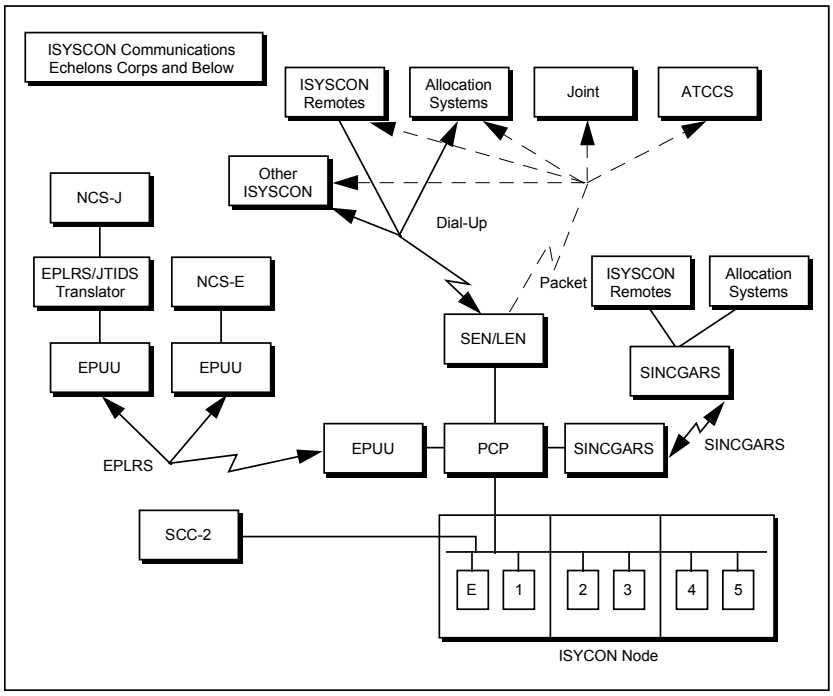


Figure O-4. Sample communications diagram

(4) Paragraph 3.4, Failure contingencies. Discuss alternative courses of action that may be taken to satisfy the operational requirements if the proposed system fails or performance is degraded. If applicable, describe anticipated degraded modes of operation, identify essential functions needed for degraded operations, and give priorities for restoring functions identified in para 3.2. Describe requirements for system backups or redundancies to ensure continued achievement of system functions given in paragraph 3.2. Consider alternatives such as pre-positioning of data files, software, and documentation at alternate sites, or with other units not subject to the same threats as the primary site or operational facility; production of special outputs after certain alerts; and requirements for communications support to permit alternate site operations.

d. Section 4.0, OMS/MP portrays the mix of missions and tasks to help clarify how the system will be used. Limit this discussion to the modes and mission profiles for the system's ORD OMS/MP characteristics requiring further definition.

(1) OMS. The OMS is a description of the anticipated mix of ways a system will be used to carry out its mission. The OMS shows the relative frequency of the various missions. All missions listed in the OMS should be further characterized in the MP by sequential events or tasks. The OMS should separately address peacetime and wartime use.

(2) MP. The MP is a time-phased description of the operational events a system experiences from beginning to end of a specific mission. For each phase of the mission, it identifies the tasks, durations, workloads, sequencing, and operating conditions. Basing the MP on the scenario used for the system level MP is insufficient.

e. Section 5.0, External environments. Describe the environments in which the system will be employed. There are several types of environments, e.g., physical, systems architecture (IT systems (computers & communications)), organizational, and threat. Describe for these, and any other applicable environments, the operational implications for IT. The following are suggested paragraphs, but the CBTDEV should tailor their use to describe the environments of the required system.

(1) Paragraph 5.1, Physical environment. Describe operational requirements for IT that are dictated by the physical environment. For example, the IT may have to be distributed in rough terrain, operate in temperature extremes, and never be employed in configurations exceeding the dimensions of a standard integrated command post shelter. Consider other aspects of the system's physical environment that may have implications for automated components (e.g., nuclear or electronic warfare environment, high density (friendly) radio environment, power sources, system vibrations).

(2) Paragraph 5.2, System architecture. Describe the current or future system architecture of the target user organizations. This would include discussions on all IT systems within the user organization. It would not only include the employed or target computer hardware and software systems, current and target automation standards, trainers, and testing and diagnostic equipment, and the computer support systems, such as a tactical operations simulator or scenario generator, but also the current or future communications environment of the target user organizations. For example, describe access to tactical satellite equipment or other tactical data distribution equipment, or embedded communication capabilities the system itself must have. Include a diagram, such as figure O-4, shown previously, to

show the known external communications requirements. Include notations for peak volumes of data and time limits for data transmission. This section is not meant as a substitute for UIRs, which describe the details of individual system-to-system interfaces.

(3) Paragraph 5.3, Organizational environment. Describe aspects of the system's organizational environment that may affect operation of IT, e.g., use in joint/combined operations, distribution in a unit, or availability of modes dependent on echelon. Also describe required support for the system's computer resource from support organizations, such as the automation management section of the corps or division signal officer, general support maintenance organization, and division support command (DISCOM) automation assistance office.

(4) Paragraph 5.4, Threat environment. If appropriate, describe implications of the threat environment. For example, if the system must automatically recognize characteristics of enemy systems, and those characteristics change frequently, then describe the anticipated types, frequency, and delivery times of changes (reprogramming) required to maintain system effectiveness.

f. Section 6.0, Security. Describe operational requirements for security in executing automated processes. IT requires a procedural workaround.

(1) Paragraph 6.1, Background information. Provide background information on the sensitivity or classification of the system's IT resources.

(2) Paragraph 6.2, Control points, vulnerabilities, and safeguards. Briefly describe external control points of the system, their vulnerabilities, and the safeguards required to reduce security risks to an acceptable level. Limit description of control points to input (where data enters the system) and output (where data is generated by the system) points. The description can include the origin of input data (such as the collection, preparation, and entry processes), the error checking and correction requirements, and the data distribution process for output data (such as the sites authorized to receive data and the disposition of output products). For each control point, describe vulnerabilities. A vulnerability is an operational condition inherent in the system which lends itself to error, loss, or compromise of information. Consider all threats to the IT system, e.g., malicious code introduction, unauthorized access, and system intrusion. Most of the safeguards will not be fully defined until the system's design. Describe briefly the areas which will need to be addressed in the system design, such as:

(a) Administrative safeguards (personnel) management, data collection, time constraints for use of the system, system access controls.

(b) Physical safeguards (requirements for dedicated equipment, onsite and offsite storage, and protection of material).

(c) Technical safeguards (control of user access, data validation procedures, requirements for labeling or display of security identification). Consider:

- Malicious Code Detection/Eradication (network/host)
- Vulnerability Assessment/Analysis (network/host)
- Access Control (network/host)

    - Password Generation
    - Identification & Authentication
- Security Management (network/host)
    - Audit Capability (active/passive)
    - Purge
- Intrusion Detection (network/host)
    - Detect/Log Intrusion
    - Alert/Notification
    - Response
- Encryption Requirement

g. Section 7.0, System development. Provide information from the users' perspective that influences the development and acquisition strategy for the system's IT. Include desired timeframes for developing the IT. Address necessary liaison and participation by organizations within the user community. If appropriate, package the functions and tasks to guide an evolutionary or incremental development plan. Provide a chart similar to that of Figure O-5 to show priorities, first version (V1), and future version requirements that are keyed to the UFD paragraph numbers.

Requirement Paragraph	Priority Group	V1 Full	V1 Partial	Future
3.2.2.2.7.c.2	2	✓		
3.2.2.2.7.c.3	2		✓	
3.2.2.2.7.c.4	2	✓		
3.2.2.2.7.c.5	3	✓	✓	
3.2.2.2.8	1	✓		
3.2.2.2.8.b.1.a	1	✓		
3.2.2.2.8.b.1.b	1	✓		
3.2.2.2.8.b.1.c	1	✓		
3.2.2.2.8.b.1.d	1	✓		
3.2.2.2.8.b.1.e	1	✓		
3.2.2.2.8.b.2	1	✓		
3.2.2.2.8.c.1	1	✓		
3.2.2.2.8.c2	2		✓	
3.2.2.2.8.c3	1	✓		
3.2.2.2.8.c4	4	✓		
3.2.2.2.9.a	2	✓		✓
3.2.2.2.9.b.1	3	✓		
3.2.2.2.9.b.2	3	✓		
3.2.2.2.9.b.3.a.1	3			✓
3.2.2.2.9.b.3.a.2	3			✓
3.2.2.2.9.b.3.a.3	3			✓
3.2.2.2.9.b.3.a.4	4			✓
3.2.2.2.9.b.3	2	✓		
3.2.2.2.9.c	2	✓		
3.2.2.2.9.d.1	3	✓		
3.2.2.2.9.d.2	3	✓		
3.2.2.2.9.e.1	2	✓		
3.2.2.2.9.e.2	3		✓	

Figure O-5. Sample priorities and blocking chart

(1) User priorities. Group the detailed requirements from Section 3.0 into categories of functional priorities. This will help the MATDEV to determine progress on high priority IT capabilities during system development. Use categories that convey the functions' contributions to system objectives. The following two categories are suggested:

(a) Category 1. Core functions that accomplish selected mission requirements.
(b) Category 2. Enhanced functions that accomplish all mission requirements.

(2) First block functions. As the system development plan matures, the CBTDEV and MATDEV will use assigned functional priorities to establish blocks for fielding. The first block includes the minimum degree of functionality that must be operational before the Army fields any part of the system. It must also represent a useful package of functions even if further development should be stopped. The CBTDEV should propose functions for full implementation in the first version of the system's IT to be fielded. Sometimes, a simple "in or out" decision cannot be made for a function. If

so, then in that function's description in Section 3.0, describe a lesser or partial degree of functionality that is acceptable for the first version. The functions actually implemented in the first version may be modified by threat and mission changes and by technical considerations as development proceeds.

h. Section 8.0, Domain impacts. Provide information from the user's view that addresses the impact on Army domains—DTLOMS. The object is to identify and implement those DTLOMS changes needed to achieve the capabilities required to employ the Army's concept for executing future missions.

(1) Paragraph 8.1, Doctrine. Address those requirements that add to or change any of the Army's fundamental principles which guide operational forces. To control the dissemination of sensitive information, maintain and distribute this section separately from the rest of the UFD.

(2) Paragraph 8.2, Training and leader development. Address changes or additions to any of the Army's training or professional development programs. These range from institutional training conducted at TRADOC schools, to individual self-development, and unit training programs conducted in the field.

(3) Paragraph 8.3, Organizations. Requirements to change or add to any of the Army's TOEs are to be outlined here. These range from modifying the numbers and types of equipment in current organization to documenting an entirely new organization.

(4) Paragraph 8.4, Materiel. All changes or additions to the Army's families of weapons, support systems, or non-system TADSS are depicted here. They range from: modernizing existing materiel through parts replacement, major product improvement of existing materiel, one for one replacement of old materiel with new materiel designed to do the same job, to completely new families of materiel designed to do something that has not been done before.

(5) Paragraph 8.5, Soldier. Describe changes or additions to the Army's MOS structure here. These may extend from changes in the numbers of soldiers needed in an MOS to the creation of an entirely new MOS and identifying the skills desired of these soldiers.

Appendix P
Horizontal Technology Integration (HTI) Guidelines

P-1. Introduction. This appendix provides guidance and considerations in the following areas:

a. General HTI information.

b. The stages of HTI.

(1) Requirements determination.

(2) Review and HTI designation.

(3) Execution.

c. HTI proposal sheet with instructions.

d. HTI Homepage.

P-2. General HTI information.

a. Although HTI programs and procedures have been ongoing in the Army since 1992, they are still evolving and will likely change as experience is gained and specific lessons learned are incorporated into policy updates. Up to this point, HTI programs and initiatives have generally evolved from two fundamentally different approaches to HTI—a macro and a micro process.

b. The HTI GOWG frequently starts HTI initiatives for selected, Army-wide, high payoff technology areas from a macro perspective; for example, Own the Night, Combat ID, Digitization, Smart Weapons and Precision Guided Munitions, Tactical Lasers. For each HTI initiative, a task force or work group is usually formed to assess total force HTI opportunities in that particular area of interest. The purpose of these initiatives is to identify specific HTI opportunities for consideration by the GOWG. Based upon the experience with the major initiatives listed above, it is easy to note that although each effort applies accepted HTI principles, each initiative tends to have unique characteristics and challenges that lead to a specifically tailored strategy to meet overall HTI objectives. This diversity in HTI strategies will likely continue as new initiatives are established. Future initiatives will frequently include the identification of HTI opportunities with potential application to a wide range of existing or developmental Army systems using common components/subsystems, software/architectures, and/or S&T efforts. These initiatives may also lead, through the application of HRI procedures, to future requirements for multi-role weapons systems that may be capable of replacing one or more existing systems. Each of these HTI initiatives generally includes a requirements, technology, and acquisition panel or subgroup. The technology and acquisition panels may sometimes be merged into a single materiel assessment IPT. For a major HTI initiative, TRADOC often establishes an ICT (see chap 4) to accomplish the requirements determination effort or consolidate the assessment into ongoing requirements determination efforts. The requirements panel identifies initial opportunities for requirements integration and common capabilities (based upon approved concepts and FOCs) to serve as the basis for development of specific HTI opportunities for assessment by the technology and acquisition panels. However, as an HTI effort progresses, these panels must work collectively to develop distinct HTI recommendations for HTI GOWG consideration. Once the task force or work group is completed, the GOWG reviews the results and approves or rejects their recommendations. The GOWG's approval of these initiatives may lead to the approval of several individual efforts as HTI programs, or direct that an effort be incorporated into an ongoing Army S&T, or system development or modification program.

c. An alternative approach to identifying HTI opportunities—from the micro perspective—is when individual PMs/PEOs, S&T developers, industry, or requirement developers recognize individual opportunities and bring them forward for review and approval. The procedures for this approach to HTI includes the development of an HTI proposal and its review and approval according to the HTI process described in paragraph 13-9. Often these individual efforts are incorporated into already approved HTI programs. For example, the Thermal Weapons Sight and the Driver's Vision Enhancement programs were approved as HTI efforts under the existing Own the Night HTI program.

P-3. The stages of HTI.

a. Stage 1 - Requirements determination. An HTI program must include a requirements assessment before it is approved for execution. Three general approaches to HTI requirements determination include:

(1) For major HTI initiatives, the first stage of HTI involves HRI and is inherent in the requirements determination process. HRI is discussed in detail in chapter 13 and in app B. HRI includes the assessment and consolidation of similar/common platform requirements (even if different variants of a platform are needed to accomplish different mission roles). HRI can also support incorporation of common components (e.g., BCIS, second-generation FLIR (SGF)) or subsystem (hardware/software) into multiple weapons systems to leverage the Army's investment and gain the most warfighting capability across the force. TRADOC is the Army lead organization for HRI for warfighting systems and capabilities.

(2) Ideally, requirements determination efforts by TRADOC ICTs will lead to the development of HTI materiel-related (combat or training) solutions that have broad application in more than one role or branch. ICT studies, analysis, and experimentation efforts will specifically address potential multiple-role solutions and platforms/systems with potential for reconfiguration into different variants for other roles. Both HRI and HTI efforts should encourage the use of common or existing components that will be in the Army, DOD, or commercial sector during the operational timeframe of the system.

(3) Any Army organization can initiate the HTI process by writing an HTI proposal and submitting it to HQDA (see app P, para P-4).

b. Stage 2 - Review and HTI designation.

(1) In this stage, the HTI objective system(s) may not be fully identified. For major HTI initiatives, TRADOC's role is to assist in solution assessment and ensure that the intended warfighting capabilities are achieved. Research and trade-off analysis performed during this stage usually leads to a specific HTI-oriented system or to multiple system applications. Previous HTI initiatives, such as Own the Night and Combat Identification, quickly led to specific systems (SGF and BCIS, respectively). A single HTI initiative can lead to more than one HTI program. The only limit on the number of HTI solutions generated by an HTI initiative is the applicability of the proposed technologies. Once a specific system is identified and is designated an HTI program, it advances to Stage 3.

(2) For individual HTI efforts that are developed using the HTI proposal process, requirements determination or HRI occurs in parallel with the HTI proposal evaluation process. In these cases, TRADOC conducts a requirements assessment on the proposal to assess the need for a specific HTI proposal and, when appropriate, determine if there is a valid warfighting need for each platform listed in the proposal. The assessment, in coordination with the MATDEV, should also consider if a wider range of applications beyond those considered by the original sponsor, is possible. This process can generate the need for Battle Lab experimentation or mission analysis before a final requirements assessment is completed. The requirements assessment is generally conducted in parallel with, and provides input to, the materiel assessment (technology and acquisition) IPT that conducts the formal proposal evaluation.

VTC and electronic staffing procedures should be used to the maximum extent possible to facilitate this process.

(3) HTI proposals are reviewed by the HTI proposal work group. This group includes representatives from the requirements, technology, and acquisition organizations. This work group decides which organizations should lead the requirements and materiel assessment efforts and recommends which proposals are ready for review by the HQDA HTI review group. The lead agency for each assessment team or work group ensures that representatives from all appropriate organizations are invited to participate. Although TRADOC is responsible for leading the requirements assessment, it should also participate in the other work groups to add a warfighting or requirements perspective to their efforts. In particular, the HTI assessments teams should include CBTDEVs, MATDEVs, M&S community representatives, and RDEC/S&T representatives. ICTs, or work groups led by TRADOC or other requirements developers, should use the procedures outlined in chapter 4, when appropriate. These lead organizations should ensure that all potential contributors and options (including near-, mid-, and far-term options) are considered in the solution process. Accordingly, joint Service, other government agencies, and national laboratories with related capabilities should be encouraged to participate. Industry input through open forums/BAAs may also be used, when appropriate.

(4) The responsible CBTDEV or TNGDEV uses the normal MRD process (see chap 11) to amend or generate appropriate MRDs (when determined that a requirement exists for the capability provided in the proposal) to support the development, acquisition, and fielding of the HTI item/subsystem. If other Army or joint Service CBTDEVs or TNGDEVs establish a similar requirement for a capability that can best be provided with the HTI solution, those associated requirements documents are amended, assuming the requirement does not already exist in the system MRD.

(5) The requirements determination process uses the results of previous ICTs or ongoing requirements efforts to minimize the effort required to respond to HTI proposals. Electronic staffing and coordination should be used to the maximum degree practicable.

(6) The most promising proposals are forwarded to the HQDA HTI review group for review prior to review by the GOWG. The HQDA HTI review group is responsible for reviewing HTI proposals before they go to the GOWG to add a “big picture” viewpoint to the evaluation process and to confirm that HTI policies have been followed. This group also reviews the individual HTI proposal pre-briefs to ensure they are ready for review by the GOWG. This group often makes an independent assessment of each HTI proposal relative to HTI policy, principles, and objectives. Proposals found lacking are sent back to sponsor with a list of recommended improvements. Recommended proposals go to the GOWG for a decision brief. If the proposal is designated as an HTI program, the GOWG also designates a lead PEO or other acquisition office to manage it. Once the GOWG formally designates a program as an HTI effort, it must still proceed like any other technology development or acquisition effort. HTI designation has no impact on the progression of the ASARC process. If a requirement has not been developed or revised prior to the GOWG decision, it is the responsibility of the TRADOC representative on the GOWG to ensure that the necessary revisions and coordination of requirements documents occur in the shortest possible time. The GOWG will not approve any memorandum of agreement (MOA) between the HTI PM and the host system PM until all requirement issues are resolved.

c. Stage 3 - Execution. Stage 3 is the execution phase of an HTI program. It includes both the development and acquisition of the HTI system. It may include TRADOC experimentation or analysis of HTI solutions to assess overall warfighting capabilities or to investigate other potential HTI applications or opportunities. As the necessary cultural change in Army acquisition policy becomes a reality, an increasing number of HTI efforts will evolve out of the early HRI work. TRADOC TSMs CBTDEVs and TNGDEVs should continue to monitor the execution of these HTI programs to ensure that the solution(s) meet the Army's future warfighting or training requirements described in approved MRDs. HTI programs should include testing for information assurance vulnerability ("Red Teaming") and risk assessments.

P-4. Guidance for preparing an HTI proposal. HTI proposals should be 1-2 pages and should include the information in the sample proposal at figure P-1. Initial HTI proposals should be sent electronically to hti@sarda.army.mil. (Note: Software preferences are MS Word 6.0 or 7.0 and MS PowerPoint 4.0 or 7.0.) While electronic submission is preferred, proposals may be mailed to HTI Proposals, OASA(ALT), ATTN: DAMO-FDZ, 103 Army Pentagon, Room 3D478, Washington DC 20310-0103. ASA(ALT) has no "kill" authority in this mailbox. Copies of all HTI proposals and queries for information should be sent via e-mail to HTI@sarda.army.mil. Copies should also go to the DCSOPS and HQ TRADOC (ATTN: ATCD-B). (See para P-5 for information on the HQDA HTI Internet website.) The following information should be provided in the proposal:

a. Item 1: Title. Provide the suggested title for the proposal.

b. Items 2 through 4: Points of Contact (POCs). Provide sponsoring agency name and lead (POC) for the HTI proposal.

c. Item 5: Executive Summary. Provide a concise, overview description of the proposal.

d. Item 6: Description. Describe the nature of the technology used in the proposed program. Describe any previous research and development efforts that the proposed program will leverage. Summarize the expected impact if the proposal is not accepted—cost, modernization, programmatics, and warfighting impact.

e. Item 7: Potential Applications/Host Platforms. List all platforms that could potentially use the proposed HTI item. Describe any anticipated limits on use of the HTI item (e.g., appropriate only for platforms at brigade level or below; intended only for use on platforms in Corps rear areas).

f. Item 8: Benefit to the Warfighter. Describe how the HTI item will directly benefit the warfighter; using operational terms when possible. This description could have a major impact on the proposal's priority.

g. Item 9: Total Program Cost. Provide, if available, an estimate of the total program cost. Break out costs into RDTE and procurement.

h. HTI Program Matrix. Fill out the matrix to the maximum extent possible with the best available estimates for the proposed program. The proposal evaluation team will work with the sponsor to revise the matrix numbers as the evaluation proceeds.

i. Item 10: Risk Assessment. Summarize the associated risk (developmental and acquisition) of the HTI proposal including technological maturity and programmatic complexity. This should also include an assessment of the anticipated complexity of the overall system integration effort (hardware/software/training/support).

P-5. HTI website. HQDA ASA(ALT) (SAAL-ZS) has an HTI section on their Internet website. It can be accessed at: http://www.sarda.army.mil/sard%2Dzs/hti/hti_main.html.

HTI Proposal

Date: **Version Number:**

1. Title: **Reference Number:**

2. Sponsoring Agency:
POC:
Address:
Telephone:
E-mail Address:

3. Materiel Developer Lead:
POC:
Address:
Telephone:
E-mail Address:

4. Requirements Lead:
POC:
Address:
Telephone:
E-mail Address:

5. Executive Summary:

6. Proposal Description:

7. Potential Applications/Host Platforms:

8. Warfighting Benefits:

9. Program Cost Summary:

HTI Program Matrix
(Estimates to be Refined During Evaluation Process)

Host Platform (HP)	Order of Appli-cation	Number of HTI Items (per HP)	Cum. # of HTI Items	Total Cost of Program ($M)	Incr. Cost of Each HP ($M/HP)	Unit Cost (Based on Cumulative Quantity)	Cost Savings
	1						
	2						
	3						
	4						
	5						

Total R&D Costs (by category – 6.2, 6.3, 6.4, etc.):

10. Risk Assessment:

NOTE: This figure is a compression of the two page DA HTI proposal planned for the ASA(ALT) HTI website.

Figure P-1. Sample HTI proposal format

Appendix Q
Milestone Decision Reviews

a. At each milestone review, the milestone decision authority (MDA) must have a balanced assessment of a program's readiness to proceed into the next acquisition phase. Review forums may be formal or informal at the direction of the MDA. All milestone decision reviews (MDRs) and/or preparation for an MDR is coordinated with the TRADOC staff. Action officers review, coordinate and staff as necessary the MDR packet, prior to providing a recommendation to the MDA.

b. ASARC. The ASARC is the Army's senior-level review body for ACAT I and II programs. The ASARC is convened at formal milestones to determine a program or system's readiness to enter the next phase in the materiel acquisition cycle, and make recommendations to the AAE on those programs for which the AAE is the MDA. ACAT ID programs are subsequently reviewed by the DAB. The ASARC is co-chaired by the AAE and VCSA.

c. IPR.

(1) The IPR is the review forum for all ACAT III, IIIA, and IV programs. General policies for reviews for IPR programs are the same as ACAT I and II programs. Reviews are conducted at milestones and at other times deemed necessary by the MDA. The MDA or designee chairs the IPR.

(2) Documentation is tailored to the specifics of the program at the discretion of the MDA, based on recommendations from the Overarching IPT and the Working Level IPT. As a general rule, basic IPR documentation should be consistent with that required by the ASARC and DAB. All recommended documentation, to include the IPR position for milestone decisions, is forwarded to reach IPR members and proponent schools at least 45 days prior to the scheduled IPR. Sufficient agreed upon copies of the IPR package are provided to each member for staffing purposes.

(3) DCSCD formally coordinates all MDR/IPR packages with DCST (CDR, Army Training Support Center) to ensure the system training support package requirements are appropriately addressed.

Appendix R
Examples

The following examples are provided:

1. Figure R-1, ICT Charter
2. Figure R-2, KPPs
3. Figures R-3-1 and R-3-2, ORD/COIC Crosswalk
4. Figure R-4, Computer Network Defense (CND) and Information Assurance (IA) wording for requirements documents
5. Figure R-5, O&O Description (from para 1 of ORD)

ATCD-MM Memo Date

MEMORANDUM FOR Integrated Concept Team (ICT) Charter Members

SUBJECT: ICT Charter for Survivability

1. Reference memorandum, ATCD-MM, 01 Apr 97, subject: Establishment of Survivability Integrated Concept Team (ICT).

2. Purpose: Identify survivability capabilities across the battlefield systems by phase ((A) Phase I, Battalion Task Force (BN TF). (B) Phase II, Brigade Force. (C) Phase III, Division Force.) and provide prioritization of survivability requirements, materiel, and technology solutions.

3. Scope: This ICT will identify near (FY98-FY99), mid (FY00-FY03), and far-term (FY04>) Army-specific (existing and systems under development and from branch-specific Future Operational Capabilities (FOCs)) Survivability capabilities that can be applied across multiple battlefield systems. The ICT report will focus on force survivability requirements, associated materiel, and technology solutions.

4. Objectives:

a. Identify and prioritize by phase the total force survivability requirements.

b. Identify and prioritize by phase the existing and developmental Army Survivability materiel and technology solutions.

5. Deliverable: A Survivability Requirements Prioritized Report (1-N listing) to the CG, TRADOC that addresses the total force survivability requirements, materiel, and technology solutions by phase.

6. Schedule: Final report is due to HQ TRADOC, DCSCD NLT 30 November 1997 for approval (see enclosed milestone schedule). The final approved report will be presented to the CG, TRADOC NLT mid-November 1997.

7. Organization: This ICT will consist of a chairman, a team leader, and members from the organizations listed below. Members will be designated by the participating and supporting organizations. Membership is by name. Once ICT members are designated by the participating organizations, individuals should not be changed, except for emergency or change of job assignment.

a. Chairman: MAJ Randall R. Stevens, Maneuver Division Chief, Combat Arms Directorate, DCSCD, HQ TRADOC.

b. Team Leader: MAJ George Conrad, Maneuver Division, Combat Arms Directorate, DCSCD, HQ TRADOC.

c. Members:

(1) Battle Labs: BLITCD, D&SABL, Mounted BL, Dismounted BL, Air Maneuver BL, and Maneuver Support BL.

(2) School DCD: Engineer, Armor, Infantry, Artillery, Air Defense, CASCOM, Military Intelligence, and Aviation.

(3) DCSINT

Figure R-1. Example of an ICT charter

ATCD-MM Memo Date
SUBJECT: ICT Charter for Survivability

8. Other Agencies as required (NGIC, DIA, TARDEC, TACOM, ARL, ARDEC, AMSAA, TRAC, DA, PEO/PMs, Industry). Responsibilities:

a. The ICT Chairman shall be responsible for:
(1) Execution of the charter.
(2) Formation of the ICT.
(3) Setting meeting dates, IPRs, and internal product milestones.
(4) Ensuring the ICT work environment fosters an atmosphere that promotes crossing organizational boundaries and free flow of dialogue.
(5) Reports through the CAD Director to the DCSCD, HQ TRADOC.

b. The Team Leader is responsible for:
(1) Day-to-day management of the ICT process.
(2) Recommending/announcing venues and meeting dates.
(3) Conducting/administering ICT meetings.
(4) Documenting decisions in minutes and distribution of minutes to the membership.
(5) Maintaining the ICT membership listing.

c. The ICT members are responsible for:
(1) Accepting taskings that require research, writing, and briefing.
(2) Actively participating in the ICT by supporting and attending ICT meetings.
(3) Completing assigned tasks and providing results on schedule.
(4) Keeping their chain of command informed of ICT progress as a condition of being empowered to act on behalf of their organization.
(5) Identifying potential good ideas across DTLOMS.

9. Duration: This charter is effective upon signature and terminates upon HQ TRADOC approval of the final report.

Encl
as

[DCSCD name]
Major General, GS
Deputy Chief of Staff for
Combat Developments

Figure R-1. Example of an ICT charter (cont)

Key Performance Parameters (KPPs) from the GRIZZLY Operational Requirements Document (ORD)

*4a(1) GRIZZLY must provide an integrated, survivable breach system. GRIZZLY must provide breach lanes through simple and complex obstacles that allow the supported maneuver force to pass through and accomplish the force's mission. The required probabilities of two GRIZZLYs to successfully breach a lane is 0.95 (threshold) and 0.99 (objective), inclusive of blade and system losses due to mines, but exclusive of losses due to direct and indirect fires.

RATIONALE: GRIZZLY must breach lanes through simple and complex obstacles to allow the heavy maneuver force to conduct Decisive Operations. The probabilities of the GRIZZLY in providing breached lanes are a function of the GRIZZLY's breach capabilities and GRIZZLY survivability to direct and indirect fires, but also the success of the maneuver force at suppressing the enemy (threat) force, obscuring the breach site, and securing the breach site. Accordingly, a separate KPP is provided for system survivability against direct and indirect fires. Nearly all obstacles include mines, so survivability of the system and the blade to mines must be considered. This KPP focuses on the capability of the GRIZZLY to breach obstacles, including mines.

Doctrine calls for two lanes per task force with a recommended allocation of two assets to achieve one lane. The GRIZZLY equipped force must provide the task force a near certainty (a 99% probability) of achieving one lane and a high probability (approximately 90%) of achieving two lanes. Assuming that two GRIZZLYs are allocated to each of two lanes, the threshold value of 0.95 results in a 0.90 probability of successfully breaching both lanes and a 0.9975% probability of successfully breaching at least one of the lanes.

*4a(2) GRIZZLY will provide a lane allowing 95% of the maneuver task force (threshold) and 99% of the task force (objective) to safely pass, excluding losses due to direct and indirect fires.

RATIONALE: Given that the GRIZZLY successfully clears a lane, this KPP expresses the quality of the lane for passing combat forces. Quality is measured by the percentage of the task force successfully passing through the lane. This KPP includes the requirement to clear mines down to the depths required by the ORD and provide lanes of sufficient width to allow passage of the maneuver force.

4c. Survivability.

*4c(1) Provide resistance to perforation of the command and control station (CCS) over a frontal 180 degree arc (threshold) from the RPG system specified on line 8 of the Infantry Weapons Table, page D-2 of the CLASSIFIED Breacher System Assessment (STA) by USAES, dated July 1992. The objective requirement is to provide resistance to perforation of the CCS over a frontal 180 degree arc against a ATGM-type system and the RPG system listed on line 5 of the Infantry Weapons Table, page D-2 of the CLASSIFIED Breacher STA.

*4c(2) Provide resistance to perforation of the CCS against a 6-gun artillery battery, firing a variable time fuze, 10 round artillery salvo of 155 mm M107 high explosive with proximity fuze comparable to the M728 from 7,000 meters (threshold). The objective requirement is to provide resistance to top attack munitions.

RATIONALE: GRIZZLY will operate as part of a combined arms task force. The maneuver commander sets the conditions for breaching success through the execution of the Suppress, Obscure, and Secure fundamentals of breaching. Ideally, direct and observed indirect fires on the breach site are eliminated before the GRIZZLY is committed to execute the Reduce fundamental of breaching operations. Force on force combat simulation and threat assessments predict that the most likely direct fire threat faced by the GRIZZLY will come from dismounted teams providing fires on the obstacle and employing handheld anti-tank weapons (RPG type weapons). The specific nomenclature is not listed to keep this document UNCLASSIFIED.

GRIZZLY is also exposed to indirect fires while conducting the breach. The specified conditions are representative of the type of fire mission expected against the GRIZZLY in the breach. These conditions equate to 60 rounds aimed/targeted at a box approximately 250 meters by 50 meters deep. These parameters will provide the inputs to existing models for development of the specific test parameters to measure compliance with this requirement. It is not intended that testing include the firing of 60 shells.

* = GRIZZLY Key Performance Parameter (KPP)

Figure R-2. Example of KPPs in the ORD

MCS BLK III

ORD CHARACTERISTICS

COMMON OPERATIONAL PICTURE (COP)
- Xmit, receive, process Cdrs Sitrep.
- Update appropriate databases.
- Improve timeliness & accuracy of C2 info.
- Div & Corps- 85% correct, 2hrs.

CONTINUITY OF OPERATIONS
- After planned move/communications outage: Provide 85% of Cdrs sitrep in 90 min.
- After unplanned outage: Provide 85% of Cdrs sitrep in 3hrs.

MAINTAIN INTEROPERABILITY
- USMTF direct computer-computer data exchange.
- Exchange data with current joint/combined C3 systems.
- Data integrity- 95% threshold.

HARDWARE/SOLDIER MACHINE INTERFACE
- Meet host platform MANPRINT standards.
- Operate under all battlefield conditions.

CRITICAL ISSUES & CRITERIA

1. DOES MCS PROVIDE MANEUVER CDRs/STAFFs INFO REQ. TO ENHANCE DECISION MAKING & SYNCHRONIZATION.
   - Display COP 85% integrity- Div-Corps 2hr/ Bde-Div and adjacent/within echelons 1hr.
   - Provide timely & accurate info exchange w/majority of users indicating it is better than current system.
   - Provide CONOPS w/85% data integrity, planned outage 90min, unplanned outage 3hrs.
   - Interoperate w/computer to computer data/USMTF exchange, & Army/joint/coalition C2 systems IAW UIRs, w/95% integrity.
2. CAN UNITS WITH MCS ACHIEVE TRAINING READINESS TO OPERATE/MAINTAIN IT & CAN STAFFS INTEGRATE IT INTO THEIR C2 PROCESS.
   - Training must prepare soldiers to perform all MCS critical tasks.
   - Users/maintainers w/manuals,tools, & test equip must be able to sustain it for 30 days.

NOTE - MCS BLOCK THREE DOES NOT HAVE DESIGNATED KPP

Figure R-3-1. ORD/COIC crosswalk, MCS Block III

FBCB2

ORD CHARACTERISTICS

COMMON SITUATIONAL AWARENESS *
- Own/friendly/enemy/neutral locations
- Standard military map w/operational graphics.
- Friendly positions horizontal, 2 echelons up/down.

ARMY BATTLE COMMAND SYSTEM INTERFACES *
- MCS/ASAS/AFATDS (threshold).
- CSSCS/FAADC2 & push/pull ATCCS data.

UNIT TASK REORGANIZATION *
- BDE internal: PLT to CO/PLT to BN/CO to BN.
- BDE external: PLT to BDE/CO to BDE/BN to BDE.

C2 INFORMATION EXCHANGE *
- 90% msg sent received in: CAT 1- 6 sec, CAT 2- 15 sec, CAT 3- 30 sec, and CAT 4- 15 minutes.

HARDWARE/SOLDIER MACHINE INTERFACE
- 910 hrs MTBFF & 30 mins MTTR.
- Meet MANPRINT standards of host platform.
- Operable under all battlefield conditions.
- Host platform sensors (fuel, ammo,laser,etc) interface.

* ORD Key Performance Parameter

CRITICAL ISSUES & CRITERIA

1. DOES FBCB2 IMPROVE BDE TF EFFECTIVENESS BY IMPROVED C2/ FORCE SITUATIONAL AWARENESS?
   - Increase TF lethality, survivability, and reconstitution.
   - Provide timely info. processing & critical combat info.
   - Ability to exchange info. with ABCS.
   - Provide common situational awareness picture.
   - Reestablish communications after TF reorganization.
   - Interface with sensors on host platforms.
2. IS FBCB2 OPERATIONALLY SUITABLE/ SUPPORTABLE?
   - Provide reliability of 910 hrs MTBF.
   - Have mean time to repair of 30 min. or less.
   - BIT/BITE 90% correct with 5% or less false alarms.
   - Readable display w/mask in combat position on move.
   - In MOPP/cold clothing reach & operate all controls.

Figure R-3-2. ORD/COIC crosswalk, FBCB2

R-4. Computer Network Defense (CND) and Information Assurance (IA) wording for Requirements Documents.

a. Requirement documents (MNS, CRD, ORDs) for information systems (computers, all automation services and host platforms), and communication networks (wide area and local area networks), must include specific language for Computer Network and Information System Defense (CND) and Information Assurance (IA). Examples of applicable requirements document language follow:

(1) Threat Paragraph:

(a) Example 1: "Computer network attack threats may exploit, disrupt, deny, degrade or destroy information resident in computers/computer networks."

(b) Example 2: "Computer network attack may result in denial of Service and/or corruption of data."

(c) Example 3: "Asymmetric threats using computer network attack may compromise data, deny Service and/or corrupt information."

(d) Example 4: "Computer network attack capabilities can severely impact mission accomplishment by destroying the combat effectiveness of weapon systems, distorting the picture of the battlefield, and adversely affecting tempo, lethality, battlefield synchronization and survivability."

(e) Example 5: "Computer network attack threats can change quickly and can be obtained rapidly by almost any potential adversary."

(2) Requirements Paragraph (MNS – Para 5, Constraints; ORD - Para 4c, Other System Characteristics; CRD – Para 4, Capabilities Required) examples follow:

(a) Example 1: (Information Systems – General) "An integrated approach is required for information system, network and network infrastructure protection. Information assurance protects and defends information systems by ensuring their availability, integrity, authentication, confidentiality, and nonrepudiation. Minimum security requirements of accountability, access, least privilege, data continuity, date integrity, control, and accreditation IAW AR 380-19 must be met."

(b) Example 2: (Information Systems – General) "Information assurance will be provided by a 'defense in depth' (DID). The DID strategy will include an external perimeter composed of COMSEC, security guards, firewalls and, where necessary, physical isolation; acting as a barrier to outside networks such as the NIPRNET. Internal digital perimeters serving as barriers between echelons and/or functional communities will consist of a combination of COMSEC, security guards, firewalls and/or router filtering. And, a protected local workstation/platform environment consisting of individual access controls, configuration audit capability, IA tools and procedures, and an automated intrusion detection capability. All of this, overseen by extensions to network management capabilities that provide real-time network surveillance and reaction to computer network attack. DID includes a robust and resilient infrastructure designed to 'contain' damage from attacks and to be readily restorable in the event of attack. The fundamental criteria are that: no single attack leads to failure of a critical function; and, no critical function or system is protected only by a single protection mechanism. It also includes the capability to isolate computer attacks for observation and deception, to wit, 'fish bowling.' Finally, it also includes the ability to 'return fire' and attack the attacker, to wit, 'hack back'."

(c) Example 3: (Information Systems – General) "The system's design will include software and hardware protection against computer network attack. Modular designs will be used to the extent practical to facilitate the rapid upgrading of protection capabilities. A defense in depth will be used to insure that every critical function has at least three levels of protection. The criteria is 'no catastrophic failure'."

Figure R-4. Computer Network Defense (CND) and Information Assurance (IA) wording for requirements documents

(d) Example 4: (Networks – General) "The network will provide a dynamic network management capability designed to provide information assurance against computer network attack utilizing the defense in depth strategy. The network management capability will include: network monitoring and analysis; remote authorization, change, or revocation of access privileges and Services; remote authentication of users or systems; remote adjustment of firewalls or guard filtering rules; and, computer network attack counterattack capabilities."

(e) Example 5: (Host Platforms/Combat Systems) "Platforms hosting an information system will provide a computer network attack protection capability. This capability will include the following: operator alert; detection of unauthorized system software configurations, malicious code, and/or technical attack to include unauthorized changes to system data. Host platforms will have embedded software/hardware capabilities to facilitate: network monitoring and analysis; remote authorization, change, or revocation of access privileges and Services; remote authentication of users or systems; remote adjustment to firewalls or guard filtering rules; and computer network attack counterattack capability as appropriate. Design will facilitate the installation of software patches and/or the testing and verification of system configuration management."

b. Testing Issues or Criteria. IT Test and Evaluation Master Plans (TEMPs) will include either computer network defense issues or criteria. If they are not otherwise addressed they will be included in the survivability section. Example issues follow:

(1) Example 1: "Does the system (HW/SW, platform, or transport) provide effective CNA prevention and detection mechanisms against know threats?"

(2) Example 2: "Does the system (HW/SW, platform, or transport) provide an effective capability to restore mission operational capability following a CNA or intrusion?"

c. Defense in Depth. Providing IA against CNA requires an integrated DTLOMS approach. Protection includes leader awareness, operator, and system administrator training, firewalls, network guards, physical security, personnel security, passwords, workstation security, transmission security communications security and IA toolkits. Detection includes network monitoring, intrusions detection through alarms/alerts, centralized configuration management, audit analysis, IA toolkits, authentication and IA training. Response includes capabilities such as restoration, changing perimeter conditions, remote Crypto-zeroization, re-keying, certificate revocation, re-authentication, centralized configuration management, re-routing of data, filter tightening, counterattack capabilities, IA tools and IA training.

Figure R-4. Computer Network Defense (CND)
and Information Assurance (IA) wording for Requirements Documents (cont)

Excerpt from Paragraph 1 of
U.S. Army Operational Requirement Document for
Close Range - Tactical Unmanned Aerial Vehicle (CR-TUAV)
"Brigade Commander's UAV"
Dated 11 Dec 1998

d. Operational Concept. The CR-TUAV is a ground maneuver brigade commander's UAV. It allows him to "see and understand" his battlespace and gain dominant situational awareness on the Army XXI battlefield. The CR-TUAV is the critical component of the Army XXI Brigade's collection package. It gives maneuver commanders the ability to look into the battlespace where ground recon assets can not penetrate or cover in a timely manner. It can also observe heavily protected areas where commanders are hesitant to commit manned aerial platforms. Lastly, it gives commanders a dedicated, rapidly-talkable asset with the capability to look wide as well as deep into their battlespace. It allows them to "see critical elements of the battlespace" and support the increased demand for immediate situational awareness on the Army XXI battlefield. The CR-TUAV is a critical tool to obtain the hard to get information needed to satisfy the commander's Priority Intelligence Requirements (PIR) and Commanders Critical Information Requirements (CCIR). It's a command and control enabler for tactical decision making.

(1) The CR-TUAV system will provide flexible, responsive RSTA, Battle Damage Assessment (BDA), and battle management support to ground maneuver commanders at brigades, armored cavalry regiments (ACR) and light divisions. The CR-TUAV is dynamically retaskable in flight to ensure it is responsive to the commander's immediate needs/changing CCIR. To optimize its capabilities, CR-TUAV is fully integrated with and cued by sound IPB and other collection systems such as JSTARS, Guardrail Common Sensor (GRCS), Artillery Counter Mortar/Battery Radars and FAADC2, in a synchronized effort to support the Warfighter. As demonstrated during the Force XXI AWEs, the information is fed directly to the brigade commander (as well as the S3 and FSCOORD); but in the meantime, the information is fused to answer CCIRs. Regardless of the UAV's role, the operations officer must ensure the UAV is synchronized with all of the other assets within the battlespace.

(2) The maneuver brigade is the premier combined arms formation for dominant maneuver on the Army XXI battlefield. The Army XXI brigade will operate on a non-linear battlefield moving at high speeds and controlling a greatly enlarged battlespace. Armed with superior situational awareness and continuous real-time Intelligence Preparation of the Battlefield (IPB), the brigade maneuvers with speed and precision to gain positional advantage on the enemy. When in position, the brigade executes decisive operations by massing the effects of direct and indirect fires at a tempo the enemy cannot match to seize and retain terrain and defeat or destroy enemy forces.

(3) This is a ground maneuver brigade commander's tactical UAV. The UAV priority is to support the maneuvering of the brigade and battalions, including fire support of maneuver. The brigade commander's UAV must be simple (threshold capability-no bells and whistles), inexpensive, easy to maintain; profiled to meet the brigade commander's needs. It needs to keep pace on the Army XXI battlefield. Launch and recovery must be from an area easily accessible to a brigade commander. Rapid set up and tear down times will ensure it keeps pace with the brigade's movement. To facilitate rapid movement, the control of the UAV may be passed to other control stations or launch/recovery stations to allow continuous flight operations to meet the commander's requirements. Due to the signature associated with the launch and recovery (L/R) of the UAV, the L/R area will normally not be collocated with the brigade TOC. However, the mission planning, tasking, and dissemination will occur through the TOC via a collocated ground control station (GCS) or, at a minimum a remote video terminal (RVT) with compatible communications for tasking and dissemination. Additionally, the brigade commander can locate up to four remote video terminals (RVT) throughout the brigade. As an example, he may choose to keep one with him, locate one each with a forward battalion, scouts, and the direct support artillery battalion. Additionally, future operations demand "information on the move". As such, the UAV is a key brigade collection asset that supports the near real time visualization of the battlespace and is focused on the brigade's decisive operations.

(4) The brigade commander requires sufficient coverage to fight on his and the battalion commanders' piece of ground. Specifically, the UAV is used to cover the dead space in front of the ground reconnaissance -- it extends the ground reconnaissance capability. It complements the Brigade Recon Troop's (BRT) ability to collect ground-level recon targets with a wider-area overhead look. As such, it helps eliminate the unknown and allows the commander to anticipate and respond - to pre-empt. In terms of IPB, the UAV helps the commander during the planning, preparation, and execution phases.

Figure R-5. Example System Operational and Organizational (O&O) Description

(a) During the planning phase the commander needs to understand the ground, and answer the following questions: Where can I move? What are the avenues? Where are the obstacles? The UAV allows the commander to see and assess environmental benefits and limitations and answer those questions. In turn, those factors will support the development of friendly considerations, and formulation of enemy COAs for the planning staff. The UAV allows the commander to quickly assess critical components of his battlespace, such as trafficability, suitability for logistical and fire support assets, and activities of civilians on the battlefield during the planning process. Without this asset, the Commander will have to commit slower moving, precious ground maneuver assets to answer these planning questions.

(b) During preparation, the commander validates his templates by BOS - he recons, in accordance with the plan, verifies the templates, and determines where the enemy is and is not. Additionally, the commander can redirect/frag his air recon (UAV) to a different mission and area. He cannot always do this with ground recon - once in, if they are fixed and attempt to move, they may die. Additionally, the commander needs to determine where he can take risk; where he can economize on forces. Instead of using troops on the flanks, the UAV can assist by providing surveillance in those areas. The UAV greatly enhances the effectiveness of the commander's counter-recon effort during the preparation phase. The UAV's mobility and range allow him to economize limited ground recon assets for the execution phase, without sacrificing his ability to detect indications of unexpected enemy spoiling actions such as Raids, Reconnaissance in Force, Fire Support Raids, etc.

(c) During execution, the UAV helps determine maneuver options/friendly courses of action. As an example, it helps answer the question, "Is that truly an assailable (or unassailable) flank?" Another example: As the brigade penetrates the enemy defense, the commander may want the UAV over the enemy reserves, to determine when and where they are moving. The brigade commander may use a UAV capability to simultaneously look deep into his battlespace while his ground recon assets and maneuver units observe closer NAIs. With this confidence that he can receive critical information during the fight- "just-in-time intelligence"-the commander can take prudent risk without fear that he will outrun his collection assets.

(d) The brigade commander's UAV needs to be dedicated for the close battle. It needs to be responsive to the current situation. The commander needs the information when it happens - not maybe; not later; not reprioritized by a higher command. The brigade commander's UAV needs to be focused for decisive operations in the brigade battlespace.

(e) In summary, the CR-TUAV is the brigade commander's most versatile confirming sensor -- his "dominant eye" -- and responds directly to his requirements. To optimize its capabilities and responsiveness to the commander, it is linked to/cued by sound IPB and wide area sensors, such as the direct feed to the JSTARS CGS when collocated with the GCS, and as an objective, direct live feed from the UAV to the CGS. Additionally, it must be interoperable with C4ISR systems and linked into the Army's Battle Command System, in particular ASAS, AFATDS, and FAADS for distribution via intelligence channels, targeting, and to meet air defense identification requirements. Due to the complexities of airspace management (ASM), even at the brigade, it needs to feed into the A2C2 system. Some of those areas are defined more precisely below.

e. System Description.

(1) A CR-TUAV system consists of four basic components: the Ground Control Stations (GCS) and related equipment; Air Vehicles (AV); Modular Mission Payloads (MMP); and communications.

(a) The system will have a minimum of two GCSs, two Ground Data Terminals (GDTs), one Portable Ground Control Station (PGCS) and one Portable Ground Data Terminal (PGDT) with line of sight (LOS) command and control links to, and receipt for telemetry and imagery from, the Air Vehicle (AV). Additionally, it will have four Remote Video Terminals (RVT) to provide payload information in the area of operations. The system's four RVTs that receive NRT video/telemetry from the AV can be used by: the brigade in the Tactical Operations Center (TOC) (if a GCS is not collocated), the brigade's subordinate maneuver battalions, or by direct support artillery or supporting aviation assets. RVT's will be allocated by the commander, based on METT-T, to support his scheme of maneuver.

(b) The system will have sufficient AVs to support a wartime surge OPTEMPO described below, as well as a means of launch and recovery, and the necessary transportation and ground support equipment for the operations and maintenance of the system. The system is designed to be easy to launch, operate, recover, and maintain with a minimum of training, logistics, and personnel. It must present a small profile in order to reduce its signature) rapidly tear down, deploy and set up; and minimize any impact on brigade CSS resources. A crew of approximately 14 will operate and maintain a full baseline (AVs and two GCSs) at the OPTEMPO indicated below augmented with the divisional Mobile Maintenance Facility (MMF) for sustainment beyond the initial 72 hours of operations.

Figure R-5. Example System Operational and Organizational (O&O) Description (cont)

(c) The system will be capable of near real time (NRT) transmission of Electro Optic/Infrared (EO/IR) imagery. Initially, the system will have a basic BO/IR mission payload, but will have a capability for growth to accommodate additional MMPs.

(d) The CR-TUAV provides unclassified products via an unsecured datalink. The GCS gives ready interface to the existing Command, Control, Communications, Computers, and Intelligence (C4I) architecture, to include CGS, AFATDS, ASAS, FAADS, and A2C2. Intelligence reports from the GCSs include voice, electronic dissemination and/or video via the various communication systems in the GCS. Communications for the system are integrated into the air vehicles and ground control components and allow for transmission and receipt of command and control data, telemetry and imagery. Additional communications and intelligence dissemination are provided via the standard DoD tactical (VHF and UHF) radios, Mobile Subscriber Equipment (MSE), and the Tactical Local Area Network (TACLAN).

(2) The CR-TUAV baseline is capable of 12 hours of continuous operations within a 24-hour period. The system has the capability of surge operations for 18 hours within a 24-hour period for no more than three consecutive days, with the following day being limited to eight hours of operations. Although the system has the capability to surge for 18 hours of 24 hours for 72 hours, the CR-TUAV baseline and its' parent brigade may be reconstituted after 36 hours. The objective system will be capable of 18 hours of continuous operations within a 24-hour period with a surge capability of 24 hours of 24 hours for a period of 3 days.

(3) It can operate during less than ideal weather conditions (operates in environments similar to a small light aircraft) with a range of 50 kms from the launch and recovery site, flying at altitudes of 14,000 feet Mean Sea Level (MSL) or greater. Nominal operating altitudes/survivable altitudes are from 8,000 to 10,000 feet Above Ground Level (AGL) for day operations and between 6,000 to 8,000 feet AGL for night operations.

(4) The CR-TUAV system will have an endurance of four hours on station at 50 kms (3-4 hrs at 200km objective).

(5) The threshold system will carry enough supplies and spares for initial operations.

(6) The complete CR-TUAV system will fit in no more than two High Mobility Multipurpose Wheeled Vehicles (HMMWVs) with shelters, two Cargo/Troop carrying HMMWVs, and two trailers with enough room for all personnel, crew members' combat equipment (rifles, helmets, camouflage netting, individual protective equipment, etc.) and enough Class I (subsistence) and Class III (Petroleum, Oils, and Lubricants) and Class IX (repair parts) supplies for initial operations (threshold)/seven-day period (objective). A threshold requirement is for a system configurable to deliver 72 hours of operational capability at a minimum of 12 flight hours on station in a 24 hour period deployable in a single C-130 sortie (using the HMMWV as the prime mover and including transportation for the entire "reduced" crew). Sustainment beyond the initial 72 hours is supported with a divisional mobile maintenance facility (MMF) consisting of a HMMWV and trailer.

(7) The complete baseline CR-TUAV system with personnel and equipment, must be transportable in no more than two C-130 sorties. The addition of a mobile maintenance facility (HMMWV with shelter and trailer) will require an additional C-130.

f. Support Concept.

(1) Hardware. The CR-TUAV equipment will be supported in accordance with the IEW Sustainment Streamlining (IEWSS) System, to include Contractor Logistics Support (CLS). The CR-TUAV maintenance concept may be Life Cycle Contractor Logistics Support. The system will be maintained IAW Aviation Unit Maintenance (AVUM) "on system repair" and Aviation Intermediate Maintenance (AVIM) "off system repair" Concept. Routine maintenance will be provided by system operators and the assigned maintenance personnel augmented (as required) by the divisional MMF. Higher level maintenance will be accomplished at the Forward Repair Activity (FRA) and/or the Electronic Service Support Center (ESSC) within theater to allow for quick turn around of critical system components.

(2) Software. The CR-TUAV system software will be maintained through standard Army life cycle software support concepts, to include CLS. The CR-TUAV system software will be updated, as required, to ensure compatibility with Military Intelligence, Aviation, and targeting systems. CR-TUAV system software will retain compatibility with older fielded systems and provide improved performance through Pre-planned Product Improvements (P3I).

Figure R-5. Example System Operational and Organizational (O&O) Description (cont)

Appendix S
Nuclear Survivability (NS) and NBC Contamination Survivability (NBCCS)

S-1. Introduction. As specified in DOD series 5000, AR 70-75, and supported by DA Pam 70-3, but limited in scope only to nuclear and nuclear, biological and chemical (NBC) contamination of the specified spectrum of threats, this appendix establishes TRADOC policy, responsibilities, and procedures for implementing nuclear survivability (NS) and NBC contamination survivability (NBCCS) of Army personnel and materiel into the development and acquisition process.

S-2. Summary. Requirements documents must properly address NS and NBCCS as specified in DOD series 5000, AR 70-75, and DA Pam 70-3. AR 70-75 specifies that "if a system is designated as mission essential or is a critical component of a mission essential end item," it will be NBCCS survivable and, as a minimum, high-altitude electromagnetic pulse (HEMP) survivable. Mission essential systems and mission critical components or functions are those systems/components/functions whose operational effectiveness and operational suitability are critical to successful mission accomplishment or to aggregate residual combat capability.

S-3. Responsibilities.

a. HQ TRADOC.

(1) The Deputy Chief of Staff for Combat Developments (DCSCD) serves as the GO-level member on the Nuclear and Chemical Survivability Committee (NCSC) IAW AR 15-41.

(2) HQ TRADOC CD directorates will:

(a) Review respective proponent requirements documents and ensure schools properly address NS and NBCCS.

(b) Provide support for NS and NBCCS waivers, modifications, exemptions, or briefings.

(3) The HQ TRADOC NS and NBCCS POC (ATCD-SN) will:

(a) Serve as TRADOC focal point for NS and NBCCS.

(b) Ensure TRADOC NS and NBCCS policy is in compliance DOD and Army NS and NBCCS policy.

(c) Serve as TRADOC representative on the NCSC Secretariat and various other NS/NBCCS conferences as required.

(4) The U.S. Army Nuclear and Chemical Agency (USANCA) will:

(a) Assist CBTDEVs and MATDEVs in developing and incorporating the correct NS and NBCCS requirements into MRDs.

(b) Review all draft MRDs for appropriate NS and NBCCS requirements.

(c) Develop and issue NS and NBCCS criteria based upon the NS and NBCCS requirements documented in the MRDs.

b. TRADOC proponents will:

(1) Determine which systems have mission critical functions, and develop appropriate NS and NBCCS requirements.

(2) Include the following on distribution lists for staffing of drafts and distribution of approved MNSs, ORDs, and DA Forms 2028: U.S. Army Nuclear and Chemical Agency, ATTN: ATNA-CM/NU, 7150 Heller Loop, Suite 101, Springfield, VA 22150-3198; Deputy Chief of Staff for Chem Bio Matters, HQ U.S. Army Materiel Command, ATTN: AMCCB, 5001 Eisenhower Avenue, Alexandria, VA 2 2333-0001; and U.S. Army Research Lab, Survivability Lethality Analysis Directorate (SLAD), ATTN: AMSRL-SL, Aberdeen Proving Ground, MD 21005-5068.

S-4. Procedures.

a. Procedure overview. To develop survivability requirements, compile an NS and NBCCS matrix as specified in figure S-2. When complete, develop NS and NBCCS requirements based on the matrix (see para S-5). Incorporate these NS and NBCCS requirements under the heading of Survivability in MNS paragraph 5 (Constraints), ORD paragraph 4c (Other System Characteristics), and other acquisition-related documents.

b. Procedure for determining NS and NBCCS requirements:

(1) Develop an NS and NBCCS matrix:

(a) List the potential nuclear and NBC threats. For NS these include HEMP, source region EMP (SREMP), initial nuclear radiation (INR), blast, and thermal radiation. In most cases SREMP, INR, blast, and thermal radiation can be combined into the single category of initial nuclear weapons effects (INWE). For NBCCS these threats include residual nuclear contaminants (fallout), neutron induced gamma activity (NIGA), biological agent hazards, chemical vapor, and chemical liquid.

(b) List the system deployment configurations and/or operational mission modes and profiles of the system. Considering the system's operational modes and mission profiles, list the critical functions and/or critical subsystems and components of the system subsequent to exposure to the threats. Critical functions must be considered in the context of the system deployment configurations. Based on the deployment configuration, the critical functions and the methods to ensure system/function survivability may be different. Also consider and list the allowable downtime or acceptable time for the critical functions.

(c) Compile a matrix with the potential nuclear and NBC threats across the top and the critical functions, subsystems, and/or components in each operational configuration down the side as shown in the example below of a generic weapon system (fig S-1).

Potential nuclear and NBC threats →

Critical functions in each operational mode ↓

Operational mission mode/profile	Critical Function, subsystem, component	Threats						
		HEMP	INWE	Residual Nuclear Contaminants	NIGA	Personnel Biological	Chemical vapor	Chemical liquid
Employed in a dismounted/ exposed mode	Acquire targets							
	Commo (voice)							
	Shoot							
Employed in vehicle mounted mode	Acquire targets							
	Commo (voice)							
	Shoot							
	Move							
Stowed in a shipping container	Acquire targets							
	Commo (voice)							
	Shoot							

Figure S-1. Example of NS and NBCCS matrix set up

(d) Develop survivability approaches for each matrix threat-operational configuration-critical function combination. Numerous approaches and techniques, as well as combinations of techniques, can ensure system survivability. Survivability can be achieved through deceiving the threat, taking advantage of system redundancy on the battlefield, providing for the timely repair/replacement/resupply of damaged equipment, designing the system so equipment is hardened to withstand the threat environment, utilizing field mitigation techniques in conjunction with system hardening, or combinations of these methods. For NBCCS, compatibility with soldiers in MOPP IV; withstanding the materiel-damaging effects of NBC contaminants and decontaminants; and being able to be decontaminated to negligible risk levels to reduce hazards to soldiers are key considerations in equipment hardening. Each matrix threat-operational configuration-critical function combination requiring NBCCS should specify which of these NBCCS elements are applicable and how they will be achieved. For decontamination, specify to what level and by what method decontamination will be done (reference types of decontamination in table 1-1 of FM 3-5).

(2) Guidelines for determining survivability techniques and methods.

(a) The intent of the NS and NBCCS efforts are to make the many systems on the battlefield survive direct and collateral effects from employment of NBC weapons. Systems subject to direct attacks may be so critical that a combination of survivability measures/methods, employed at both system and force level, may be required to ensure system survivability and availability. Therefore, deception, avoidance and active defense (detection and hit avoidance) should be adjuncts to kill avoidance survivability methods of hardening, reconstitution and mitigation rather than supplanting them.

(b) Materiel hardening is usually found to be the most cost effective method of achieving NS and NBCCS for high-value, low-density assets.

(c) Materiel hardening, especially for NS and the ability to operate in a NBC contaminated environment, is appropriate for systems that are critical to the immediate prosecution of the battle. Normally it is not possible to repair/replace/resupply these type systems before they are required.

(d) Other systems whose criticality is less time sensitive may be made survivable by taking advantage of battlefield redundancy or providing for timely repair/replacement/resupply. These methods must be proven operationally effective and incorporated into logistics support plans. The cost to produce and procure spares as well as provide for additional logistics capability may be cost prohibitive.

(e) Mission critical systems with electronic components, must be hardened against HEMP as a minimum. Redundancy and providing for timely resupply are inadequate countermeasures against the HEMP threat because its effects cover very large areas and can affect theater-wide stocks.

(3) For all survivability methods, MATDEVs and CBTDEVs must work together to address the following DTLOMS issues:

(a) Doctrine. Ensure the systems operator-level Technical Manual (TM) -10 outlines specific procedures for immediate, operational, and thorough decontamination to supplement (not repeat) procedures in FM 3-5. If the procedures in FM 3-5 are found to be adequate, the TM should specify that fact. This information must also be addressed in the system's squad/platoon-level TTP manuals. If specific workarounds are required for operating the system in MOPP IV, then the TTP series must address those procedures. Ensure any warnings (for hazards such as a soldier exceeding mission profile time in a decontaminated system) are documented in appropriate manuals.

(b) Training. Ensure operator-level courses and training support packages (TSP), (e.g., BT, AIT, OSUT, BMOC) provide the necessary training on the TM and TTP specific procedures for decontamination and operation in MOPP IV.

(c) Leader development. Assess whether leader courses require specific topics to be developed for inclusion in the instruction for Basic Noncommissioned Officer Course (BNCOC), Advance Noncommissioned Officer Course (ANCOC), Sergeant Majors Academy (SMA), Officer Basic Course (OBC), Officer Advanced Course (OAC), Combined Arms Staff Services School (CAS3), Command and General Staff College (CGSC), Army War College (AWC), etc.

(d) Organizations. Assess requirements for changes and additions to TOE. Can the procedures created for the -10 and TTP be accomplished with existing force structure or are additional resources required? Is density of equipment sufficient to counter the potential threat?

(e) Materiel. Assess whether or not additional R&D is needed for the system to meet the survivability requirement. Determine whether or not requirements can be met with other DTLOMS alone.

(f) Soldier. Assess whether or not changes in MOS are needed to comply with the survivability requirement.

(4) Balance the survivability level of the subject system with those systems the subject system is expected to be compatible with, to be supported by, or to support. Consider the density of fielding versus impact of threat.

(5) If survivability requires materiel solutions identify:

(a) Specifically, which aspects of NS or NBCCS (compatibility, hardness, and decontamination) or other options (such as overpressure, ventilated face piece, outriggers, Chemical Avoidance Protective Entrance (CAPE), or Advanced Integrated Collective Protection System (AICPS)) are desired to enhance survivability.

(b) Required level of decontamination (Immediate, Operational, or Thorough, see table 1-1 of FM 3-5).

(c) Manpower available to complete decontamination (individual, crew, or company).

(d) Time constraints during which decontamination must be completed.

(e) Resources available to complete decontamination.

(6) For all survivability approaches, the MATDEV, with assistance from the proponent, must validate, through test/analysis, the selected approaches to survivability (system or component redundancy; timely and adequate re-supply; mitigation techniques; tactics, techniques, and procedures (TTP); or materiel hardening) that satisfy the survivability requirement and HQDA-approved criteria.

S-5. For survivability solutions, develop NS and NBCCS requirements for inclusion in requirements documents. For clarity and completeness the survivability matrix should be included in the requirements document. Based on the matrix and using operational terms, develop NS and NBCCS requirements and incorporate them into requirements documents. Tailor the requirements to the need. As examples, consider one or combinations of the following statements to specify NS and NBCCS requirements:

a. "Nuclear survivability (NS), including high-altitude electromagnetic pulse (HEMP) survivability, and nuclear, biological, and chemical contamination survivability (NBCCS) are not required because the system is not mission critical."

b. "High-altitude electromagnetic pulse (HEMP) survivability is required. However, operation through a HEMP event is not required. The recycling of power to restore operations after a HEMP event is acceptable. Rationale: The system is mission critical and hardening to survive the effects of HEMP is required due to the large radii (thousands of kilometers) of damaging effects levels extending from a single high-altitude nuclear burst. Failure to harden against HEMP could result in the loss of all or a large number of systems throughout the battlespace."

c. "High-altitude electromagnetic pulse (HEMP) survivability is required. The time urgency of the capability is such that operation through a HEMP event is required. Rationale: The system is mission critical and loss of capability cannot be afforded for even a short duration. Hardening to survive the effects of HEMP is required due to the large radii (thousands of kilometers) of damaging effects levels extending from a single high-altitude nuclear burst. Failure to harden against HEMP could result in the loss of all or a large number of systems throughout the battlespace."

d. "The system must be nuclear-survivable. Nuclear survivability is the capability to withstand initial nuclear weapons effects (INWE), including high-altitude electromagnetic pulse (HEMP), and still accomplish the mission. The system should survive an INWE environment equal to that in which a sufficient percentage of the operators remain combat effective long enough to execute the mission. Rationale: The system is mission critical and must be nuclear-survivable to meet the projected threats. The nuclear survivability program is based on the philosophy that mission critical, front-line combat equipment should survive an INWE environment."

e. "The system must be capable of operations in a NBC contaminated environment. The system must be able to withstand the materiel-damaging effects of NBC contaminants and decontaminants; be able to be decontaminated to negligible risk levels to reduce hazards to soldiers operating, maintaining and resupplying it; and be able to be operated, maintained, and resupplied by soldiers wearing the full NBC protective ensemble (MOPP IV)."

f. "The system (or specific components of the system) must be high-altitude electromagnetic pulse (HEMP) survivable while in (list the specific operational modes). Hardening to survive the effects of HEMP is required due to the large radii (thousands of kilometers) of damaging effects levels extending from a single high-altitude nuclear burst. Failure to harden against HEMP could result in the loss of all or a large number of systems throughout the battlespace."

g. "System components which contribute to (specify the critical functions) in (specify the specific operational modes) must survive (specify the threats) through (specify the survivability method or techniques appropriate for function and operational mode)." For components or systems with decontamination requirements, include, "the system must be decontaminated to (specify level) as measured during standard mission profiles after (specify type of decontamination, per table 1-1, FM 3-5) by (specify available personnel) in (specify time constraints) using (specify decontamination apparatus/equipment available/required)."

h. "Loss of (specify the major non-critical functions or components and operational mode) resulting from (specify threat) for (specify applicable time the function can be lost) is acceptable."

S-6. Example. The following examples use an arbitrary tactical wheeled vehicle with enclosed cab and an exposed weapon system to illustrate the matrix and requirements necessary for an ORD.

a. Example matrix.

Critical Function in System Deployment Configurations	Threats				
	HEMP	Rad Contaminants	Personnel BIO Hazard	Chem Vapor	Chem Liquid
From shipping, storage, or staging deployment configurations must remain postured for move-out functions without additional preparation.	TTP (Power Off)	TTP (Cover)	TTP (Button up) & Bleach Harden	TTP (Button up) & Vapor Harden	TTP (Cover)
From move-out operations must remain capable to set-up for "shoot, move & communicate" operations without maintenance.	Survive HEMP (TTP for weapon: Power Off)	Compatible (Overpress, MOPP-4) Rad hard	Compatible (Overpress, MOPP-4) BIO hard	Compatible (Overpress, MOPP-4) Vapor hard	Compatible (Overpress, MOPP-4) Liquid hard
While "shooting, moving, & communicating," must remain able to shoot, drive, and manually reload.	Survive HEMP, loss of auto-reload OK	Compatible (Overpress, MOPP-4)	Compatible (Overpress, MOPP-4) BIO hard	Compatible (Overpress, MOPP-4) Vapor hard	Compatible (Overpress, MOPP-4) Liquid hard

Figure S-2. Example NS and NBCCS matrix

b. Example requirement for use in an ORD.

Survivability. Systems powered-down warfighting functions while in shipping, storage, and staging deployment configurations must survive HEMP and NBC (required) environments and result in an operational ready system. System components that contribute to driving, shooting, manual reloading, and command and control functions in "shoot, move, & communicate" deployment configurations must survive HEMP and NBC (required) environments through materiel and overpressure solutions. Operation of these components must be compatible with soldiers in MOPP-4. The system must be decontaminable to negligible risk levels as measured during standard mission profiles after thorough decontamination by crew personnel in 75 minutes using the M17 Decontamination Apparatus. Loss of system auto reload functions resulting from HEMP environments during operations is acceptable.

Appendix T
Army Operational Architecture (AOA)

T-1. Army Operational Architecture (AOA). AOA is an element of the Army Enterprise Architecture (AEA). The Army Enterprise is the entire Army—major commands, headquarters, agencies, installations, and Army forces—and the activities that those organizations perform. The Army Enterprise represents the Army as a corporate entity, and prescribes a new way of accomplishing the Army's missions by taking full advantage of information technology (IT), using innovative business practices, and synchronizing Army IT resource management activities toward common goals. The AEA fulfills the 1996 Clinger-Cohen Act requirement to develop an enterprise-wide IT architecture. The AEA is an Army-wide IT architecture that describes the relationships among key Army institutional processes and IT to ensure: the alignment of the requirements for information systems with the processes that support the Army's missions; adequate Army, joint, and combined interoperability; redundancy and security of information systems; and the application and maintenance of a set of standards (including technical standards) by which the Army evaluates and acquires new systems. The AEA is composed of three architectures: the AOA, the Army Systems Architecture (ASA), and the Joint Technical Architecture-Army (JTA-A). The TRADOC Program Integration Office-Army Battle

Command System (TPIO-ABCS) is the TRADOC Executive Agency for the AOA. Figure T-1 depicts the relationship and responsibilities within the AEA community.

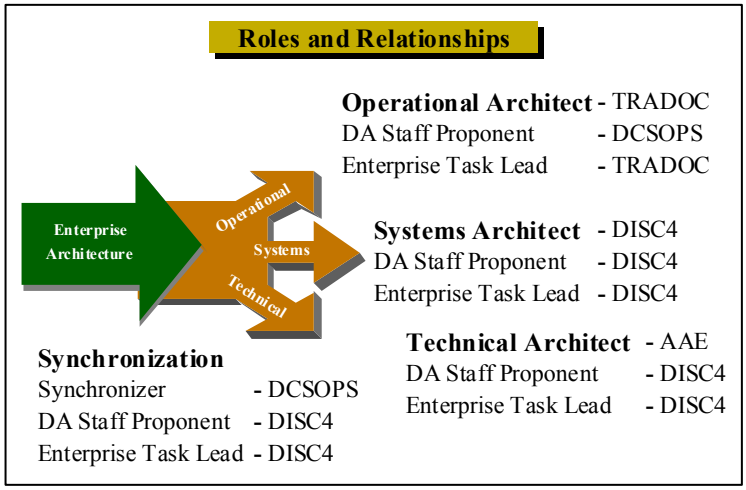


Figure T-1. Roles and relationships

T-2. Operational architecture (OA). An operational architecture is a view of the functions performed across the battlespace (physical and logical). A definition of OA, in operational terms, is provided in figure T-2. An OA is completed to allow and support the development of reengineering recommendations relative to the DTLOMS domains. It is the baseline for the identification of new C3I requirements and requirements generation for each functional area, and serves to facilitate the development of new concepts. Development of operational architectures also allows the Army leadership to better understand the impact of changes throughout the force as they relate to the DTLOMS domains. The development of operational architectures also provides the mechanism and process to identify new information requirements, information exchange requirements, and associated information elements for the force. Operational architecture development supports the warfighter, the M&S community, the training community, force design decisions, doctrinal changes, the development and fielding of technology enhancements/systems, software development, and the building of system architectures. OA provides the following five key elements to the baseline of this pamphlet:

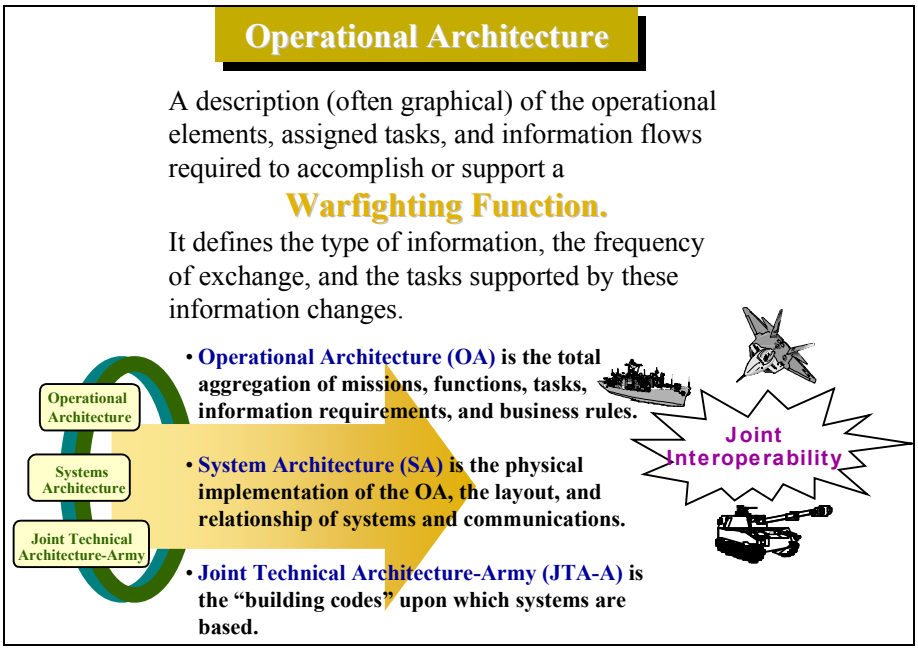


Figure T-2. Operational Architecture

a. OA is a functional blueprint that provides a disciplined approach to the requirement determination process (RDP), and is the cornerstone for RDP.

b. OA provides the functions, information requirements, and the performance parameters that a warfighter needs to perform his mission. The OA is used by the ASA community to develop and field the correct type and number of systems to enable the warfighter functional requirements.

c. OA should precede the development of system architectures. This ensures full advantage is taken of reengineering potentials identified through the operational architecture process, and that technology enhancements are analytic-based and represent optimized battlefield return on investment.

d. OAs identify and document new and emerging operational requirements, and act as the change catalyst for development of operational capabilities supporting the warfighter.

e. The OA provides the functional and information exchange requirements (IERs) for the C4RDP.

T-3. Operational architecture process. The process under which operational architectures are developed is supportive of the Army's combat development activities and is founded upon the requirements identified within this document. This process ensures the Army is building and fielding capabilities that support the warfighter, represent the optimum value added, and provides the analytic basis for sound decisions concerning reengineering opportunities across the DTLOMS domains and realistic assessments of return on investments. The OA process, and resultant operational architecture development, is executed along two axes simultaneously—a standards-based and a capabilities-based axis—and is applied to the entire Army Enterprise. OA policy and guidance serve as control measures that guide efforts along both axes. Warfighters' visions and concepts that lead to requirements are the starting points, or foundation, of the process.

a. The standards-based axis includes compliance with and application of the Joint Technical Architecture-Army (JTA-A). Compliance with the applicable JTA-A standards will enable Army forces to be interoperable and flexible. Application of the JTA-A involves the use of common operating systems, common software, data standardization, data definition standardization, development and adherence to a common data element dictionary, and software reuse. The application of and adherence to these standards and principles will ensure systems compatibility and interoperability when fielded and support the seamless exchange of information throughout the Army, in the joint environment, and with our Allies.

b. The capabilities-based axis involves supporting the development of objective Information Technologies (IT) capabilities through architecture development efforts. These efforts may be focused toward the development and enhancement of specific capabilities—situational awareness, battlefield visualization, information operations, cooperative engagement, etc.; or toward specific Army organizations—Division XXI, Corps XXI, Army XXI, and the Army After Next. The main focus on the capabilities-based axis is the development of objective IT architectures for Division, Corps, and Army XXI. Division, Corps, and Army XXI represent capabilities and the operational architectures that describe those capabilities. In that context, the representative IT architectures are capability configurations.

T-4. OA life cycle. The OA life cycle is a living development cycle that defines and describes the combat user requirements. The cycle is an evolutionary process that incorporates a cradle-to-grave approach in developing combat users' requirements. The four phases consist of concept, development, verification and validation, and fielding.

a. Conceptual phase. This begins with the initial definition of the functional requirements as defined by the Combat User. Interviews and analysis are conducted with the field users to determine the functional tasks and activities.

b. Developmental phase. Activity models, node trees, and context diagrams document the requirements as defined from the initial interviews. From these products are generated the data models that define the informational exchange requirements for the battlefield.

c. Verification and validation phase. Once the products are developed, they are verified and validated by the TRADOC TPIO-ABCS, schools and centers, and the warfighter community. Changes to the baseline OA products are controlled, authorized, and executed by the Configuration Control Board (CCB). Products are verified to ensure they conform to applicable government standards, plans, and doctrine.

d. Fielding phase. Verified and validated OA products are distributed or fielded to the applicable TRADOC organization, schools and centers, the systems architect (SA), and MATDEV for implementation. The SA and MATDEV work with the OA staff regarding any anomalies, risk factors, schedules, and required resources. Any detected anomalies are documented and reported back to the OA for investigation.

T-5. OA products. The OAs are not done as an afterthought, but are the basis under which the requirements determination process functions. The purpose in developing operational architectures is to provide a disciplined approach to the identification and development of new requirements, to optimize new capabilities and systems fielding (based on realistic constraints), and to ensure that developed items are based on valid operational requirements and meet the needs of the warfighter. While certain and specific products are identified with the development of operational architectures, they serve only as the means by which new and emerging IT enhancements are realized. While the products are merely a means to the end, they offer the ability to identify and capture, and ultimately support the entire combat developments process. The products are not the end themselves; rather, they are the means by which warfighters' needs are satisfied. The identification of a new/emerging concept or operational requirement starts the process of operational architecture development.

a. When an activity or agency (combat developments activity, MACOM, etc.) plans to conduct an OA with associated products, they must submit a project proposal to the CG, USACAC. The project proposal is then reviewed by TPIO-ABCS to validate the approach and product development requirements. TPIO-ABCS OA branch places the project proposal under the AOA configuration management and control process, and arranges the necessary coordination with HQ TRADOC. The activity/agency conducting the OA provides a progress update to the TPIO-ABCS OA branch once a quarter (or upon request) until the completion of the OA project.

b. Because the intent of the process is to ensure a disciplined approach to requirements determination, any modifications to products or their development must first be coordinated through the TPIO-ABCS OA CCB. Product development follows the procedures and guidelines identified in the AOA Implementation Plan, and must be consistent with those procedures identified within the AEA Master Plan. OA products are applicable to all combat development and materiel development agencies, to include the warfighter. OA impacts across the DTLOMS domains through these agencies. At a minimum, development of an OA includes the following products:

(1) Operational concept diagrams. These diagrams are developed in two parts. The first is the development of an operational concept for battle deployment of the unit being modeled. The second is a graphic representation or depiction of that concept. While the graphic representation depicts the concept in a simple, pictorial form (using MS PowerPoint software), the operational concept must define how the concept is expected to support the warfighting requirement and enhance command and control across the battlefield. The operational concept diagrams are used to describe, in general terms, how command and control will be executed for the organization to be modeled and provide the focus, or view, against which the modeling and analysis will be completed.

(2) Command relationship diagrams. These diagrams are line and block charts that describe the relationship among the various organizations within the major unit being modeled. They not only describe relationships, but also serve as the baseline and show the basic functions performed at the respective echelons. These diagrams serve the purpose of both describing command relationships and providing a basic understanding of the functions performed at each respective node within the organization. Capturing this level of functional decomposition allows further scoping to provide the appropriate focus for the follow-on modeling efforts. Development of good functional diagrams in the initial phase of OA development ensures commonality of modeling efforts, appropriate level of functional decomposition, and assists in optimizing resources against the most significant areas of OA development and analysis. The command relationship diagrams and the functional diagrams provide the framework for the development of the node tree and the basis for model development. Adequate and correct descriptions and identification of major functions at this higher level ensures the most appropriate level of resource management.

(3) Activity/process models. Activity and process modeling provide a description of the activities and functions being performed at each level within the structure(s) being modeled. Additionally, the process models provide necessary timing data and information, which support the development of dynamic modeling and simulation. These models are developed using Integrated Computer-Assisted Manufacturing (ICAM) Definition (IDEF) language with standard IDEF conventions and notations. The activity (IDEF0) and process (IDEF3) models provide the identification of functions/activities performed, associated processes, and information relative to information flow and information exchange requirements. The results of these modeling activities provide the basis from which to execute further dynamic modeling and simulations and to conduct refined, analytic analyses and assessments. These are the basis upon which BPR recommendations are made and the future, or "to-be," OAs are developed. Utilization of this modeling software and technique provides a disciplined approach to data/information capture, documentation, standardization of definitions/terms, and a thorough understanding and description of the activities associated with specific nodes. These IDEF models provide the detailed information relative to information and transport requirements and information exchange requirements from which additional OA products are developed. IDEF models

are used to develop BPR recommendations and changes to DTLOMS domains. BPR is a method for looking at the current function of an element, and determining if a better alternative is available to enhance future functional efficiencies. The activity/process models are utilized by: the M&S community, such as the TRADOC Analysis Command (TRAC); the Army Systems Architect in the development of systems architectures; software engineers and designers to gain a greater understanding of the functions/activities the software must support; doctrine writers to write emerging concepts and doctrine; the warfighter to assess where efficiencies may be gained in either their force structure or conduct of operations; and the training community in the development of training support plans (TSPs) and development of new training tasks. The results of the data/information collection and IDEF modeling also populate numerous databases, such as the Enterprise Architecture database (vis-à-vis the C4RDP), the DISA C2 Core Data model/base, the Army Common Database, the C4ISR Common Data Model/Base (CADM), and the ABCS Common Activity Model.

(4) Data modeling. IDEF1X data modeling supports the information requirements identified in the activity model, and describes in detail the information entities, attributes, and entity relationships. DODD 8320.1 and Federal Information Publication Standards 183 and 184 require all data models to be activity model based. Prior to the execution of data models, the C2 Core Data Model is queried to ensure no duplication of effort exists and that all data models to be developed are valid extensions to the C2 Core DM. In the future, other data models, such as the CADM (previously mentioned) and the ABCS Transition Data Model will also be queried to ensure maximum optimization of work already performed/completed. The development of data models/extensions provides the necessary resolution of information/data to the MATDEV, systems engineer, and software developer to develop systems and software in an optimal manner. The TRADOC systems managers for respective systems must be a part of this process and support the development of data models for their systems. All data modeling initiatives being conducted in support of TRADOC systems must be coordinated with the CG, USACAC (TPIO-ABCS as the USACAC lead). USACAC (TPIO-ABCS) validates the requirement, coordinates execution with HQ TRADOC (as necessary), and ensures the data modeling approach is consistent and complementary to development of the OA initiatives.

(5) Information exchange requirements (IER) matrix. This matrix identifies the connectivity between the various operational elements at the leaf node level and provides the performance parameters associated with leaf node information requirements (inputs and outputs). The operational element connectivity will be shown as information exchanges between a producer (normally one person) and various users. This information and the definitions provided with the activity model are of major importance to the Systems Architects. Through the development of the IER matrix, current information requirements (IRs) and IERs within the C4RDP will be validated, as well as identification and creation of new IRs, IERs, and OPFAC rules which feed into the C4RDP database.

(6) OA analysis. The analysis, which is the result of both activity/process and data modeling, subject matter expert (SME) interviews, data collection and assimilation initiatives, and study of the assembled information, remains critical to the ability to identify and recommend reengineering actions for each of the DTLOMS domains. It also provides the opportunity and ability to conduct “what-if” analysis on alternative ways of operating, assessing the impact of changing doctrinal applications, technology enhancements, and training strategies, and organizational/force structure modifications. This is supported by dynamic M&S initiatives and can be centrally conducted from the OA Laboratory and Integration Center (see para T-7).

(7) Value added assessment. The value added assessment is a result of the OA analysis that allows for improvements in DTLOMS, cost savings, and/or cost avoidance.

(8) Figure T-3 shows the OA products and their applicability to different agencies and activities.

Operational Architecture Products

Users	Products						
	Concept Diagrams	Command Relationship Diagrams	Activity Process Models	Logical Data Models	Information Exchange Matrix	Unit OA Analysis	Value Added Assessment
Warfighter	✓	✓	✓		✓	✓	✓
Combat Developer	✓	✓	✓	✓	✓	✓	✓
Doctrine Developer	✓				✓	✓	✓
Force Structure Developer	✓					✓	✓
Training Community	✓	✓	✓		✓	✓	
Testing Community			✓		✓	✓	
Modeling/ Simulation Community			✓		✓	✓	✓
Systems Architect	✓	✓	✓	✓	✓	✓	✓
Systems Engineer	✓			✓	✓		
POM Developers						✓	✓

Figure T-3. Operational Architecture products

T-6 Configuration management.

a. The purpose of configuration management (CM) is to establish an orderly method of control over the configured baseline OA products. A complete description of the OA CM process and the CCB is located in the AOA Implementation Plan. The specified procedures provide:

(1) A means for requested changes to be initiated, reviewed, approved, prioritized, and implemented.

(2) A means to track the implementation of changes made to the OA product set and repositories through a configuration control process.

(3) A means for issues to be identified, reviewed, and resolved, or put into the change process.

b. No change to the OA products will be implemented unless it is authorized and approved by the CCB and verified and validated by the CM process.

T-7. OA Laboratory and Integration Center. The TRADOC OA Laboratory and Integration Center is located within the TPIO-ABCS and the USACAC. Its purpose is to provide the capability to conduct dynamic M&S, support the assessment and development of recommended changes to the DTLOMS domains, to provide the ability to merge and integrate various activity/process models and data models, and to provide configuration control and management of all OA activities within the TRADOC. Access to the OA lab is through a server administered by TPIO-ABCS OA branch. The OA Internet website address is: http://leav-www.army.mil/oa. The OA products and models are available to view and download.

T-8. OA repository. TPIO-ABCS maintains the Army's OA repository. After an OA is completed and accepted by the OA CCB, it resides in the OA repository. Access to the repository is through a server administered by TPIO-ABCS OA branch. The OA products and models are available to view and download. This is essential to maximize product reuse, thereby creating efficiencies and saving resources. Any agency conducting an OA should review the products in the repository to evaluate the reuse potential.

T-9. Performance measures. The Army must measure performance to determine the degree of how to use its resources effectively and efficiently. The CSA has determined that increased return on investment is a key criterion for performance measurement. To implement this requirement, TPIO-ABCS collects data gathered in each of the OA life cycle phases. The data focuses in two main areas: internal and external. Internally, the OA staff must collect data on the expended man-hours, funds, and resources to implement OA. Externally, data must be collected on how the implementation of OA has provided cost savings and reduced risks. OA performance measures are intended to provide the focus and structure required to support the disciplined approach that OA brings to the requirements determination process.

T-10. Analysis results. Issues and observations are discovered during each of the OA life cycle phases. This data can include issues related to resources, doctrine, training, reports, manpower, or DTLOMS criteria. These findings are tracked, documented, and submitted to the TPIO-ABCS OA. In turn, TPIO-ABCS reviews, evaluates, and catalogs these findings and forwards them to either the CCB or appropriate agency for consideration. Pending the findings, it is possible that this data can also be considered performance measure criteria.

T-11. OA Internet web page. TPIO-ABCS OA branch maintains an OA web page at http://leav-www.army.mil/oa/ that notifies users of the latest AOA information. This includes the AOA Implementation Plan, OA product status, information on the repository, and updates on the AOA program.

Appendix U
Weapon Systems Diagnostics

The Tiered Approach to Procuring Weapon Systems Diagnostics

Tier	System Category	Example	Diagnostics Requirements	Interface	Fielded Systems	New Systems
1	Critical Major Combat Weapon Systems	Tanks, Helicopters, Missiles, Howitzers-Real Time C2 Transmission Capability	Onboard: Automated Onboard Monitoring, Diagnostics Reporting-Linked to C2, Integrated STAMIS; IETM; ETM	Brigade and Below C2 or Other Appropriate C2	Where Justified: Retrofit Automated Onboard Monitoring and Diagnostic Reporting, IETM. ETMs that Connect with Integrated STAMIS.	Design for Reliability and Maintainability Onboard: Automated Onboard Monitoring, Diagnostics Reporting-Linked to C2, Integrated STAMIS; IETM; ETM
2	Critical CS/CSS Equipment	Trucks, Engineer Equipment, Materiel Handling Equipment (MHE), Mobile Electric Power (MEP)-Remote Query	Onboard Alert, Monitoring and Data Storage-Movement Tracking System (MTS), IETM, ETM	MTS, C2 (where required)	Where Justified: Develop IETM. ETMs that connect with Integrated STAMIS.	Design for Reliability and Maintainability Onboard Monitoring and Data Storage
3	Non-Critical	Heaters, Field Service Equipment	Monitors and Stores Operating Data-Query with Handheld Diagnostic Device, ETM	Standard Connector, Infrared (IR), Touch Wand, or Low Power Radio Transmitter, etc.	Where Justified: Develop IETM. ETMs that Connect with Integrated STAMIS	Design for Reliability and Maintainability Onboard Monitoring and Data Storage
4	Equipment Not Requiring Digital Diagnostics	Tents, Shop Equipment, Load Bearing Equipment (LBE)	None	None		Design for Durability or Economical Replacement

Appendix V
Guidance for Developing Reliability Failure Definition and Scoring Criteria (FDSC)

V-1. Purpose. This document provides a general TRADOC philosophy and generic guidelines for use in the development and application of failure definition (FD) and scoring criteria (SC) for reliability applications in U.S. Army systems.

V-2. Implementation. This guidance is effective immediately and supercedes Failure Definition and Scoring Criteria Guidelines dated March 1995.

V-3. Philosophy.

a. The intent of a FD is to do exactly what it says; that is to define what the user sees as degraded and unacceptable performance of a system, which when evidenced by a component or subsystem

malfunction is considered a "failure," irrespective of who or what caused the malfunction. For specific systems, a FD may be taken a step further by defining different types of failures for different levels of degradation. In early system development the FD should be based on the functions of the system. As the system's hardware is developed/determined, the FD may be refined. The CBTDEV is responsible for development of the FD/SC; however, input from the acquisition community may be useful later when refining the FD. Their input should help itemize, for example, how specific components/subsystems affect system operation and how the user's definitions can be used (or refined, if necessary) to better test and evaluate a system's performance.

b. By law (directive and regulation), the FD and reliability and maintainability (R&M) requirements must reflect an operational perspective. The FDSC must clearly identify what is and is not defined as part of the operational system. Operational system descriptions must include all elements of the system, including government-furnished and contractor-furnished hardware (whether developmental or not), system software, operating and support documentation, and the crew and maintainer personnel. FDs must capture all operational reliability failures, regardless of the source or cause of such failures. The SC addressed below must provide the mechanism to properly assign responsibility for cause(s) of failures.

c. Development of the FD should be (as a minimum) a two-step process. The first part of the process is to develop, from a macro sense, generic statements of degraded and unacceptable performance with respect to essential functions. These "definitions" should then be reviewed as the system design becomes known, and refined to include whatever level of detail is necessary for accurate and consistent scoring of the system. When accomplished in this fashion, it may not be possible to have a totally mature failure definition in the early stages of an acquisition program; the FD will mature along with the program.

d. The intent of the SC is to outline a specific, and agreed upon, process for reviewing and scoring all appropriate incidents that are used in evaluation of a system's reliability. The end result of the scoring process is to provide "scored" data points that can be used for analysis of system reliability performance.

e. In summary, the FD and, to a lesser extent, the SC for a system are living documents with the basic FD and SC being developed during the early stages of a system's acquisition program and with refinement/detail added (primarily to the FD) as necessary throughout the phases of the program.

V-4. Responsibility.

a. The CBTDEV is responsible for developing and documenting the failure definition for a system throughout the acquisition process. As a system progresses through its acquisition program and becomes better defined, it is often necessary to refine and/or add detail to the FD. This is primarily the responsibility of the CBTDEV with the MATDEV providing specific information regarding a system's configuration, failure modes and effects of failures. Specific information of this type may be provided in a Failure Mode Effects and Criticality Analysis (FMECA) if one is performed for the system under consideration.

b. The CBTDEV also is responsible for developing and documenting the SC. A system's SC should be coordinated with all agencies with (R&M) interests (e.g., the MATDEV (system developer for automated information systems), the test agency, and the independent evaluators).

c. Compatibility of the FDSC, ORD, RFP, and test and evaluation planning is maintained through coordination among CBTDEVs, materiel/system developers, testers and independent evaluators for their respective documents.

V-5. Structure.

a. The FDSC should be structured in a stand-alone document. It must contain a system description, a FD section, and a SC section. A section providing definitions and additional explanations or information may also be included as necessary.

b. System Description. The FDSC should begin with a brief overview of the system, including what it is and how it's intended to be used. The overview should be followed by a specific operational system description. This description must be operational in nature, and must identify that which is and that which is not part of the system with respect to its R&M requirements.

c. Failure Definition.

(1) The first part of a FD contains a listing of a system's essential functions. The essential functions are generic statements of the system characteristics. They are itemized in the FD to use qualitative and quantitative descriptions to state the amount of degradation acceptable (if any) before the system is considered to have "failed" (note the fine, but distinct, line between definition of an essential function and definition of a failure). The essential functions usually have both a qualitative and quantitative aspect.

(2) The second part of a FD contains explicit definitions of what constitutes failures. These definitions will likely be based on or stated in terms of the system's essential functions. For multi-functional systems the FD should associate the failure definitions for a system to specific failure categories and essential functions in a relationship matrix (this matrix often constitutes a third part of the FD). The primary failure categories that are used are non-essential function failure (NEFF) and essential function failure (EFF). A third category, system abort (SA), should be addressed when applicable.

d. Scoring Criteria . Scoring criteria provide the procedure(s) for classifying test incident reports into proper failure categories and for charging failures to appropriate causes. The scoring process structure shall follow a multiple choice format, unless there is an overriding reason to deviate based on peculiarities of the specific system. The multiple choice section should be concise, using only short descriptive terms without explanations. Special instructions for data collection, definitions for specific terms, and explanations of SC terminology, various constraints, and/or additional information should follow as separate sections of the SC. The SC may be supplemented with a pictorial diagram to further clarify the process.

V-6. Conclusion. A key to successful FDSCs, especially for complex systems, is the use of reasonable flexibility and creativity to address peculiar needs of a system. Application of this policy guidance will

require a thorough understanding of the principles and of the definitions of the failure categories outlined above. Implementing information is provided in the instructions that follow.

V-7. Preface to Instruction Set. The remaining paragraphs of this appendix are an "Instruction Set" for developing an FDSC. These instructions address in detail the elements and processes involved in developing an FDSC. Layout is similar to many textbooks, using examples inserted within the narrative to enhance understanding. Examples are just that – examples. There are few changes from the last published FDSC guidance, dated March 1995. Those guidelines were printed with a bright yellow cover, hence frequently referred as the "FDSC Yellow Book." This appendix is an updated, in-total incorporation of the "FDSC Yellow Book." Changes made since 1995 are mainly descriptive in nature. Several topics have been expanded to enhance understanding of concepts. The best example is the newly expanded discussion of routine operating procedures (ROPs). Titles of the three event categories have also been changed to be more self-descriptive. Figure V-1 is a table of contents for the "Instruction Set."

Instruction Set

TABLE OF CONTENTS

V-8. Introduction to Instruction Set

V-9. FDSC Content

a. System Description

b. Failure Definition
(1) Essential Functions
(2) Specific Reliability Failure Definition(s)
(3) Failure Categories
(4) Relationship Matrix
(5) Parallel Terminology
(6) Non-Reliability Failures (Often Applicable to Maintainability)
(7) Other Events and Failures (Not Applicable to R or M)

c. Scoring Criteria
(1) Structure
(2) Instructions
(3) Classification
(4) Chargeability
(5) Instructions for Test Data Collectors
(6) BIT/BITE
(7)Definitions and Explanations

d. Summary

e. Conclusion

Relationship Matrix Example

Event Classification Comparison Table

Scoring Criteria: Multiple Choice Format Example

Figure V-1. Instruction Set Table of Contents

V-8. Introduction to Instruction Set.

a. An FDSC for a system has two primary functions: the first is to describe what is considered the proper (or possibly improper) operation of a system; the second is to outline a process for classifying (or

scoring) test events. The level of detail contained in an FDSC is also dependent upon two conditions: one, it is a derivative of the complexity of the specific system under consideration; and two, it is dependent upon the acquisition phase of the system (i.e., additional definition/detail may be required later in system development). The ultimate goal in developing FDSC is to provide the tester(s) and the evaluator(s) a tool adequate enough to eliminate the need for most, if not all, formal scoring conferences.

b. FDSC should be considered "living" documents. When events occur that are not clearly covered by the FD or the SC, the individual(s) classifying the events should make informed judgments based on knowledge of the system and other pertinent evidence presented as to how to proceed and/or score the event. When limitations of either the FD or the SC are discovered, the document should be revised to reduce or eliminate the limitations. Additionally, as the system design becomes known, the definitions should be updated and/or expanded to whatever level of detail is necessary for accurate and consistent scoring of the system.

c. In general, the Combat Development Engineering (CDE) Division, with input from the CBTDEV proponent, has the primary responsibility for developing the FD and the SC. Certain categories/types of systems will deviate from this generalization (e.g., the functional proponent may be involved, in conjunction with CDE, in developing the FD for automated information systems).

d. Usually, little or no input from other players is needed for the initial FD or the SC. Input from the materiel/system developer may be required, especially for complex systems, as the system matures and the FD is refined. At all stages of FD and SC development, all interested agencies (e.g., materiel/system developer, tester, evaluator) should be apprised of the content of both the FD and the SC to ensure common understanding for test and evaluation purposes.

V-9. FDSC Content. The FDSC should be structured as a stand alone document (in some cases it may be possible, even advantageous, to structure both the FD and the SC as individual stand alone documents). As a minimum, a complete FDSC should contain three parts — system description, FD, and SC. These sections may be supplemented with other supporting information if needed to further structure/clarify the process.

a. System Description. The content and level of detail included in this section is entirely dependent upon the system under consideration. It should, however, identify what is included as part of the system from an operational reliability evaluation perspective. This must be consistent with the system definition used to derive the operational reliability requirements.

b. Failure Definition**.** This part has two sub-parts: 1) a list of the system's essential functions, and 2) formal definitions of what constitutes a failure. Description of each sub-part is provided below.

(1) Essential Functions. The essential functions are generic statements that provide a fundamental description of the primary or basic operations which a system must be capable of performing. NOTE: There is a distinct line between definition of an essential function and definition of a failure.

The following example illustrates the generic nature of essential functions.

EXAMPLE. The XYZ system must provide the following essential functions at the levels specified in the ORD. The system must be capable of performing these functions in all scenarios/mission profiles depicted in the OMS/MP.

1. Create. The action of electronically preparing information such as a report or overlay.

2. Receive. The capability to electronically acquire or obtain information.

3. Save. The capability to electronically store information for retrieval at a future time.

4. Display. The capability of visually depicting information on the workstation screen/monitor.

5. Transmit. The capability to electronically dispatch information from one source to another.

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(2) Formal Failure Definition(s).

(a) For the purposes of this instruction set, a failure is defined as an event or inoperable state in which an item or part of an item does not, or would not, perform as specified (Reference MIL-STD 721C, Definitions of Terms for Reliability and Maintainability). Thus, the purpose of the FD is to ultimately describe, from a user's perspective, degraded and unacceptable performance which, when evidenced by component or subsystem malfunction, is considered a failure, irrespective of who or what caused the malfunction. Primary failure categories are non-essential function failure (NEFF), essential function failure (EFF), and system abort (SA). These categories are described in more detail in the next section.

(b) The development of the FD should be, as a minimum, a two part process -- an initial product and one or more refinements. The first part of the process is to develop, from a macro sense, generic statements of degraded and unacceptable performance. The second part is to review and refine these statements (as the system design matures) to the level of detail necessary for accurate and consistent scoring of the system. Note that in the early stages of a system's acquisition program, it may not be possible to have a totally comprehensive failure definition.

(c) The initial FD is where general statements of what constitutes a failure are listed. Reference the following examples:

EXAMPLE. For the XYZ system, a failure is defined as the inability to perform any one (or more) of the essential functions.

EXAMPLE. For the XM-81 grenade, a failure is defined as any malfunction of the grenade which prevents a proper launch from the launcher tube, and/or prevents the grenade from exploding and dispersing the screening medium.

(**NOTE**: In some instances, especially for single shot devices, the essential function(s) and the FD(s) can be formulated in a single section. In these situations, there will only be a single part to the FD, as the previous example infers.)

EXAMPLE. For the GHI System, any test event that is a malfunction of the system in any way will be scored as a failure. Scoring an event as a failure does not attempt to discriminate or assess the cause of the failure; that is a procedure that is addressed later in the scoring process. Events scored as failures will be further evaluated to determine the severity and/or effect of the failure. This determination of severity/effect will be made using the essential function definitions.

(d) Refinement of the FD occurs after more details are known about the actual configuration and design of the system. The extent of refinements that may be required can cover a very wide range. For example, minor refinements to correct misinformation received or gross assumptions made during initial development of the FD may suffice for some systems. At the other extreme, though, it may be desired and very beneficial to add copious detail to the FD.

(3) Failure Categories.

(a) The failure categories described below reflect the latest efforts to overcome limitations of FD and SC approaches used before 1995. These earlier approaches centered around a single failure category that focused on very significant/complete malfunction, which seriously impacted the user's ability to perform the mission. No provision was made to recognize that many systems continued in use even though some function(s) (perhaps even some combat utility) had been lost. Moreover, earlier versions provided no name for other (degrading types of) failures. By default, these were scored and referred to using the name of the associated maintenance action. This practice has led to confusion over the years for both reliability professionals and decision makers since a "failure" cannot possibly be a "maintenance action." This instruction set makes clear distinction between the two by providing a failure category (and a resulting maintenance demand category) for each test event (further discussion of maintenance categories can be found in the section entitled Scoring Criteria, Instructions for Test Data Collection).

(b) Failure definitions should be expressed in terms of two primary failure categories: non-essential function failure (NEFF) and essential function failure (EFF). When applicable, a third category, system abort (SA), may also be defined. The SA category is considered a subset of EFF. These categories stem from a reliability engineering perspective that focuses on system functions rather than missions. Reliability engineers should not make judgments as to whether a malfunctioning system will continue in use within a mission. Such decisions are made only by commanders in the field and will vary depending on the situation at that moment in time. From a reliability engineering perspective, the goal is to minimize failures and malfunctions that impact a system's essential functions. In so doing,

soldiers and commanders will be able to accomplish their missions with minimum disruption caused by degraded capability or complete loss of system function.

(c) An EFF is generally described as a failure or malfunction causing degradation below an established level or causing complete loss of an essential function(s). (Special considerations for redundancy are considered later under Scoring Criteria, Definitions and Explanations.) All EFFs are serious failures because they impact an essential function. If loss or degradation of the function(s) results in immediately removing the system from Service, the failure is not only an EFF, but also an SA. A SA generally precludes ability to enter into use or to continue in use. For some systems, all EFFs will also be SAs. In these, the FD should so designate, and only NEFF and EFF or SA categories would be used. See example below.

EXAMPLE. (Cases in which all EFFs are also SAs.)

Most single-shot devices fall in this group (i.e. munitions, personnel parachutes, aerial delivery systems). Some continuously operating systems may fit in this group if for every EFF, use would be aborted. In other words, users would not elect to use them in a degraded state.

(d) Many systems will, however, need all three failure categories to adequately segregate test events. In many systems, a user would elect to continue using a system after experiencing an EFF. These would obviously not be SAs. The most predominant reason for continuing use is that the system continues to add value to the user, even though its operation is degraded. Normally, the user will continue to use the system in its degraded state until reaching the end of the current usage period. Because of the seriousness of impact, the user will certainly want to correct the malfunction prior to beginning another usage period. However, time not permitting, the user may move into the next usage period with the degraded system and, hopefully, accomplish the corrective action at the end of the second period. An example of such is shown below.

EXAMPLE. (Cases in which not all EFFs are SAs.)

Multi-functional systems whose remaining essential functions continue to add value even though one or more functions have been lost or degraded. A major weapons platform such as a tank is a good example. Tanks do not fight as single, independent systems. Instead, they engage as a system of systems (e.g., a platoon comprised of four tanks). If one tank loses its coaxial machine gun, that tank has suffered an EFF, but not a SA (per tank's FD). If fighting alone, the failure definition could assign this to be a SA since the crew is now vulnerable to close-in infantry threat. However, because the four tanks fight together, the other three can provide some coverage. The platoon views the degraded tank as having a residual combat utility worth keeping for the value it can add to the whole.

(**NOTE**: An important distinction is made here between system and mission abort. The unit (platoon) performs missions. Removal of one system from the unit aborts that system, but not the unit's mission. Thus, the focus of reliability engineering vernacular should be system, not mission. FDSC guidance published before 1995 failed to make this significant distinction. Additionally, while

reliability requirements and the associated FDSC will be at the system level, they will reflect full consideration of the mission and consequences of system failures on the mission.)

> Single-function systems that may have fallen below their designed productivity, but still are able to yield significant output. Many combat support and combat Service support systems fall in this group. Those which operate as continuous production facilities are particularly good examples. These include systems that issue, store and transfer petroleum products, purify water, process field laundry, etc. These systems operate around-the-clock providing products at specified performance rates (e.g., gallons per hour, pounds per hour). Their FDs specify failure to meet these specified production rates as EFFs. However, if a petroleum dispensing system experiences an EFF which lowers, but does not stop, its delivery rate, operators would certainly not abandon use of the system until it is fixed. Instead, they would continue dispensing at the degraded rate until corrective actions could be accomplished. SA for these systems is typically defined in their FD as complete stoppage or some extreme level of degradation beyond which operation would not be worthwhile. To the users of these systems, "something is better than nothing."

(e) Though not equal, an analogous way of viewing the three failure categories is by comparing them to readiness categories from AR 700-138. The user may require a certain level of performance to fully accomplish all aspects of a system's essential functions. Events causing system performance to fall below these levels causes an EFF and essentially brings the system from a "fully mission capable" system to a "mission capable" system. A "mission capable" system may accomplish some, but not all, applications. The user may accept further degradation in performance before actually removing the system from use. Falling below this level of performance causes a SA and essentially brings the system from "mission capable" to "not mission capable."

(Note: Care should be taken not to be caught up in the mire of system versus mission as mentioned earlier. Remember, the paragraph above is an analogy, not an equating.)

(4) Relationship Matrix.

(a) As stated before, the initial FDs (for most systems) are generic statements of degraded and unacceptable performance. The process of developing these definitions and of assuring they are both valid and are actually "what is wanted" is enhanced with the use of a relationship matrix. The matrix is initially set up as a table (or spreadsheet) with row and column headings. One set of headings should itemize the expected essential functions, while the second heading set provides a listing of known/envisioned system hardware/subsystems. The body of the matrix (individual row/column intersections or cells) are marked, as appropriate, to show the relationship between the hardware/subsystems and the respective essential functions. Additional information/notes are usually required (over and above the relationship notations) to describe the conditions necessary for an event to be considered either an EFF or a SA. Reference to these notes is made within the body of the matrix. The individual notes are usually included at the end or bottom of the matrix and are an integral part of the relationship notations. As inferred here, the matrix should be developed concurrently with the initial FDs. A sample initial matrix is provided in figure V-8 at the end of this appendix.

(b) As the system design becomes known, the definitions should be revised and/or expanded to whatever level of detail is necessary or is possible with the information available. The relationship matrix or a matrix supplement is the prime place to incorporate the additional, detailed information. Development and incorporation of updated information is usually not a quick or simple task. It can be made much easier if a Failure Mode Effects and Criticality Analysis (FMECA) is one of the deliverables in a system's acquisition. If a FMECA is not available, the task becomes somewhat more difficult. It requires both the reliability engineer and the user to become very knowledgeable about a system's configuration, operations, failure mechanisms, and failure modes. With this knowledge in hand, the engineer, working with the user, outlines (to the maximum extent possible) the known and/or envisioned failure modes, relates them to a specific function (or sub-function, if possible), and identifies the failure mode as causing a specific type of failure (i.e., NEFF, EFF, or SA).

(**NOTE**: From a realistic standpoint, failure events present themselves in one of two ways. Either a hardware item is noted to be "failed" or it is noted that a function/operation is not proper or is lost. With this in mind, supplementation of the matrix/FDs will often require a listing of subsystems and/or components in an appropriate format (e.g., an item listing or a block diagram) along with the textual listing of a system's failure modes. Both of these lists must then be cross-referenced to each other. With a complete package of this sort, one can readily determine the effect (score) of an event, whether that event manifests itself as a hardware failure or as a loss of function.

At first glance the relationship matrix may appear to be more "red tape." However, if applied with purposeful intent and used to its full benefit, the matrix both assists the user in developing accurate FDs and provides other involved parties insight into both the definitions and the rationale behind the definitions.

(5) Parallel Terminology.

(a) The failure categories described in these guidelines have been developed to focus reliability analysis and evaluation efforts on system function. Part of the rationale for using this approach is that the failure category terms (NEFF, EFF, SA) are comparable to and defined similarly to terms and categories in other military guidance. The Event Classification Comparison table in figure V-9 summarizes terminology and definitions from this document and from MIL-STD 1629A, MIL-STD 882C, DOD-STD 2167A, and a Ballistic Research Labs Technical Report, BRL-TR-3010. Note the similarity in category definitions between the various applications.

(b) In particular, two columns from that table should be noted: the terms and definitions from this document, and the terms and definitions from MIL-STD 1629A (FMECA). Figure V-2 depicts how a direct application of the MIL-STD 1629A (FMECA) categories could be made during the failure definition process (provided that the FMECA is developed in consonance with a system's essential functions). For most systems, though, the FMECA will be an item/deliverable that is contracted for during system (or prototype) acquisition. In this case, FMECA information would be used to develop a relationship matrix supplement (this application was addressed in the above discussion on the Relationship Matrix). If using FMECA terms, do not reference MIL-STD 1629A directly.

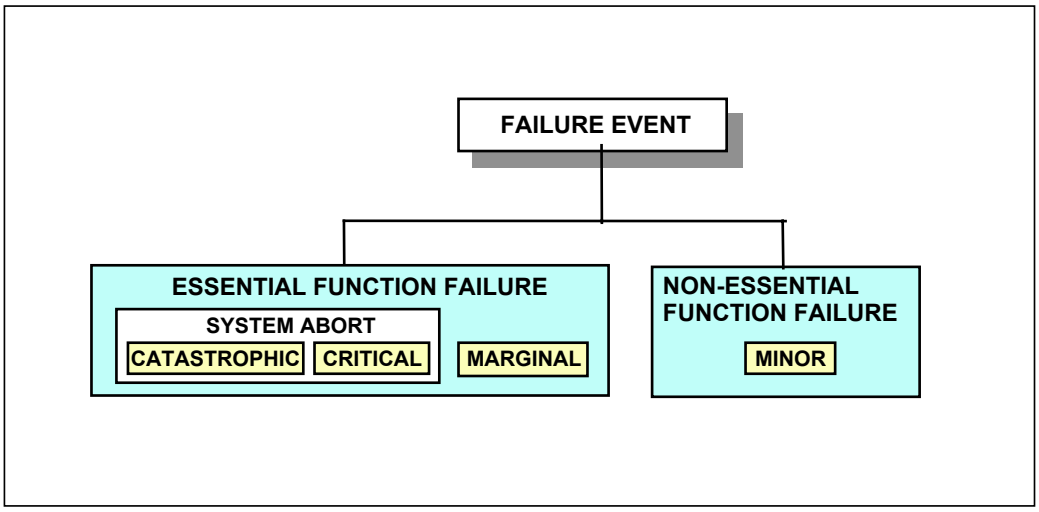


Figure V-2. Parallelism of failure categories

(c) A similar diagram showing parallels between safety and FDSC failure categories can easily be visualized. Existence of safety design hazards should never be categorized as reliability failures. Such are design shortcomings and should be addressed through other forums. Safety hazards created as a direct result of system malfunction or degradation are legitimate reliability failures and should be categorized accordingly.

(6) Non-Reliability Failures Usually Applicable to Maintainability.

(a) This category addresses a variety of possibilities for sub-categorizing events which are not reliability failures. The list includes:

- Preventive maintenance, checks and Services (PMCS)
- Routine operating procedures (ROPs)
- Scheduled maintenance

These are defined later in the Scoring Criteria section under "Definitions and Explanations." Most have been used by the Army R&M community in FDSC for many years. Note the three above, PMCS, ROP, and scheduled maintenance may include maintenance times (clock-hours or maintenance man-hours) that would be used in making maintainability calculations.

(b) Routine Operating Procedures (ROP).

- Routine operating procedures (ROP) warrant additional discussion. These include operating procedures routinely performed by the operator & prescribed in the user manual. Typically, they are tasks the operator or crew may quickly perform and are not charged as reliability failures. (**Note**: These do not include maintainer tasks that may be addressed in some user manuals.) This is not a catch-all category that accounts for any crew/operator correction within a specified time limit. The intent is to not penalize a system for needing a minor, quick remedy, using only on-board spare or repair parts, that is considered a normal, routine operating procedure operators are expected to

perform. (**Note**: Time expended by a crew performing ROPs is not used in maintenance ratio calculations.)

- An ROP should be based on how quickly and easily the crew or operator can do the task without adverse impact on mission accomplishment, crew safety, etc. An example may be re-booting a computer. If frequency of occurrence is an issue, the manuals may address unacceptable recurrence. A constraint for the example could be that the operator may not re-boot the computer more than x times during a y-hour period. If the constraint is exceeded, the events will be recorded on their own merits as failures with associated maintenance demands. An alternate approach is to establish a system requirement in the ORD for frequency with which a specific ROP will be acceptable (e.g., not more than three times during the eight-hour mission). Each FDSC must specifically and uniquely address this issue as it pertains to the system at hand.

- Development and inclusion of a ROP listing within the FDSC is recommended. Such lists have proven invaluable, because manuals tend to lag behind hardware and software development. ROPs are rarely identified in an adequate fashion in early versions of system operator manuals. A successfully demonstrated solution has been to develop an initial listing of a typical ROP for the type of system being addressed. Current manuals for and knowledge of existing similar systems is a good starting point. This list is updated just as is the relationship matrix discussed earlier. Early testing and subsequent event scoring will uncover potential additions needed to the ROP listing. Scoring IPT members, in many cases, can easily determine if a procedure is a bonafide candidate and should be added to the list. Those cases that are unclear can be tabled by the IPT and explored by the CD representative prior to updating the ROP list. FDSC updates have been initiated solely for expanding and clarifying legitimate ROP. This dynamic ROP listing becomes a valuable resource for the MATDEV in maturing the system's operator's manual.

(7) Other Events or Failures Not Applicable to R or M.

(a) Categories which fall under this heading have previously been found under a heading entitled "No Test." This old heading was frequently confusing to persons less experienced in the reliability scoring process. The new title, "Other Events or Failures Not Applicable to R or M" is intended to be more descriptive of categories included in this group of events often recorded in test incident reports (TIR). The list includes:

- Pre-test Checkout
- System (Hardware or Software) Modification
- Test Peculiar Events
- Test-directed Abuse
- Non-R&M Oriented Events
- Unrelated Damage
- Performance Limitations

These are defined later in the Scoring Criteria section under "Definitions and Explanations." (para V-9c(7)). Most have been used by the Army R&M community in FDSC for many years. Events falling in these categories are not applicable to R&M and will not be used in calculation of system R&M characteristics.

(b) Performance Limitations**.** Performance limitations are another phenomena frequently reported on TIRs that are not associated with reliability. These events report the inability of a system to meet specified performance limits although no malfunction/failure has occurred. Performance limitations are often misleading in the way they are worded. Some testers refer to them as "failures." However, they are not reliability failures. Reports of system performance limitations are not applicable to R&M and are not to be used in the calculation of system R&M characteristics. Consider the following example:

EXAMPLE. (A vehicle is required to travel over flat terrain at a speed of 45 miles per hour (MPH). Throughout testing, the vehicle has never shown the ability to travel above 35 MPH. However, it has dependably operated at 35 MPH each time it was tested. The tester reports this as a failure on the TIR. Is this a reliability failure? No, it is a performance limitation failure. Based on the test results, the vehicle is a very reliable, 35 MPH vehicle.

The opposite answer is demonstrated by the following similar, but distinctly different example:

EXAMPLE. (A vehicle is required to travel over flat terrain at a speed of 45 miles per hour (MPH). Early in testing the vehicle repeatedly demonstrated it could travel at 45 MPH and higher. However, as the test progressed, the maximum speed began to deteriorate. Eventually, top sustained speed was only 35 MPH; yet, no apparent malfunction had been detected. The FDSC defines deteriorated speed as becoming an EFF of the "move" essential function at 35 MPH and below. The tester reports this as a failure on the TIR. Is this a reliability failure? Yes. (Note the importance of addressing such deterioration in the FDSC.)

---

c. Scoring Criteria. The scoring criteria should outline a specific process for classifying test events into proper categories and for charging failures to appropriate causes. The end product of the scoring process is uniformly sorted data that can be used for analysis of system performance.

(1) Structure.

(a) The structure of the SC should be a multiple choice format, unless there is an overriding reason to deviate. The SC should address event chargeability, event classification, and should include instructions for test data collection.

(b) The format is straight-forward and uncluttered. This approach is widely used throughout the commercial sector for such purposes as survey questionnaires, market research, and other forms of information gathering and sorting. A particular strength is that it does not depend on knowledge of analytical or decision-tree logic (a convoluted approach used to handle chargeability in older FDSC

documents). These guidelines and instructions extend this questionnaire-type approach to the classification process as well. A basic example follows in the section entitled "Classification."

(2) **Instructions.**

(a) The approach is simple -- read the statement, then assign the event to the appropriate category (or categories) listed beneath the statement. An example is shown below in the section entitled Classification. To simplify and avoid clutter in the outline, the SC should be written as straightforward as possible, with definitions and explanations following in a separate section. Multiple choice statements must specify the number of selections to be made in each category (e.g., "one" versus "all that apply"). The multiple choice section, normally one to two pages, replaces the stepped-out scoring procedures and flowchart from FDSC guidance before 1995. The multiple choice section should become the primary tool used by persons scoring test events. The explanations section should be a lesser-used reference, primarily used by those not as familiar with the terminology.

(b) Figure V-3 illustrates the scoring process. Events reported in TIRs should be classified as Reliability Failures, Non-Reliability Failures (applicable to maintainability), or Other Events or Failures not applicable to R or M. This last grouping are those that should not be used in R&M evaluations. Event categories for this third group are shown in Figure V-3; these categories should be familiar from previous guidance where they were usually included under the old heading of "No Test." Non-Reliability Failure events are PMCS, ROPs performed by the crew and specified in the operator's manual and/or FDSC, and scheduled maintenance. The two main failure event categories are Non-Essential Function Failure (NEFF) and Essential Function Failure (EFF). A subset of EFF is System Abort (SA). A third failure event category is Dependent Failure. These are events caused by other simultaneous or previously occurring reliability failures.

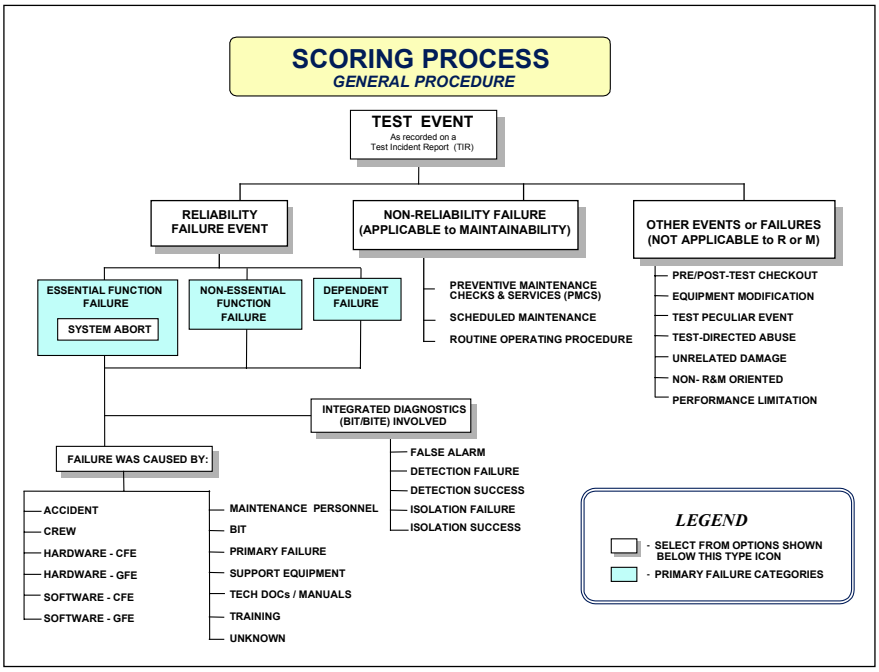


Figure V-3. Scoring Process Diagram

(3) **Classification**. Classification of an event should be made based upon the event's impact on system operational performance. Primary classification categories are NEFF, EFF, SA, Dependent Failure, Non-Reliability Failure (applicable to maintainability), and Other Events or Failures (not applicable to R or M). These have been discussed earlier.

EXAMPLE

Scoring Procedure

1. Select appropriate category below and proceed as directed:
   a. Event is "Other Event or Failure (not applicable to R or M." Proceed to #2.
   b. Event is "Non-Reliability Failure (applicable to maintainability)." Proceed to #3.
   c. Event is "Reliability Failure." Proceed to #4.

2. Assign event to appropriate category, then proceed to next event:
   a. Pre-test Checkout.
   b. System (Hardware or Software) Modification.
   c. Test Peculiar.
   d. Test-directed Abuse.
   e. Non-R&M Oriented.
   f. Unrelated Damage.
   g. Performance Limitation

3. Identify the event as one of the following and proceed to next event:
   a. Preventive maintenance, checks and Services (PMCS).
   b. Scheduled maintenance.
   c. Routine operating procedures (ROP) performed by operator and prescribed in user manual or list of ROP in FDSC.

4. Assign event to one or more of the following failure categories:
   a. EFF
   b. SA
   c. Non-EFF
   d. Dependent Failure

---

(4) Chargeability. Event chargeability consists of assigning the cause of an event to one of several sources. The ability to assign chargeability is highly dependent on good data collection and knowledge of the system's design. Causes shown in the example below are typical (but not all inclusive) to most SCs.

EXAMPLE, continued

5. Identify the cause of the event from the following list:
   a. Hardware (GFE or CFE).
   b. Software (GFE or CFE).
   c. Crew/Operator.
   d. Technical Documentation/Manuals.
   e. Accident.
   f. Maintenance Personnel.
   g. Training.
   h. Support Equipment.
   i. Unknown.
   j. Primary Failure
   k. BIT/BITE

Hardware. This category includes not only malperforming hardware but also personnel-related incidents that are attributable to the hardware's design. For example, if the device has an exposed ON/OFF switch that is easily tripped inadvertently, the unintended power disruption may be charged to hardware, and not to crew.

Software. This category includes all incidents attributable to the software of the system under test. Personnel-related incidents that are rooted in the software's design should again be charged to software and not to crew. Care should be taken to distinguish between genuine software reliability problems and simply improperly designed software incapable at any time of executing a given task. Consideration is also needed in distinguishing between software that is part of the system under test and "peripheral" software, that which is not actually part of the system under test.

Crew/Operator. The "Crew/Operator" category includes all events attributable to crew/ operator error that were not rooted in hardware/software design problems, inadequate training or poorly written manuals.

Technical documents / Manuals. This category includes all events that are attributable to misleading, incorrect, or nonexistent-but-needed information in the technical documents/manuals. These technical documents/manuals may appear in many forms, including but not limited to, paper, plastic, metal, loose-leaf books, equipment data tags, or stored electronically on some media (e.g., tape, diskette) or embedded in the system itself. Poorly written technical documents/manuals may cause crew or maintenance personnel errors; in such cases, technical documents/manuals should be charged.

Maintenance Personnel. This category includes all incidents attributable to maintenance personnel errors that were not rooted in hardware/software design problems or poorly written manuals.

Training. This includes any event that can be directly attributed to inadequacies in training due to omitted or incorrect training procedures, or inappropriate training material such as information above the general level of understanding of the target audience. For an event to be charged to training, the instructional information needed must have been included in the manuals.

Support Equipment. These are incidents caused by special tools, common tools, TMDE, associated software, and occasionally the power sources.

Accident. This category includes only those accidents that are not caused by the design of the system. That is, accidents that are due to inadequate training, inadequate warning in the manuals, and careless operation would not be charged to the "Accident" category; they would be charged to the appropriate root cause of the accident.

Primary Failure. Chargeability category for failure events caused by an earlier or concurrent primary failure. This category applies to those events scored as dependent failures.

BIT/BITE/Prognostics. Category for failure events attributable to built-in-test, built-in-test-equipment, or prognostics.

Figure V-4. Typical chargeability categories

Once an event has been classified as a failure, chargeability must be assigned. Actual maintenance need not be performed to assign chargeability. Assigning chargeability is a key step in beginning the corrective action determination process. Figure V-4 briefly describes typical categories for assigning chargeability. Other categories can be added or used in lieu of these categories. A category may be further broken down, if required, depending upon the system. For example, "hardware" may be further broken down into contractor-furnished equipment (CFE) or government-furnished equipment (GFE).

(5) **Instructions For Test Data Collection**

(a) Accurate collection of data and information is critical to successful evaluation of a system's R&M performance. Some of this information and data is used by scoring personnel to make final determinations regarding categorization of reliability failures. Instructions for test data collection should appear as part of the SC. These instructions should itemize recording of "typical" information, e.g., maintenance and supply requirements (these are addressed more in the next paragraph), time to repair (in both clock-hours and man-hours), etc. These instructions may also itemize recording of other specific information, e.g., keywords, black box or subsystem designations, etc.

(b) Maintenance and supply demand categories, defined later in the Definitions and Explanations section, are determined based on the failure category assigned or by definition. Formal scoring of a maintenance and/or supply demand is not required (the demand is an outcome of the associated failure event, not an event that requires scoring consideration). Maintenance and/or supply demands should be recorded by test data collectors as part of their routine efforts. These categories should be clearly defined in the SC for the data collectors to ensure they are properly recorded.

(c) A typical list of data and information that should be collected is at figure V-5:

· Maintenance level	· CCMD
· Maintenance man-hours	· SMD
· Maintenance clock-hours	· NUMD
· MOS	· EUMD
· Spare parts or LRUs used	· ELD
· Repair parts used	· NELD
· POL quantity used	

Figure V-5. List of typical data collected

(6) BIT/BITE

(a) Where applicable, the SC may include a statement regarding Built-In-Test (BIT), Built-In Test Equipment (BITE) or Prognostics Scoring. At the time of initial development of the FDSC the presence of BIT, BITE or prognostics may be unknown. Addition of such a statement may be done as part of the maturing process of the FDSC. An example statement to address these areas is shown below:

EXAMPLE

If applicable, assign to appropriate BIT/BITE category below:

a. False Alarm.
b. Detection Failure.
c. Detection Success.
d. Isolation Failure.
e. Isolation Success.

(b) A false alarm is any indication of a non-existent failure. A detection failure occurs when BIT/BITE/Prognostics fail to detect an actual event (true alarm). The opposite is a detection success. An isolation failure occurs when BIT/BITE does not isolate a failure to the faulty subsystem, component or LRU in accordance with the approved maintenance concept. Its opposite is an isolation success.

(7) Definitions and Explanations

(a) Explanations previously found embedded throughout the stepped-out scoring narrative now belong in a section with this title. Definitions should be as straightforward as possible. Explanations relative to the system under consideration would be appropriate here. This section, in concept, is reminiscent of a glossary in which significant terms are defined for the benefit of those less familiar with FDSC terminology. Terms may be arranged alphabetically or categorically. Initially, this section will likely be the most lengthy part of the FDSC. For complex weapon systems, the FD may eventually become more lengthy as its relationship matrix matures.

(b) Figure V-6, at the end of this appendix, contains terms with definitions or explanations that are possible candidates for this section.

(c) FMECA severity categories provide a qualitative measure of potential consequences resulting from an event. These categories, along with information obtained from technical documentation for the system, information from the tester, etc., should be considered in the development of a system's FD and, if desired, can be integrated into the scoring of a reliability-related event. In either case, an event resulting in a critical or catastrophic hazard would be considered a system abort; an event resulting in a marginal hazard would be considered an EFF; an event resulting in a minor hazard would be considered an NEFF. Severity classifications are defined in MIL STD 1629A. If using FMECA terms, do not reference MIL-STD 1629A directly since MIL STDs can no longer be used in contracts and systems test and evaluation.

(d) Special Considerations for Redundancy. Definitions and explanations will need to be tailored to accommodate systems where redundancy is present. No standard definition is suitable to address all possible situations. While in most cases EFFs generate EUMDs and NEFFs generate NUMDs, redundancy may cause exceptions. Consider the following cases in Figure V-7 that address redundancy of essential functions.

Case 1 -- Full Redundancy With Invisible Switching. If redundancy of an essential function is built in (not visible to crew), Essential Function Failure occurs only when all redundant layers have failed and function is lost. Such an event would be scored as an EFF and would generate an EUMD.

Case 2 -- Full Redundancy With Visible Switching. When the system is designed to alert the crew when an internal layer of redundancy is lost, or when routine operating procedures call for crew to actuate the redundancy, such failure event would be scored as an NEFF but would generate an EUMD. Here the function is not lost; therefore dictating the NEFF failure category. However, criticality of the essential function would necessitate essential restoration of the redundancy; thus, generating an EUMD.

Case 3 -- Partial Redundancy. When system design provides two similar but not equal means of accomplishing the same essential function, failure of one or the other may be categorized as an EFF. The user would not abort use of the system since the remaining capability provides at least partial performance of the essential function. A tank's primary versus thermal sights would be an example since they both perform the "see" function. Such EFF events would generate an EUMD since both capabilities are uniquely important, though overlapping. (**NOTE:** Operational "workarounds" are not redundancies in a reliability engineering sense.)

Figure V-7. Redundancy considerations

d. Summary**.** In general, a FDSC document should be structured as follows:

- System Description

- Failure Definition
  - Essential Functions
  - Failure Definition
  - Relationship Matrix
  - List of Typical ROPs

- Scoring Criteria
  - Procedure
  - Instructions for Data Collection
  - Definitions and Explanations

Any other pertinent information that may be needed (or added as system acquisition progresses) should, in general, be included as appendices to the basic document.

e. Conclusion.

(1) The 3 R's of the DOD seem to be Reduced resources, Reorganize, and Re-engineer. For the R&M community to stay up-to-date with these 3 R's, it must constantly search for ways to do business smarter. When introduced in March 1995, this FDSC approach ushered in a fresh approach to the way business was done. Positive response throughout and beyond the Army have been overwhelming. Its users have extended to other Services and allied countries. All feel it is a relatively simple, common-

sense approach. However, development of an end product that is simple and direct in application is often not an easy task. Rather, it is often a circuitous, perhaps even a rough route that must be taken to provide a satisfactory result.

(2) Figures V-8, V-9 and V-10, at the end of this appendix, are examples provided as tools to guide reliability FDSC preparation and aid in understanding.

Other Events or Failures (not applicable to R or M). This category is used to group those events that shall not be included in the overall R&M evaluations of the system. These events may include pre-test inspections, system modifications, test-peculiar events, test-directed abuse, unrelated damage, performance limitation and other non-R&M related events. Other non-R&M related events include suggested improvements, inadequate test procedures, reports on unacceptable replacement parts (provided they are discovered prior to or during installation), test schedule delays, etc. This includes post test events; events that occurred after completion of the test. This does not include events that occurred during test whose resulting maintenance demands were not performed during test; these will be scored on their own merits with associated maintenance times estimated based on previous or similar maintenance actions.

Pre-test/Post-test Checkout. Events observed during burn-in, pre-test inspection, or other pre-test activities. The test plan must specify the number of hours for the pretest burn-in to permit a determination of when the pre-test period has ended. All events detected after the pre-test period will be scored on their own merits. Most post-test events will be scored on their own merits. Only those post-test checkout events not pertaining to system R&M would be classified in this category.

Equipment (System) Modification (hardware or software). This includes all maintenance actions involved in the installation of hardware kits, software modifications, or incorporation of redesigned components or software upgrades. If the replaced component was not functioning at the time of its replacement with the modification, the event will be scored on its own merit. The maintenance time will be estimated based on the time to restore the system to its original condition. Subsequent malfunctions of the modification will be scored on their own merit.

Test Peculiar. Malfunctions caused by equipment that is not part of the system being tested or people not acting as test players (crew or maintenance personnel). Engineering evaluations to analyze the cause of the malfunctions, as well as any malfunctions and/or maintenance efforts caused by the engineering evaluation are scored as "NO TEST". This also includes maintenance evaluations conducted as a part of the test plan and malfunctions to or caused by test peculiar instrumentation. Events related to test peculiar diagnostic equipment used in lieu of the diagnostic equipment which will be fielded are scored on their own merits.

Test-directed Abuse. Events in which the tester directs the deliberate abuse of the system (e.g., a test to over-stress the performance limit of the system), whether called for by the test plan or not.

Unrelated Damage. This includes damage caused by natural phenomena (e.g., lightning, earthquakes) or other influences beyond control of the operational elements of the system.

Non-R&M Oriented. This includes those events for which a Test Incident Report (TIR) might be initiated by the test activity, but which are not events used in R&M computations. Examples include suggested improvements, reports on inadequate test procedure, unusable or unacceptable replacement parts discovered prior to or during installation, test schedule delays, and suggested human factors improvements. Recommended changes to the system support package not related to a specific test event are also covered.

Non-Reliability Failure. Category for events which are not reliability failures, but may have implications on system maintainability.

Preventive Maintenance, Checks and Services (PMCS). Actions of a preventive nature which are listed in, and performed in accordance with, applicable technical documentation/manuals.

Scheduled Maintenance. Actions performed on a scheduled basis as prescribed in applicable technical documentation/manuals.

Routine Operating Procedures (ROPs). Routine operating procedures performed by the operator and prescribed in the user manual (or on List of Typical ROP in the FDSC). Tasks the operator or crew may quickly perform that are not charged as reliability failures. (**Note**: These do not include maintainer tasks that may be addressed in some user manuals.) This is not a "catch all" category that accounts for any crew/operator correction within a specified time limit. The intent is to not penalize a system for needing a minor, quick remedy, using only on-board spare or repair parts, that is considered a normal, routine operating procedure the operator is expected to perform. Such performance by operators should not detract from or

Figure V-6. Examples of terms and definitions

degrade their ability to focus on their primary roles. These procedures should be based on how quickly and easily the crew or operator can do the task without impact on mission accomplishment, crew safety, etc.

Performance Limitation. Those events which report inability of a system to meet specified performance limits even though no malfunction (reliability failure) has occurred.

Non-Essential Function Failure (NEFF). Events that result in a system's loss of non-essential functions. An NEFF generates an NUMD and, if corrected by the crew/operator (and authorized in the TM or other applicable document), a crew correctable maintenance demand (CCMD).

Essential Function Failure (EFF). An EFF is generally described as a failure or malfunction causing degradation below an established level or causing complete loss of an essential function(s). Exceptions are those tasks that may have been identified ROPs. All EFFs are serious failures since they impact an essential function (see fig V-8). A frequency or time constraint for determining when an EFF becomes a SA may be specified. An EFF generates an EUMD and, if corrected by the crew/operator (and authorized in the TM or other applicable document), a CCMD.

System Abort (SA). An event resulting in loss or degradation of an essential function(s) which renders the system unable to enter Service or causes immediate removal from Service. The minimum acceptable level is described in the relationship matrix. Every SA is an EFF by definition (see fig V-8). A SA prevents the system from being mission capable, resulting in a "Not Mission Capable" status under wartime conditions.

Dependent Failure. A failure event caused by another related event that occurs simultaneously or nearly simultaneously to the related causing event. In some cases, it may be necessary to present engineering evidence to clearly link the dependent event to the causing event.

Crew Correctable Maintenance Demand (CCMD*)* (Optional). The CCMD is an optional category used to capture events in which the crew or operator corrected failures. These maintenance actions must be authorized at the crew/operator level in the TM or applicable documentation. Each failure event should be recorded based on its impact on system performance, regardless of who accomplishes the corrective action. An event scored on its own merits and fixed by the crew generates a CCMD. An EFF corrected by the crew/operator (and authorized in the TM or other applicable document), generates both an essential unscheduled maintenance demand (EUMD) and a CCMD.

Scheduled Maintenance Demand (SMD*).* An SMD is recorded when a test incident report documents a regularly scheduled Service, as well as "on-condition" maintenance (usage, wear, etc.), such as tire or track replacement based on documented replacement criteria. Crew PMCS are also considered scheduled maintenance, but should be separately recorded. The PMCS is normally not considered when calculating the maintenance ratio, but could be tracked, depending on the system, as a partial measure of crew burden. To qualify as an SMD, an event must meet the necessary intervals, conditions, or durability requirements defined in applicable system technical documentation (i.e., technical manuals).

Non-Essential Unscheduled Maintenance Demand (NUMD*).* This category should be used to cover the remaining incidents that require unscheduled maintenance but did not qualify as EUMDs. Obviously, an NEFF which requires unscheduled maintenance to remedy results in an NUMD. Note that an NEFF that is corrected by the crew/operator (and authorized in the TM or other applicable document), generates both an NUMD and a CCMD.

Essential Unscheduled Maintenance Demand (EUMD*).* An EUMD is recorded for each event requiring unscheduled maintenance that results from an impending or imminent EFF, an actual EFF, or a SA. Fully redundant component failures, although they do not cause the loss of an essential function, should be classified in this category since they are necessary for the system to be fully capable (a fully redundant component provides equal capability to the system and should not be confused with a "back-up" capability). Note that an EFF that is corrected by the crew/operator (and authorized in the TM or other applicable document), generates both an EUMD and a CCMD.

Essential Logistics Demand (ELD) (Optional). Both essential unscheduled maintenance demands (EUMD) and all scheduled maintenance demands (SMD) place essential demands on the logistics system. Thus, both are recorded as ELDs. Each part (requested or consumed) and each corrective action is considered one logistics demand. It is possible to have more than one essential logistics demand per event. This category does not include operator or crew level preventive maintenance checks and Services (PMCS); it may include items/parts consumed during conduct of the PMCS.

Non-Essential Logistics Demand (NELD*) (Optional).* An NELD is recorded for all non-essential unscheduled maintenance demands (NUMD). Each part (requested or consumed) and each repair is considered one logistics demand. It is possible to have more than one logistics demand per event. This category does not include operator or crew level preventive maintenance checks and Services (PMCS); it may include items/parts consumed during conduct of the PMCS.

(NOTE: ELDs and NELDs are sums of maintenance and supply demands.)

Figure V-6. Examples of terms and definitions (cont)

Hardware. Chargeability category that includes malperforming hardware and personnel-related events attributable to the hardware's design. For example, if the device has an exposed ON/OFF switch that is easy to trip inadvertently, the unintended power disruption may be charged to hardware, and not to crew. This category may be further broken down into sub-categories for government furnished and contractor furnished hardware.

Software. Chargeability category that includes all events attributable to the software of the system. As with hardware, personnel-related events that are rooted in the software's design should again be charged to software and not crew. Consideration is also needed in distinguishing between software that is part of the system under test and "peripheral" software, that is not actually part of the system under test.

Crew/Operator. Chargeability category including all events attributable to crew/operator error that were not rooted in hardware/software design problems, inadequate training, or poorly written manuals.

Technical documentation/Manuals. Chargeability category that includes all events attributable to misleading, incorrect, or nonexistent, but needed, information in the manuals. Poorly written manuals may cause crew or maintenance personnel errors; in these cases, manuals should be charged.

Maintenance Personnel. Chargeability category which includes all events attributable to maintenance personnel errors that were not rooted in hardware/software design problems, inadequate training, or poorly written manuals.

Training. Chargeability category which includes any event that can be directly attributed to inadequacies in training due to omitted or incorrect training procedures, or inappropriate training material such as information above the general level of understanding of the target audience. For an event to be charged to training, the instructional information needed must have been included in the manuals.

Support Equipment. Chargeability category which includes any event caused by special tools, common tools, TMDE, spares, repair parts, associated software, and sometimes power sources, not part of the operational system.

Accident. Chargeability category including only those accidents that are not caused by the design of the system. That is, accidents that are due to inadequate training, inadequate warning in the manuals, and careless operation would not be charged to the "Accident" category; they would be charged to the appropriate root cause of the accident.

Primary Failure. Chargeability category for failure events caused by an earlier or concurrent primary failure. This category applies to those events scored as a dependent failure.

False Alarm. Any indication of a non-existent failure given by BIT/BITE/Prognostics.

Detection Failure. Failure of BIT/BITE/Prognostics to detect an actual event (true alarm).

Detection Success. Success of BIT/BITE/Prognostics in detecting an actual event (true alarm).

Isolation Failure. Failure of BIT/BITE/Prognostics to isolate a failure to the faulty subsystem, component or LRU in accordance with the approved maintenance concept.

Isolation Success. Correct determination of BIT/BITE/Prognostics in isolating the faulty subsystem, component or LRU in accordance with the approved maintenance concept.

Figure V-6. Examples of terms and definitions (cont)

Example Relationship Matrix for Light Tank ABC

Note: E = EFF, S = SA

DESCRIPTION	SEE	MOVE	ACQUIRE	SHOOT	COMM	SURVIVE	TOW	SA	NOTES
Mobility									
Engine		E						S	1
Accessories		E					E	S	1
Transmission		E					E	S	1
Tracked Vehicle									
Track & Acc		E					E	S	1
Final Drive		E					E	S	1
Wheeled Vehicle									
Wheels		E					E	S	1
Drive Line & Acc		E					E	S	1
Suspension		E					E		
Mobility, Other									
Brakes		E					E	S	3
Steer		E					E	S	2
Air Cleaner		E					E	S	1
Fuel System		E					E	S	1
Cooling Sys		E					E	S	1
Hull Structure		E		E		E	E	S	1
Driver's Viewer	E	E					E		
Batteries	E	E	E	E	E	E	E	S	4
Generator/Reg	E	E	E	E	E	E	E	S	4
Elec control/ indicators	E	E	E	E	E	E	E	S	4
Main Gun									
Main Gun				E				S	5
Gun mount & recoil mech.				E				S	5
Main gun sights			E	E		E		S	6
Fire control				E				S	7
Autoloader (if equipped)				E				S	9
Gun/turret drive and stab			E	E		E		S	5
Coax weapon				E					
CDR's weapon				E					
Turret/turret structure			E	E	E	E			
Shoot function, other			E	E					
Intercom sys					E			S	8

Figure V-8. Example Relationship Matrix(cont)

Example Relationship Matrix for Light Tank ABC, Continued.

DESCRIPTION	SEE	MOVE	ACQUIRE	SHOOT	COMM	SURVIVE	TOW	SA	NOTES
Transmitter						E			
Receiver						E			
Ext. phone						E			
Accessories						E			
Grenade launcher							E		
NBC sys							E		
Fire supp sys							E		
Countermeasures Sys							E		

Notes:
1. SA if unable to maintain ≥32 kilometers per hour on level terrain; EFF otherwise.
2. SA if steering capability is lost; EFF otherwise.
3. SA if braking capability is lost; EFF otherwise.
4. SA if vehicle electric power is lost; EFF otherwise.
5. SA if capability to fire main weapon is lost; EFF otherwise.
6. SA if all sighting capability is lost; EFF otherwise.
7. SA if all fire control capability is lost; EFF otherwise.
8. SA if no communication capability between driver and commander; EFF otherwise.
9. SA if autoloader capability is lost.

Figure V-8. Example Relationship Matrix(cont)

R & M Community	***MATDEVS & Contractors***	***Safety Community***	***Software Community***	***Vulnerability Community***
FDSC Failure Categories & Definitions (Implemented in 1991)	FMECA Failure Definitions from MIL-STD-1629A (para 4.4.3a-d)	Hazard Severity Categories from MIL-STD=882C (table 1, para 4.5.1)	Software Problem Reporting Priority Classification from MIL-STD-2167A (table X-1, p. 56)	Degraded State Definitions from Degraded States Vulnerability Analysis (BRL Tech Report, BRL-TR-3010, June 1989, p. 19)
N/A (May be classified as a system abort, depending on system.)	Catastrophic – A failure that may cause death or weapon system loss (e.g., aircraft, tank, missile, ship).	Catastrophic – Death, system loss, or severe environmental damage.	N/A (May be classified as a system abort if software could cause death or weapon system loss).	Total Kill – Complete loss of mobility and firepower and/or crew casualty.
System Abort – An incident which causes a system not to start or to be withdrawn from performing its normal function(s).	Critical – A failure that may cause severe injury, major property damage, or major system damage which will result in mission loss.	Critical – Severe injury, severe occupational illness, major system or environmental damage.	Priority Classification 1 – Prevents the (operator's) accomplishment of an operational or mission essential capability (specified by baseline requirements) or jeopardizes personnel safety.	Subsystem Kill – Loss of main and/or secondary armament, total immobilization, no internal or external communication.
Essential Function Failure - An incident which causes degradation in the performance of one or more essential functions. Results in a requirement for maintenance before full operation is resumed.	Marginal - A failure which may cause minor injury, minor property damage, or minor system damage which will result in delay or loss of availability or mission degradation.	Marginal - Minor injury, minor occupational illness, or minor system or environmental damage.	Priority Classification 2 or 3 – Adversely affects the accomplishment of an operational or mission essential capability so as to de-grade performance and for which: (priority 2) no alternative work-around solution exists, or (priority 3) an alternative workaround solution exists	Subsystem Degraded - No fire on the move, reduced accuracy, stop after time target, reduced speed (significant), no acquire on the move, reduced acquisition capability, external commo lost.
Non-Essential Function Failure - Any malfunction not affecting an essential function but requiring maintenance not identified in the technical documentation as scheduled maintenance.	Minor - A failure not serious enough to cause injury, property damage, or system damage, but which will result in unscheduled maintenance or repair.	Minor - Less than minor injury, occupational illness, or less than minor system or environmental damage.	Priority Classification 4 or 5 - (Priority 4) A software problem that is an operator inconvenience or annoyance and which does not affect a required operational or mission essential capability, or (Priority 5) all other errors.	Subsystem Degraded (minor) - Increased time to fire, secondary weapon loss, reduced speed (slight), internal commo lost.

Figure V-9. Event classification comparison table

Scoring Criteria: Multiple Choice Format Example

Scoring Procedure

1. Select appropriate category below and proceed as directed:

    a. Event is "Other Event or Failure (not applicable to R or M)." Proceed to #2.
    b. Event is "Non-Reliability Failure (applicable to maintainability)." Proceed to #3.
    c. Event is "Reliability Failure." Proceed to #4.

2. Assign event to appropriate category, then proceed to next event:

    a. Pre-test Checkout.
    b. System (Hardware or Software) Modification.
    c. Test Peculiar.
    d. Test-directed Abuse.
    e. Non-R&M Oriented.
    f. Unrelated Damage.
    g. Performance Limitation

3. Identify the event as one of the following and proceed to next event:

    a. Preventive maintenance, checks & Services (PMCS).
    b. Scheduled maintenance.
    c. Routine operating procedures (ROP) performed by operator & prescribed in user manual or List of ROP in FDSC.

4. Assign event to one or more of the following failure categories:

    a. EFF
    b. SA
    c. Non-EFF
    d. Dependent Failure

5. Identify the cause of the event from the following list:

    a. Hardware (GFE or CFE).
    b. Software (GFE or CFE).
    c. Crew/Operator.
    d. Technical Documentation/Manuals.
    e. Accident.
    f. Maintenance Personnel.
    g. Training.
    h. Support Equipment.
    i. Unknown.
    j. Primary Failure
    k. BIT/BITE

Figure V-10. Scoring criteria: Multiple choice format

Appendix W
Joint Service Integration Group Operational Requirement Document Process

W-1. Joint Service Integration Group, CG, U.S. Army Chemical School (USACMLS).

a. Mission: Coordinate and integrate the Services' NBC defense requirements and review NBC training and doctrine initiatives.

b. Functions:

(1) Prepares and publishes the Joint NBC Defense Modernization Plan.

(2) Updates the Readiness and Training portions of the Annual Report to Congress on the Status of NBC Defense Programs.

(3) Plays a major role in preparing the NBC Defense Program Objective Memorandum (POM).

(4) Coordinates preparation of joint NBC Defense Operational Requirements Documents.

(5) Coordinates professional NBC Defense Training by the Services at USACMLS.

(6) Reviews joint NBC defense doctrine and training initiatives.

(7) Coordinates and integrates Services' NBC Defense M&S efforts.

(8) Develops the joint requirements list and joint priority list.

W-2. Joint NBC Operational Requirements Document Process. The generation of joint NBC ORDs consists of the following three distinct phases: Draft ORD, Revised Draft ORD, and Final ORD. Milestone updates to an ORD occurs in similar fashion using the Revised Draft and Final ORD phases. The JSIG establishes a Joint Working Group (JWG) to develop the ORD. The JWG consists of Service user representatives, the MATDEV, the commodity area manager (CAM), testers, and Joint Staff representatives as applicable (see figs W-1 and W-2, at the end of this app).

a. Draft ORD Phase. NBC defense requirements are identified through various sources. Normally, a JSIG AO or Service submits an NBC operational requirement or similar document to the JSIG Executive Office.

(1) The JSIG Executive Office formally staffs the requirement, to include AoA Study, if required, to the JNBCDB, and to the Services to determine the expected level of joint DOD component involvement or to determine the JPD. Services are also asked to provide comments to the requirement to facilitate the development of the revised draft ORD. Services have 45 days to review, assign a JPD, and provide comments to the JSIG Executive Office. If no other Service responds with a JPD of "Joint "or "Joint Interest", the JSIG continues the joint development process of the ORD and returns it to the originating Service for consideration as a Service-unique requirement.

(a) The Services may assess a program JPD as "Joint", "Joint Interest" or "Independent", in accordance with the governing instructions and regulations. The JSIG assigns an overall JPD of "Joint" when at least two Services express interest in Joint Development of the requirement (i.e., two or more Services assess the program potential as "Joint").

(b) A Service responding with a JPD of "Joint Interest" (at any time during the development process) has no approval authority over the final ORD and also has no subsequent funding implications for development, acquisition, nor operations and sustainability. Services with a JPD status of "Joint Interest" may change their JPD to "Joint" during the Milestone II or Milestone III revisions to the ORD.

(c) A Service responding with "Independent" is not be included in any subsequent staffing of the document. Services with a JPD status of "Independent" may change their JPD to "Joint" during the Milestone II or Milestone III revisions to the ORD.

(2) When the requirement is deemed to have a JPD of "Joint," the JSIG assigns a document tracking number and appoints a lead Service to write the revised draft ORD using comments received from the other Services. The lead Service has 30 days to develop the revised draft ORD and send it to the JSIG Executive Office.

(3) The JSIG notifies the JSMG of the JPD and requests a lead Service for material development be identified. The notification includes the date of the initial JWG meeting and a request for the lead Service MATDEV PM to attend.

b. Revised Draft ORD Phase. The JSIG Executive Office establishes and notifies the Services of the initial JWG meeting date. The initial JWG meeting normally occurs 90 days from the date of distribution of the draft ORD to the Services.

(1) The initial JWG incorporates additional Service/DOD agency inputs and develops the revised draft ORD for staffing to the services and appropriate DOD agencies. The revised draft ORD is used to develop the Services' specific annexes.

(2) The JSIG Executive Office assigns a Trading Number to the revised draft ORD and coordinates with Services and agencies. Services and DOD agencies have 60 days to review and provide comments to the lead Service ORD POC. Courtesy copies are also provided to the JSIG Executive Office and the Service's central ORD requirements office/JSIG AOs as required.

c. Final ORD Phase. The JSIG Executive Office establishes and notifies the Services of the final JWG meeting date. The final JWG meeting normally occurs within 90 days from the date of distribution of the revised draft ORD.

(1) The final JWG reviews and finalizes the ORD.

(2) At the conclusion of the final JWG the Services are provided with the final ORD for their concurrence and lead Service approval.

(3) Services have 60 days to concur with the ORD. The lead Service has an additional 30 days to approve the ORD. Services unable to meet the suspense must request an extension from the JSIG Executive Office.

(4) Services may not make any changes to the final ORD prior to approval. Services may "concur", "concur with comment" or "non-concur" on the final ORD.

(a) Services may concur with comment on the ORD. Comments may be considered during the next milestone ORD revision.

(b) Service non-concurrence is addressed by a JWG convened to address only the specific comment(s) causing non-concurrence. Additional staffing to resolve the specific non-concurrence may be required.

(c) The lead Service distributes courtesy copies of comments to the JSIG Executive Office and Service requirements/approval authorities.

(5) Services forward letters of concurrence to the JSIG Executive Office and provide a courtesy copy to the lead Service. Upon receipt of all Service concurrences, the JSIG Executive Office notifies the lead Service to proceed with final approval of the ORD.

(6) The lead Service approves the ORD and provides the JSIG Executive Office with a copy of the approval letter and approved ORD.

(7) The JSIG Executive Office promulgates the approved ORD to each of the Services' central requirements office, JSMG, and designated DOD agencies. Services are responsible for internal distribution of the ORD.

Draft ORD Phase	Revised Draft ORD Phase	Final ORD Phase
■ JSIG Executive Office receives & reviews Service NBC defense requirement ■ JSIG Executive Office coordinates requirement with services ■ Services review, assign JPD & provide comments to JSIG Executive Office (45 days) ■ If two or more services assign a JPD "Joint" to the requirement, the JSIG will appoint a lead Service to develop the draft ORD ■ Lead Service develops draft joint ORD & provides to JSIG Executive Office for Service coordination (30 days) ■ Administrative processing (15 days)	■ Initial JWG develops revised draft ORD ■ JSIG assigns a joint tracking number to the ORD and provides the revised draft ORD to the Services for review ■ Services review & provide comments to lead Service/JSIG Executive Office (60 days) ■ JSIG Executive Office schedules final JWG ■ Administrative processing (30 days)	■ Final JWG meets to finalize ORD ■ JSIG provides final ORD to Services for concurrence/approval ■ Services concur & provide concurrence letters to lead Service (60 days) ■ Lead Service approves ORD (30 days) ■ JSIG Executive Office promulgates the ORD
Total: 90 days	**Total: 90 days**	**Total: 90 days**
		Grand Total: 270 days

Figure W-1. Operational Requirement Document Process Matrix

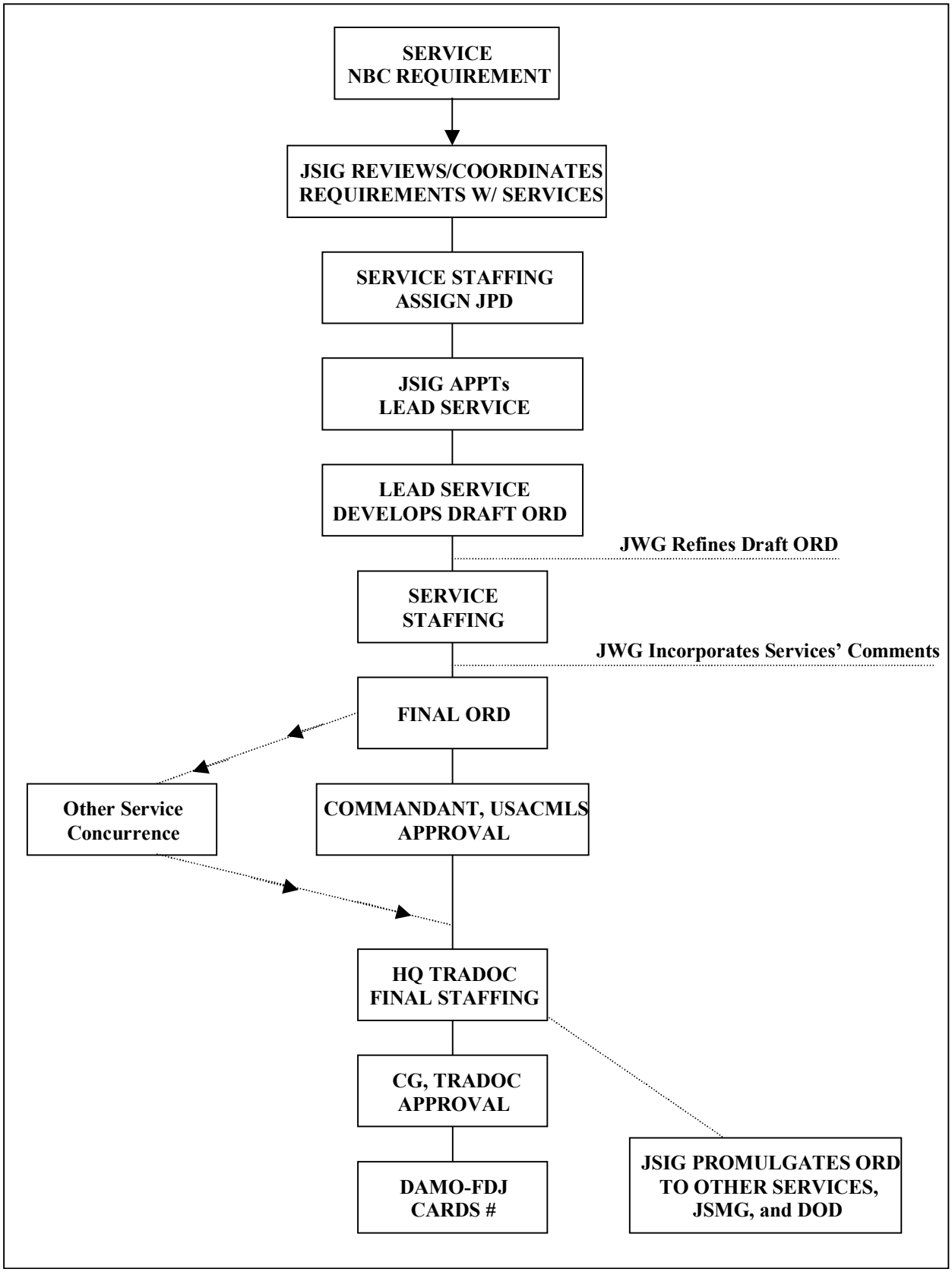


Figure W-2. ORD Flow Chart (Army Lead)

Index

This index is organized alphabetically by topic and by subtopic within topic. Topic and subtopics are identified by paragraph number.

Advanced Concepts and Technology program II (ACT II)
- Further experimentation, 8-9g, 8-4g
- Intent, 8-9a
- Pre-contract award meeting, 8-9e
- Project administration, 8-9f
- Project selection, 8-9c
- Proposal solicitation, 8-9b

Advanced Concept Technology Demonstration (ACTD)
- Army nomination process for, 8-8f(2)
- Army nomination timelines for, 8-8f(2)(a)
- Candidate Development Team for, 8-8f(4)
- Candidate reviews for, 8-8f(7) through (10)
- Concept document for, 8-8f(2)(d) and (e)
- Disposition decisions for, 8-8f(12)
- Execution oversight for, 8-8f(11)
- FOC basis for, 8-8f(2)(b)
- Generation of, 8-8e, 8-8f(2)(c)
- Implementation Directive for, 8-8f(5)
- Information sources on, 8-8a
- Management oversight of, 8-8f(1)
- Management Plan, 8-8f(6)
- Participants in, 8-8c and d, 8-8f(3)
- Purpose of, 8-8b
- Sustainment of residual capabilities, 8-8f(14)

Advanced Technology Demonstration (ATD)
- Annual review of, 7-5
- Description of, 8-7b
- Sub-demonstration by a Battle Lab, 8-7b(2)

Advanced Warfighting Experiment (AWE)
- Concept for an, 8-5c
- Description of, 8-5a and b
- Execution of an, 8-5e
- Planning for an, 8-5d
- Reporting of an, 8-5f

Analysis of Alternatives (AoA). See studies and analyses

Battle Lab Board of Directors (Battle Lab BoD)
- Membership of, 8-1c
- Role in WRAP candidate selection, 8-1c
- Role in experimentation, 8-1c
- Role in requirements identification, 8-1c

Capstone requirements document (CRD). See materiel requirements

Combat Developments (DCSCD) Homepage (www.tradoc.army.mil/dcscd/index.htm)
Approved concepts, 5-7e
CEP resume sheet format, app E
Core staffing list for MRDs, 11-4b
Future operational capabilities (TRADOC Pam 525-66), 6-4b(7)
Ongoing ICTs, 4-3c, 4-3g
SEP MOI, 11-9a
Command, Control, Communications, and Computers Requirements Definition Program (C4RDP). See materiel requirements
Concept Experimentation Program (CEP)
Description of, 8-4a
Limited Objective Experimentation Plan (LOEP) format, app F
Concept Experimentation Program Reviews (CEPRs), 8-4e
Executor planning, 8-4c, app F
Quick reaction processing of experiment project proposals (resume sheet) for, 8-4b(2), app E
Preparation of experiment project proposals (resume sheet) for, 8-4b, app E
Processing of experiment project proposals (resume sheet) for, 8-4b(1)
Reports of, 8-4f, app G
Resourcing of, 8-4d
Resume sheet format for, app E
Support of ACT II, 8-4g
Concepts - warfighting
Approval and distribution of, 5-7e
Concept statement, 5-6a, 5-7a
Coordination of, 5-6b, c, and f, 5-7b, c, and d
Core staffing list for, 5-7c, C-11
Definition of, 5-2b
Format for, 5-6a and b, app C
Capstone type, 2-3, 5-3a
Operational type, 2-4, 5-2b
Revision of, 5-6e
Cost as an independent variable (CAIV). See studies and analyses
Doctrine
Army doctrine requirements process, 10-2c
Determination of requirements for, 2-7, 6-2, 8-1, 9-1, 9-2, B-2c
Definition of, 5-2c
Horizontal requirements integration considerations for, 13-7b(4)
Joint doctrine requirements process, 10-2c
Experimentation - warfighting
ACT II. See Advanced Concepts and Technology program II (ACT II)
ACTD. See Advanced Concepts Technology Demonstration (ACTD)
ATD. See Advanced Technology Demonstration (ATD)
AWE. See Advanced Warfighting Experiment (AWE)
Battle Lab experimentation team, 8-1b
Battle Lab role in, 8-1a
CEP. See Concept Experimentation Program (CEP)

JT&E. See Joint Test and Evaluation (JT&E) Program
LOE. See Limited Objective Experiment (BLE)
Simulation used in, 8-3. See also Models and simulation (M&S)
Force Design Update (FDU). See organization requirements
Future operational capabilities (FOC)
Annual review and update, 6-4
Description of, 2-5, 6-2a
Format for, 6-3, app D
Inclusion in concepts, 5-6d
Uses of, 6-2b, c, and d
Horizontal requirements integration (HRI), 13-7, B-2d
Horizontal technology integration (HTI)
Description of, 13-6a through c, P-2
Homepage for, P-5
Management structure for, 13-6(d)
Process for, 13-6(e), P-3
Proposal sheets for, P-3a(3), P-4, fig P-1
Information technology (IT). See materiel requirements
Integrated concept team (ICT)
Characteristics of, 4-2a, B-2
Charters for, 4-3e
Core team, 4-3d, 4-3e(2) and (3)
Helpful hints for, B-9
Horizontal requirements integration considerations for, 13-7
Industry and academia participation in, 4-3d, B-3
Membership, 4-1, 4-3d, B-2, B-6 through B-8
Proposals for, 4-3b(2), B-5, fig B-2
Purposes of, 4-2b, 4-3b(1), 4-3c
Reporting for, 4-3b(2), 4-3c, 4-3e(8), 4-3f, 4-3g
Steps for conducting an, B-4
Tier one teams, 4-3b
Tier two teams, 4-3c
Transition or termination of, 4-3e(9) and (l0), B-4d(4)
Joint Test and Evaluation (JT&E) Program, 8-10
Joint User/Developer Science and Technology Objective (STO) Review
Participants in, 7-4b(2)(a) and (b)
Process for, 7-4b(2)(c)
Purpose of, 7-4a
Schedule for, 7-4a(2), 7-4b(1)
Key performance parameters (KPP), 11-3e
Leader development requirements
Determination of, 2-7, 6-2, 8-1, 9-1, 9-2, B-2c
Documentation and processing of, 10-1, 10-4
Horizontal requirements integration considerations for, 13-7b(4)
Leader Development Action Plan (LDAP), 10-4c(3)
Leader Development Decision Network (LDDN), 10-4c

Leader Development Support System (LDSS), 10-4b and c
Limited Objective Experiment (LOE)
Description of, 8-6
Limited Objective Experimentation Plan (LOEP) format, app F
Experimentation report format, app G
Materiel acquisition reviews, 13-11, app Q
Materiel requirements
Acquisition phase and milestone applicability, 10-7
Base operations and non-deployable warfighting requirement, 11-9d, 13-2
Capstone requirements document (CRD) applicability, 11-2a
Catalog of Approved Requirements Documents (CARDS) number, K-2b(2)(e), K-3a(8), K-3b
Clothing and Individual Equipment (CIE) requirements, 11-9b
Core staffing list for, 11-4b
C4RDP, app N
CRD preparation for, 11-2a, app I
CRD coordination and approval. See MNS or ORD processing
Determination of, 2-7, 6-2, 8-1, 9-1, 9-2, 9-3, 9-4, B-2c
Horizontal requirements integration considerations for, 13-7b
HTI implications. See horizontal technology integration
Information technology (IT) considerations, 13-2
ICT operations for, B-8
ICT members for, fig B-6
International requirements, 11-16
Joint potential designators for, 11-12
Joint requirements, 11-13
Mission needs statements (MNS) applicability, 11-2b
MNS preparation, 11-2b, 11-3c, app I
MNS processing, 11-4, 11-6, 11-7, app K and L
Modifications, requirements for and prioritization of, 11-11d through f
Operational mode summary/mission profile (OMS/MP), 11-8b, app J
Operational need statement (ONS), 11-14
Operational requirements document (ORD) applicability, 11-2c(3)
ORD changes, 11-10
ORD KPPs, 11-3e
ORD preparation, 11-2c, 11-3d, app I
ORD processing, 11-4, 11-6, 11-7, app K and L
ORD requirements rationale, app I
ORD relationships to other documents, 13-5, 13-6
ORD threshold and objective requirements, 11-3d(1)
ORD to request for proposal (RFP) crosswalk, 13-6
Organizational CIE, 11-9c
Preplanned product improvement (P3I) requirements, 11-11c
Program coordination, 11-8
Soldier enhancement program (SEP) requirements, 11-9a
System training plan (STRAP) development and submission with ORD, 11-8a
Transmittal memorandums for, app L

User's Functional Description (UFD) for, 11-15, app O
Mission needs statement. See materiel requirements
Models and simulations (M&S)
Requirements approval process for, 12-3, M-1, M-6
Requirements determination for, M-5
Requirements documentation for, 12-2, M-3, fig M-4
Requirements integration analysis, 12-1, 12-2
Requirements Integration Work Group (RIWG) for, M-5b, c, and d, fig M-2
Support for experimentation, 8-3
Support for studies and analyses, 9-6b
Operational requirements document (ORD). See materiel requirements
Organization requirements
Basis of issue plan (BOIP), 10-5f(3)(b)
Determination of, 2-7, 6-2, 8-1, 9-1, 9-2, B-2c
Force Design Update (FDU) process for, 10-5d, app H,
FDU issue package for, 10-5e, H-3c
FDU briefing package for, H-3c(3), fig H-3
FDU briefings for, H-3g through k
FDU field review of, H-3f, fig H-6
FDU decision criteria for, H-4
FDU evaluation guide, fig H-4
FDU review board for, H-3d, fig H-5
HRI considerations for, 13-7b(4)
Qualitative and quantitative personnel requirements information (QQPRI), 10-5f(3)(b)
Table of organization and equipment (TOE) process, 10-5f
Total army analysis (TAA) process, 10-5g
Unit reference sheet (URS), 10-5c
Requirements/solution determination - DTLOMS
Description of, 2-5, 2-6, 2-7
Experimentation support of, 8-1a, See also Experimentation - warfighting
FOC support of, 6-2
Studies and analyses support of, 9-1, 9-2, See also studies and analyses
Sequence of, 2-7, 6-2a
Solution ICT operations for, 4-2a(4), 4-2b, B-7a, see also Integrated Concept Team (ICT)
Solution ICT membership for, fig B-4
Schedule - science and technology (S&T) and experimentation integrated, 8-11
Science and Technology (S&T) Review
Participants in, 7-3a(6), 7-3c
Purposes of, 7-1c, 7-3a
Schedule for, 7-1a, 7-3d
TRADOC Consolidated S&T Report, 7-3e
Soldier requirements
Description of, 10-6b
Determination of, 2-7, 6-2, 8-1, 9-1, 9-2, B-2c
Documentation of, 10-1, 10-6
Horizontal requirements integration considerations for, 13-7b(4)

Military Occupational Classification Structure (MOCS) system for, 10-6b and c
Studies and analyses
Analysis of alternatives (AoA), 9-3c, 9-5
CAIV, 9-3a
Cost performance trade-off analyses, 9-4b
DTLOMS determination analysis, 9-2a, 9-5
M&S requirements integration analysis (RIA), 12-1, 12-2
Organizations conducting, 9-6a
Tools for, 9-6b, 8-2
Reports of requirements analysis and AoA, 9-5
Requirements trade-offs analyses, 9-3a, 9-4a, 9-5
Support of mission needs determination, 9-2
Support of materiel operational requirements, 9-2a (3) and (4), 9-2b, 9-3
System concept studies, 9-3b
Technology trade-offs, 9-2b
Trade-off analyses, 9-3a, 9-4a and b, 9-5
TRADOC standard scenarios for, 9-7
TRADOC study program, 9-8
Technology Demonstration (TD), 8-7a
Threat assessment
Approval of, 13-1c
Holistic capabilities approach to, 13-1b
Support to concept development, 13-1d
Support to DTLOMS requirements determination, 13-1e
Support to materiel requirements documents, 13-1f, app I
TRADOC Warfighting Lens Analysis (WFLA) process, 13-10
Training requirements
Course administrative data (CAD), 10-1, 10-3d(2)
Determination of, 2-7, 6-2, 8-1, 9-1, 9-2, B-2c
Documentation of institutional training requirements, 10-1, 10-3
Horizontal requirements integration considerations for, 13-7b(4)
Individual training plan (ITP), 10-1, 10-3d(1)
Program of instruction (POI), 10-1, 10-3d(3)
System training plan (STRAP) processing, 11-8a
Training device requirements documentation, Chapter 11, app I
Training Requirements Analysis System (TRAS), 10-3b through h
User Functional Description (UFD). See Materiel requirements
Vision - warfighting, 2-2, 5-2a
Warfighting Rapid Acquisition Program (WRAP)
Army Systems Acquisition Review Council (ASARC) decisions for, 13-9e(1)
ASARC membership for, 13-9d
Candidate qualification for, 13-9b(3)
Documentation for, 13-9c
Funding of programs approved for, 13-9e(2)
Purpose of, 13-9a
Selection of candidates for, 8-1c, 13-9b(2)

Submission of candidates for, 13-9c, 13-9e(2)

Glossary

Section I
Abbreviations

6.2	Exploratory Development
6.3	Advanced Development
6.4	Demonstration and Validation
6.5	Engineering and Manufacturing Development
AAE	Army Acquisition Executive
ABCS	Army Battle Command System
ABIC	Army Battlefield Integration Concepts
AC	Active Component
ACAT	Acquisition Category
ACAT I	Acquisition Category I (DOD Reg 5000.2-R/and AR 70-1)
ACAT IA	Acquisition Category I Automation (DOD Reg 5000.2-R/AR 70-1)
ACAT IAC	Acquisition Category I Automation-Component Managed (DOD Reg 5000.2-R/AR 70-1)
ACAT IAD	Acquisition Category I Automation-Defense Managed (DOD Reg 5000.2-R/AR 70-1)
ACAT IC	Acquisition Category I Component (DOD Reg 5000.2-R/AR 70-1)
ACAT ID	Acquisition Category I Defense (DOD Reg 5000.2-R/AR 70-1)
ACAT II	Acquisition Category II (DOD Reg 5000.2-R/AR 70-1)
ACAT IIA	Acquisition Category II Automation (AR 70-1)
ACAT III	Acquisition Category III (DOD Reg 5000.2-R/AR 70-1)
ACAT IIIA	Acquisition Category III Automation (DOD Reg 5000.2-R/AR 70-1)

ACAT IV	Acquisition Category IV (AR 70-1)
ACCB	Army Configuration Control Board
ACCS	Army Command and Control System
ACM	advanced concept manager
ACP	Army cost position
ACR	advanced concepts and requirements; ammunition consumption rate
ACSIM	Assistant Chief of Staff for Installation Management
ACT II	Advanced Concepts and Technology Program II
ACTD	Advanced Concepts Technology Demonstration
ADA	air defense artillery
ADCSOPS(FD)	Assistant Deputy Chief of Staff for Operations and Plans, Force Development
ADM	acquisition decision memorandum
ADO	Army Digitization Office
ADP	automated data processing
ADTL	Armywide doctrinal and training literature
AECP	Army Experimentation Campaign Plan
AFTADS	Advanced Field Artillery Tactical Data System
AGCCS	Army Global Command and Control System
AIEP	Army Ideas for Excellence Program
AIM	Army Interaction Manager
AIS	automated information system
AMC	U.S. Army Materiel Command
AMDPCS	Air and Missile Defense Planning and Control System

AMEDD	Army Medical Department
AMEDDC&S	Army Medical Department Center and School
AMSAA	Army Materiel Systems Analysis Activity
AMSEC	Army Model and Simulation Executive Council
AMSO	Army Model and Simulation Office
ANCOC	Advanced Noncommissioned Officer Course
AO	action officer
AoA	Analysis of Alternatives
AOA	Army Operational Architecture
AOC	area of concentration
APB	Acquisition Program Baseline
APD	Army program directive
AR	Army regulation
ARI	Army Research Institute; aviation restructive initiative
ARL	Army Research Laboratory
ARO	U.S. Army Research Office
ARPRINT	Army Program for Individual Training
ARSTAF	Army Staff
AS	acquisition strategy
ASA	Assistant Secretary of the Army
ASA(ALT)	Assistant Secretary of the Army (Acquisition, Logistics and Technology)
ASA(FM&C)	Assistant Secretary of the Army (Financial Management and Comptroller)
ASA(IL&E)	Assistant Secretary of the Army (Installations, Logistics and Environment)

ASARC	Army Systems Acquisition Review Council
ASAS	All Source Analysis System
ASIOE	associated support items of equipment
ASIP	Army stationing and installation plan
ASP	ammunition supply point
ASTAG	Army Science and Technology Advisory Group
ASTARS	Army Standards Repository System
ASTMIS	Army Science and Technology Management Information System
ASTMP	Army Science and Technology Master Plan
ASTWG	Army Science and Technology Working Group
AT	alert time
ATD	Advanced Technology Demonstration
ATEC	Army Test and Evaluation Command
ATRRS	Army Training Requirements and Resources System
ATSC	Army Training Support Center
AUB	Army Uniform Board
AURS	automated unit reference sheets
AUTL	Army universal task list
AUTS	Automatic Update Transaction System
AV	aviation
AVRDEC	Aviation RDEC
AWE	advanced warfighting experiment
AWC	Army War College

BAA	Broad Agency Announcement
BAS	Battlefield Automated System
BCIS	Battlefield Combat Identification System
BCT	Brigade Combat Team
BCTP	Battle Command Training Program
BFA	battlefield functional area
BIT	built-in-test
BITE	built-in-test equipment
BLITCD	Battle Laboratory Integration, Technology, and Concepts Directorate
BLPO	Battlefield Laboratory Project Officer
BNCOC	Basic Noncommissioned Officer Course
BoB	Blueprint of the Battlefield
BoD	Board of Directors
BOIP	basis-of-issue plan
BOS	Battlefield Operating System
BPR	business process reengineering
C2	command and control
C3	command, control, and communications
C3I	command, control, communications and intelligence
C3S	command, control and communications systems
C4	command, control, communications, and computers
C4I	command, control, communications, computers, and intelligence
C4RDP	Command, Control, Communications, and Computers Requirements Definition Program

CAA	Center for Army Analysis
CAD	course administrative data; Combat Arms Directorate
CAIV	cost as an independent variable
CALL	Center for Army Lessons Learned
CARDS	Catalog of Approved Requirements Documents
CAS3	Combined Arms Staff Services School
CASCOM	Combined Arms Support Command
CASE	computer assisted software engineering
CATS	combined arms training strategy
CATT	combined arms tactical trainer
CB	C4RDP Board
CBD	“Commerce Business Daily”
CBE	command budget estimate
CBRS	Concept Based Requirements System
CBTDEV	combat developer
CCB	Configuration Control Board
CCMD	crew correctable maintenance demand
CCTT	Close Combat Tactical Trainer
CD	combat development
CDB	communications database
CDE	Combat Development Engineering Division
CDF	Core Distributed Interactive Simulation (DIS) Facility
CDR	commander

CEAC	Cost and Economic Analysis Center
CECOM	Communications and Electronics Command
CEP	Concept Experimentation Program
CEPR	Concept Experimentation Program Review
CEPSARC	Concept Experimentation Program Schedule and Review Committee
CERDEC	Communications-Electronics RDEC
CFE	contractor-furnished equipment
CFJO	Concept for Future Joint Operations
CG	commanding general
CGSC	Command and General Staff College
CIA	Central Intelligence Agency
CIC	critical intelligence categories
CID	Capability Integration Division
CIE	clothing and individual equipment
CINC	Commander in Chief
CIO	Chief Information Officer
CJCS	Chairman, Joint Chiefs of Staff
CK	containerized kitchen
CM	configuration management
Comdt	commandant
CMF	career management field
CNA	computer network attack
CND	computer network defense

CoC	Council of Colonels
CoE	Corps of Engineers
CofS	Chief of Staff
COFT	conduct-of-fire trainer
COI	contemporary operational issues
COIC	critical operational issues and criteria
CONPLAN	contingency plan
CONUS	continental United States
COR	contracting officer's representative
CPIPT	Cost and Performance Integrated Product Team
CPLAN	command plan
CRB	Cost Review Board
CRD	capstone requirements document
CSA	Chief of Staff, U.S. Army
CSM	Command Sergeant Major
CSS	combat Service support
CSSCS	Combat Service Support Control System
CSSD	Combat Service Support Directorate
CT	calendar time
CTC	Combat Training Center
CTSF	Consolidate Testing and Support Facility
CTT	common task test
CTU	Consolidated TOE Update

DA	Department of the Army
DAB	Defense Acquisition Board
DARPA	Defense Advanced Research Projects Agency
DAS(R&T)	Deputy Assistant Secretary of the Army (Research and Technology)
DCE	data collection effort
DCG	deputy commanding general
DCS	deputy chief of staff
DCSBOS	Deputy Chief of Staff for Base Operating Systems
DCSCD	Deputy Chief of Staff for Combat Developments
DCSDOC	Deputy Chief of Staff for Doctrine
DCSINT	Deputy Chief of Staff for Intelligence
DCSLOG	Deputy Chief of Staff for Logistics
DCSOPS	Deputy Chief of Staff for Operations and Plans
DCSPER	Deputy Chief of Staff for Personnel
DCSSA	Deputy Chief of Staff for Simulations and Analysis
DCST	Deputy Chief of Staff for Training
DDRS	Defense Data Repository System
DFCC	Digitized Force Coordination Cell
DIA	Defense Intelligence Agency
DII COE	defense information infrastructure common operating equipment
DIS	distributed interactive simulation
DISC4	Director of Information Systems for Command, Control, Communications, and Computers

DISCOM	division support command
DIVIT	division institutional training
DLMP	Doctrine Literature Master Plan
DLP	Doctrine Literature Program
DM	demonstration manager
DMA	Defense Mapping Agency
DMSO	Defense Models and Simulation Office
DOC	desired operational capability
DOCDEV	doctrine developer
DOD	Department of Defense
DODD	Department of Defense directive
DODI	Department of Defense instruction
DODIC	Department of Defense identification code
DODIPP	DOD Intelligence Production Process
DPAE	Director, Program Analysis and Evaluation
DPG	defense planning guidance
DRAG	Doctrine Review and Approval Group
DT	developmental test/tester; down time
DTIC	Defense Technical Information Center
DTLOMS	doctrine, training, leader development, organization, materiel, and soldier
D-T-L-O-S-M	doctrine, training, leader development, organization, soldier, and materiel (order of consideration during requirements determination)
DTSS	Digital Topographic Support System
DUSA(OR)	Deputy Under Secretary of the Army (Operations Research)

DUSD(AT)	Deputy Under Secretary of Defense (Advanced Technology)
E3	electromagnetic environmental effects
EA	electronic attack
EAD	echelons above division
ECC	Experimental Force (EXFOR) Coordination Cell
ECCM	electronic counter-countermeasures
ECM	electronic countermeasures
ECP	engineering change proposal
E-Date	effective date
EEA	essential elements of analysis
EFF	essential function failure
EMD	Engineering and Manufacturing Development
EMI	electromagnetic interference
engr	engineer
EPLRS	Enhanced Position Location Reporting System
EPP	extended planning period
EPUU	EPLRS User Unit
EPW	enemy prisoner of war
EUP	equipment usage profile
EW	electronic warfare
EXFOR	experimental force
FAA	functional area assessment
FAQ	frequently asked questions

FAR	Federal Acquisition Regulation
FBCB2	Force XXI Battle Command—Brigade and Below
FCT	Future Capability Team
FBI	Federal Bureau of Investigation
FD	failure definition
FDD	Force Design Directorate
FDSC	failure definition and scoring criteria
FMECA	failure mode effects criticality analysis
FDU	force design update
FFR	Force Feasibility Review
FIO	foreign intelligence officer
FIPS	Federal Information Processing System
FLIR	Forward-Looking Infrared
FM	field manual
FOC	future operational capability
FORSCOM	Forces Command
FSA	force structure allowance
FTS	Federal Telecommunications System
FSV	Future Scout Vehicle
FY	fiscal year
FYDP	Future Years Defense Program
GCCS-A	Global Command and Control System-Army
GFE	Government furnished equipment

GIS	geospatial information Services
GLPS	Gun Laying and Positioning System
GO	general officer
GOWG	General Officer Working Group
GPS	Global Positioning System
HHAR	health hazard assessment report
HLA	high-level architecture
HLFD	high-level functional description
HMMWV	High-Mobility Multipurpose Wheeled Vehicle
HQ	headquarters
HQDA	Headquarters, Department of the Army
HRI	horizontal requirements integration
HRS	high resolution scenario
HSI	human systems integration
HTI	horizontal technology integration
HW/SW	hardware/software
ICAM	Integrated Computer-Assisted Manufacturing
ICP	interface change proposal
ICT	Integrated Concept Team
IDEF	ICAM Definition Language
IE	independent evaluator
IER	information exchange requirement
IETM	Interactive Electronic Technical Manual

IEW	intelligence and electronic warfare
IEW COMCAT	IEW communications catalog
IFTE	Integrated Family of Test Equipment
ILS	integrated logistics support
IMETS	Integrated Meteorological System
IMI	interactive multimedia instruction
IO	information operations
IOC	initial operational capability
IPL	integrated priority list
IPPT	Integrated Process and Product Team
IPR	in process review
IPT	Integrated Product Team
IR	information requirements
IRR	Individual Ready Reserve
ISYSCON	Integrated System Control System
IT	information technology
ITMRA	Information Technology Management Reform Act
ITP	individual training plan
ITRO	InterService Training Review Organization
J4	Logistics Directorate, Office of the Joint Chiefs of Staff
J6	Command, Control, Communications, and Computers Directorate, Office of the Joint Chiefs of Staff
J6I	Architecture and Integration Division, Office of the Joint Chiefs of Staff

J7	Operational Plans and Interoperability Directorate, Office of the Joint Chiefs of Staff
JCS	Joint Chiefs of Staff
JDOC	Joint Desired Operational Capability
JDWP	Joint Doctrine Working Party
JFCOM	U.S., Joint Forces Command
JFKSWCS	JFK Special Warfare Center and School
JFOC	Joint Future Operational Capability
JFS	joint feasibility study
JOB	Joint Oversight Board
JPD	Joint Program Directive; Joint Potential Designator
JROC	Joint Requirements Oversight Council
JRTC	Joint Readiness Training Center
JS	Joint Staff
JSA	joint Service agreement
JSIG	Joint Service Integration Group
JSMG	Joint Service Materiel Group
JTA	Joint Technical Architecture
JTA-A	Joint Technical Architecture-Army
JT&E	joint test and evaluation
JTIDS	Joint Tactical Information Distribution System
JWCA	Joint Warfighting Capabilities Assessment
JWFC	Joint Warfighting Center
JWG	joint working group

KPP	key performance parameter
LABCOM	Laboratory Command
LCCE	life cycle cost estimate
LDAPs	Leader Development Action Plans
LDDN	Leader Development Decision Network
LDRDEV	leader developer
LDSS	Leader Development Support System
LEN	large extension switch
LIN	line item number
LNO	liaison officer
LOE	limited objective experiment
LOEP	Limited Objective Experiment Plan
LOGSACS	Logistics Structure and Composition System
LRIP	low rate initial production
LRS	low resolution scenario
LRU	line replacement unit
MACOM	major Army command
MAIS	major automated information system
MANPAD	man-portable air defense
MANPRINT	manpower and personnel integration
MARC	manpower requirements criteria
MATDEV	materiel developer
MCS	Maneuver Control System

MDA	Milestone Decision Authority
MDAP	mandatory procedures for major defense acquisition program
MDEP	Management Decision Package
MDR	Milestone Decision Review
MEDCOM	Medical Command
MER	Manpower Estimate Report
MFORCE	Master Force
MFP	materiel fielding plan
MILDEP	military deputy
MILSATCOM	military satellite communications
MILSPEC	military specification
MIL-STD	military standard
MMI	man-machine interface
MNS	mission needs statement
MOA	memorandum of agreement
MOC	management of change
MOCS	military occupational classification and structure
MODPLAN	modernization plan
MOE	measure of effectiveness
MOI	memorandum of instruction
MOP	measure of performance
MOS	military occupational specialty
MP	mission profile; military police

MRD	materiel requirements document
MRMC	Medical Research and Materiel Command
MS	milestone
M&S	model and simulation
MSC	major subordinate command
MSDS	mission specific data set
MSE	mobile subscriber equipment
MSRD	model and simulation requirements document
MSRR	Model and Simulation Resource Repository
MWD	military working dog
MWRH	Mounted Water Ration Heater
NATO	North Atlantic Treaty Organization
NBC	nuclear, biological, and chemical
NBCC	nuclear, biological, and chemical contamination
NBCRS	NBC Reconnaissance System
NCOA	Noncommissioned Officer Academy
NCOES	Noncommissioned Officer Education System
NCS-E	Net Control Station-EPLRS
NCS-J	Net Control Station-JTIDS
NET	new equipment training
NEFF	non-essential function failure
NGIC	National Ground Intelligence Center
NIMA	National Imagery and Mapping Agency

NMD	National Missile Defense
NMS	National Military Strategy
NSC	National Simulation Center
NSS	National Security System
NSTD	nonsystem training device
NTC	national training center
O&O	operational and organizational
O&S	operations and support
OA	operational architecture
OAC	Officer Advanced Course
OBC	Officer Basic Course
OCIE	organization clothing and individual equipment
ODCSCD	Office of the Deputy Chief of Staff for Combat Developments
ODCSLOG	Office of the Deputy Chief of Staff for Logistics
ODCSOPS	Office of the Deputy Chief of Staff for Operations and Plans
ODUSD(AT)	Office of the Deputy Under Secretary of Defense for Acquisition and Technology
OE	operational element
OI	organizational integrator
OJCS	Office of the Joint Chiefs of Staff
OM	operational manager
OMA	Operation and Maintenance, Army
OML	Order of Merit List
OMS	operational mode summary

OMS/MP	operational mode summary/mission profile
ONS	operational needs statement
OOTW	operations other than war
OPA	Other Procurement Army
OPFAC	operational facility
OPFOR	opposing forces
OPLAN	operating plan
OPSEC	operations security
ORD	operational requirements document
ORGDEV	organization developer
ORS	operational requirements statement
OSCR	operations and support cost reduction
OSD	Office of the Secretary of Defense
OT	operational test/tester; operating time
P3I	preplanned product improvement
PA&E	program analysis and evaluation
pam	pamphlet
PAPA	Public Affairs Proponency Activity
PBD	program budget decision
PBG	program budget guidance
PCP	programmable communications processor
PD	program directive
PDM	program defense memorandum

PDSS	post-deployment software support
PEG	program evaluation group
PEO	program executive officer/office
PERSACS	Personnel Structure and Composition System
PM	program/project/product manager
PMAD	Personnel Management Authorization Document
PMCS	preventive maintenance checks and Services
PMSD	Program Management and Services Directorate
PM TRADE	project manager Training Aids and Devices
PO	project officer
POC	point of contact
POI	program of instruction
POL	petroleum, oils and lubricants
POM	program objective memorandum
PPBES	planning, programming, budgeting, and execution system
PPBS	planning, programming, and budgeting system
PPSS	post production software support
PR	production requirement
PRA	primary review authority
PROBE	Program Optimization and Budget Evaluation
PSA	principal staff assistant
PSY	professional staff years
QQPRI	qualitative and quantitative personnel requirements information

R&D	research and development
R&M	requirements and materiel; reliability and maintainability
RC	Reserve Component
RC3	Reserve Component Configured Courseware
RCTI	Reserve Component Training Institute
RDA	research, development, and acquisition
RDD	requirements definition document
RDEC	Research, Development, and Engineering Center
RDTE	research, development, test, and evaluation
reg	regulation
rep	representative
RFP	request for proposal
RIA	requirements integration and approval
RIC	Requirements Integration Council
RID	Requirements Integration Directorate
RIM	Requirements Integration Manager
RIWG	Requirements Integration Working Group
ROP	routine operating procedure
ROTC	Reserve Officer Training Corps
RRC	Requirements Review Committee
RS	resume sheet
S&T	science and technology
SA	Secretary of the Army; system architecture; system abort

SACS	Structure and Composition System
SAG	senior advisory group
SAMAS	Structure and Manpower Allocation System
SAP	special access program
SAR	safety assessment reports
SAT	systems approach to training
SBCCOM	soldier, biological and chemical command
SBIR	Space-Based Infrared
SC	scoring criteria
SCC	standards categories coordinators
SEP	Soldier Enhancement Program
SGF	Second Generation FLIR
SIGCEN	Signal Center
SIGSEC	signal security
SINCGARS	Single Channel Ground-Air Radio System
SIO	senior intelligence officer
SIP	system improvement plan
SLDDEV	soldier developer
SMA	Sergeant Majors Academy
SMART	Simulation & Modeling for Acquisition, Requirements, and Training
SMD	scheduled maintenance demand
SMDC	Space and Missile Defense Command
SMDR	structure and manning decision review

SME	subject matter expert
SNAP	Standards Nomination and Approval Process
SOW	statement of work
SPCC	Study Program Coordination Committee
SPI	software process improvement
SRO	strategic research objective
SRS	software requirements specification
SRSC	software review and scoring committee
SRU	shop replacement unit
SS	system/subsystem specification; support system
SSA	software support activity
SSCOM	Soldier Support Command
SSP	Simulation Support Plan
SSS	system segment specification
ST	standby time
STA	System Threat Assessment
STAMIS	Standard Army Management Information System
STAR	System Threat Assessment Report
STO	science and technology objective
STOG	science and technology objective guidance
STP	short-term project
STRAP	system training plan
STRICOM	Simulation, Training, and Instrumentation Command

SVP	special visibility program
SWA	Southwest Asia
T&E	test and evaluation
TAA	total Army analysis
TAADS	The Army Authorization Documents System
TACITS	Total Army Centralized Individual Training Solicitation
TADIL	tactical automated data information link
TADSS	training aids, devices, simulations, and simulators
TAEDP	total Army equipment distribution program
TAIS	Tactical Airspace Information System
TASS	Total Army School System
TATS	Total Army Training System
TBD	to be determined
TD	technology demonstration; training development
TDA	tables of distribution and allowances
TDAD	Training Development and Analysis Directorate
TDY	temporary duty
TEA	training effectiveness analysis
TEB	Technical Evaluation Board
TECO	Test and Evaluation Coordination Officer/Office
TEMO	training, exercise, and military operations
TEMP	Test and Evaluation Master Plan
TI	tactical Internet

TILO	Technical Integration Liaison Office
TIR	test incident report
TMD	theater missile defense
TMDE	test, measurement, and diagnostic equipment
TNGDEV	training developer
TOE	table of organization and equipment
TOMA	Training Operations Management Activity
TPF	total package fielding
TPIO	TRADOC Program Integration Office
TPO	TRADOC project officer
TRA	technical review authority
TRAC	TRADOC Analysis Center
TRADE	Training Aids and Devices
TRADOC	U.S. Army Training and Doctrine Command
TRAS	Training Requirements Analysis System
TSARC	Test Schedule and Review Committee
TSD	Tactical Software Division
TSM	TRADOC system manager
TSO	Threat Support Office
TSP	TRADOC Study Program; training support package (per para 3-30d)
TS/SCI	top secret/special compartmental information
TTP	tactics, techniques, and procedures
TWVRMO	Tactical Wheeled Vehicle Requirements Management Office

U&S	unified and specified
UCP	UIR change proposal
UFD	user functional description
UIC	unit identification code
UID	user interface description
UIR	user interface requirement
UJTL	universal joint task list
URS	unit reference sheet
USACAC	United States Army Combined Arms Center
USACE	U.S. Army Chief of Engineers
USASOC	U.S. Army Special Operations Command
USAFMSA	U.S. Army Force Management Support Agency
USAINSCOM	U.S. Army Intelligence and Security Command
USANCA	U.S. Army Nuclear and Chemical Agency
USMTF	U.S. message text format
VCSA	Vice Chief of Staff of the Army
VMF	variable message format
VTC	video teleconferencing
WARM	wartime reserve mode
WARSIM 2000	Warfighter Simulation 2000
WFH	wartime flying hours
WFLA	Warfighting Lens Analysis
WIN	Warfighters' Information Network

WO	warrant officer
WRAP	Warfighter Rapid Acquisition Program
WUR	wartime usage rate
WWW	World Wide Web
XO	executive officer

Section II
Terms

Acquisition Phase
Phases provide a logical means of progressively translating broadly stated mission needs into well-defined, system-specific requirements and ultimately, into operationally-effective, suitable, and survivable systems. All the tasks and activities needed to bring the program to the next MS occur during acquisition phases.

Acquisition Program
A directed, funded effort designed to provide a new, improved, or continuing weapons system or AIS capability in response to a validated operational need. Acquisition programs are divided into different categories, which are established to facilitate decentralized decision making, and execution and compliance with statutory requirements.

Acquisition Strategy
The AS documents the appropriate planning process and provides a comprehensive approach for achieving goals established in material requirements. It serves as a principal long-range document, charting the course of a major acquisition program over its life-cycle.

Advanced Development (Research and Development Budget Activity 6.3)
Includes all efforts, which have moved into the development and integration of hardware and other technology products for field experiments and tests. The results of this type of effort are proof of technological feasibility and assessment of operability and producibility that could lead to the development of hardware for Service use. It also includes advanced technology demonstrations that help expedite technology transition from the laboratory to operational use. Projects in this category have a direct relevance to identified military needs. Advanced Development may include concept exploration as described in DODD 5000.1, but is non-system specific (Milestone 0).

Army Acquisition Executive
Senior acquisition executive responsible for administering acquisition programs IAW established policies and guidelines. The AAE is also the senior procurement executive.

Army Systems Acquisition Review Council
Top level, DA review body for ACAT I and ACAT II programs. Convened at formal milestone reviews or other program reviews to provide information and develop recommendations for decision by the AAE.

Army Vision
The Army Vision document is a conceptual template for how the United States Army will channel the vitality and innovation of its soldiers and civilians and leverage technological opportunities to achieve new levels of effectiveness as the land component member of the joint warfighting team.

Army White Paper
The White Paper is a document used to express a thought and to create discussion. White papers, as discussion documents, carry no official status. They are sometimes structured in a form that could eventually be a requirements determination document but are not used in lieu of TRADOC requirements documents.

Automated information system
A combination of computer hardware and software, data, or telecommunications, that performs functions such as collecting, processing, transmitting, and displaying information. Excluded are computer resources, both hardware and software, that are physically part of, dedicated to, or essential in real time to the mission performance of weapon systems.

Base operations requirements
Base operations are any requirements which do not fall within the definition of "warfighting" requirements, e.g., those requirements that have no interaction with tactical units and do not support an exchange of warfighting information. Examples of base operations requirements includes morale, welfare and recreation Services; base Services support; real estate; facility support Services; maintenance and repair; minor construction; and environmental compliance.

Block modification
A grouping of modifications for the purpose of achieving economies in funds, manpower, equipment, and/or time to enhance configuration management. A block modification includes several modifications in engineering, procurement, and/or applications that are managed as a single modification. Block modifications will be accomplished whenever possible.

Branch proponent
The branch proponent is the commandant or director of the respective school or institution that develops warfighting concepts; doctrine; tactics, techniques, and procedures; organization designs, materiel requirements; training programs; training support requirements; manpower requirements (except as provided in AR 600-3); education requirements; and related matters for a branch in the Army.

Business process reengineering
The fundamental rethinking and radical redesign of core processes to bring about dramatic improvements in performance under political conditions characteristic of the public sector environment.

C3I/C4I Systems
C3I means command, control, communications, and intelligence systems. C4I is the same but with the addition of word "computer." While Information Technology, by definition, includes C3I/C4I systems, C3I/C4I systems are classified as National Security System IT (see definition).

Capstone Requirements Document
Identifies systems requirements to define a mission area and serves as a guide for ORD development. CRDs can be a combination of two or more MNS/ORD programs. The CRD is the bridge between the MNS and program ORDs. It is a living document that reflects changes in threat or technologies.

Capstone Concept
This is the highest level Army concept. This concept links National Military Strategy, Defense Planning Guidance, Joint Vision, The Army Plan, and other high level documents to a description of required future operational capabilities. These capabilities cover the entire range of military operations at strategic, operational, and tactical levels in joint, multi-national, and interagency activities. There is only one capstone concept at a time and TRADOC Pam 525-5 serves as the capstone concept.

Catalog of Approved Requirements Documents
CARDS is a DCSOPS publication that lists approved materiel requirements documents. Its purpose is to provide up-to-date reference information to the combat and materiel development communities.

Chief Information Officer Validation
A representative of the DISC4 (the Army CIO) participates in the requirements determination process as a member of the ICT, and later the IPT, and validates requirements against business process reengineering, compliance with the JTA-A, and ensures they are in compliance with emerging C4I technologies.

Combat developer
A command, agency, organization, or individual that commands, directs, manages, or accomplishes the combat developments work.

Combat developments
The processes of analyzing, determining, documenting, and obtaining approval of concepts, future operational capabilities, organizational requirements, and materiel requirements; leading the Army community in determining solutions for needed future operational capabilities; fostering development of requirements in all DTLOMS domains; providing user considerations to and influence on the Army's S&T program; and integrating the efforts and representing the user across the DTLOMS during the acquisition of materiel and development of organizational products to fill those requirements.

Command, Control, Communications, and Computers Requirements Definition Program
The C4RDP is the Army's only validated source of Battle Command, Combat Service, and Combat Service Support information exchanges. The database is used to develop integrated architectures that can be shared and used by communications architects, program managers, systems integrators, and communication modelers.

Concept developer
Army, joint, or military agency personnel, normally within a combat developments organization, responsible (or have the lead responsibility) for developing and staffing concepts of operation and for evaluating the applicability and potential of DTLOMS ideas to the concept. Concept development and evaluation is a combat developments function supported by an ICT that includes representatives from the DTLOMS domains and HQ TRADOC.

Concept for Future Joint Operations (CFJO)
The Concept for Future Joint Operations is a rudimentary, abstract description of a desired goal as seen by the Chairman of the Joint Chief's of Staff, as he looks at the future battlefield America's armed forces will face in the 21st century.

Concepts of Operation
All concepts written by proponents that support, enable, and amplify the capstone concept are concepts of operation. These concepts translate a vision or visions into a more detailed, but still abstract, description of some future activity or end state, principally concerned with a 3-15 year timeframe. Concepts are unrestricted and support the current capstone concept (TRADOC Pam 525-5). A concept of operation addresses all DTLOMS domains. These concepts address combat, combat support, and combat Service support.

Critical operational issues and criteria
Those decision maker, key operational concerns with bottom line standards of performance, which if satisfied, signify the system is operationally ready to proceed into full production (Milestone III, or an engineering change proposal or modification work order authorization decision for modifications). COICs are prepared in sets that include the issues, and for each issue, a scope, appropriate criteria, and rationale.

DCSCD Internet Website
The World Wide Web site containing DCSCD information. (http://www.tradoc.army.mil/dcscd)

Demonstration and Validation (Research and Development Budget Activity 6.4)
Includes all efforts associated with advanced technology development used to demonstrate the general military utility or cost reduction potential of technology when applied to different types of military equipment or techniques. It includes evaluation and synthetic environment, prototypes, and proof-of-principle demonstrations in field exercises to evaluate system upgrades or provide new operational capabilities. The demonstrations evaluate integrated technologies in as realistic an operating environment as possible to assess the performance or cost reduction potential of advanced technology. It may include concept exploration, as well as demonstration and validation as described in DODD 5000.1, but it is system specific (Milestone 0/I).

Deployable
Term used to describe that which accompanies an organization in actual engagement or in support of wartime operations.

Doctrine
Body of thought composed of the fundamental principles by which military forces guide their actions in support of objectives. It represents consensus on how the Army conducts operations today. It ranges from TTP to basic doctrine (such as FM 100-5).

Doctrine developer
Command, agency, organization, or individual that commands, directs, manages, or accomplishes the doctrine developments work.

Doctrine developments
The process of researching, conceptualizing, analyzing, integrating, determining, documenting, publishing, distributing, and articulating requirements for and products (e.g., field manuals) of doctrine and TTP.

Doctrine requirements
Changes or additions to any of the Army's fundamental principles that guide operational forces. These principles range from TTP to FM 100-5.

DTLOMS Determination Analysis
A DTLOMS determination analysis is the product of ICT members' brainstorming activities. Analysis is derived from studies experiments (constructive, virtual, live), models, simulations, testing, analysis, research, recommendations, exercises, operational lessons learned, and senior military judgement.

DTLOMS Determination Report
A required product of an ICT chartered to provide DTLOMS solution sets. The report is produced by ICT members during brainstorming activities and approved by the ICT convening official. See figure B-5 for specific content.

DTLOMS idea
Conceptual and prototype DTLOMS products that may have applicability and potential as a solution to approved operations concepts and FOC. DTLOMS ideas require evaluation to determine their level of applicability and potential.

Electronic attack
That division of electronic warfare involving the use of electromagnetic, directed energy, or antiradiation weapons to attack personnel, facilities, or equipment with the intent of degrading, neutralizing, or destroying enemy combat capability. Also called EA.

Electronic protection
That division of electronic warfare involving actions taken to protect personnel, facilities, and equipment from any effects of friendly or enemy employment of electronic warfare that degrade, neutralize, or destroy friendly combat capability. Also called EP.

Enduring battlefield functions
Enduring battlefield functions are functions that are not expected to change. They are: Battle Command and Leadership—decision making and providing leadership, a dynamic process that occurs wherever the

commander is located. Maneuver—movement of dismounted, mounted, and aviation combat forces to gain positional advantage. Fires—application of combat power beyond visual range to impair an adversary's freedom of operations and/or inflict casualties. Maneuver Support—those actions taken to husband combat power and provide the force freedom of movement. Sustainment—action required to provide for the support and maintenance of the force.

Engineering and Manufacturing Development (Research and Development Budget Activity 6.5)
Includes those projects in engineering and manufacturing development for Service use. This area is characterized major line item projects. Program control will be exercised by review of individual projects. Includes engineering and manufacturing development projects as described in DODD 5000.1, and may include operational test and evaluation (Milestone II).

Exploratory Development (Research and Development Budget Activity 6.2)
This activity translates promising basic research into solutions for broadly defined military needs, short of major development projects, with a view to developing and evaluating technical feasibility. This type of effort may vary from fairly fundamental applied research to sophisticated bread-board hardware, study, programming, and planning efforts that establish the initial feasibility and practicality of proposed solutions to technological challenges. It would thus include studies, investigation, and development effort. The dominant characteristic of this category of effort is that it be pointed toward specific military needs with a view toward developing and evaluating the feasibility and practicability of proposed solutions and determining their parameters. Program control of the Exploratory Development element will normally be exercised by a general-level of effort. Exploratory Development precedes the system specific research described in DODD 5000.1.

Future Operational Capability
Structured statements of capabilities required to achieve the ideas articulated in a concept. These statements identify areas needed to maintain military dominance over the operational environment in which it will be required to operate. FOCs cover a time period of 3-15 years into the future.

Horizontal Technology Integration
The application of common technology solutions across multiple systems to improve the warfighting capability of the total force. It represents the holistic process of developing, integrating, and fielding of common or multi-use technologies, hardware, and software into different types of weapons and information systems that fight together as units or task forces.

Human Requirements Integration
The holistic process of developing future, force-oriented requirements based upon approved concepts, warfighting experimentation/analysis, and future operational capabilities.

Information assurance
Information operations that protect and defend information and information systems by ensuring their availability, integrity, authentication, confidentiality, and nonrepudiation. This includes providing for restoration of information systems by incorporating protection, detection, and reaction capabilities. Also called IA.

Information technology

a. The term information technology, with respect to an executive agency, means any equipment or interconnected system or subsystem of equipment that is used in the automatic acquisition, storage, manipulation, management, movement, control, display, switching, interchange, transmission, or reception of data or information by the executive agency. For purposes of the preceding sentence, equipment is used by an executive agency if the equipment is used by the executive agency directly or is used by a contractor under a contract with the executive agency which (1) requires the use of such equipment, or (2) requires the use, to a significant extent, of such equipment in the performance of a Service or the furnishing of a product.

b. The term information technology includes computers, ancillary equipment, software, firmware, and similar procedures, Services (including support Services), and related resources.

c. Notwithstanding subparagraphs a and b, the term information technology does not include any equipment that is acquired by a federal contractor incidental to a federal contract.

Initial operational capability

The IOC is the first attainment of the capability by an MTOE unit and supporting elements to operate and maintain effectively a production item or system provided the following:

a. The item or system has been type classified as standard or approved for limited production.

b. The unit and support personnel have been trained to operate and maintain the item or system in an operational environment.

c. The unit can be supported in an operational environment in such areas as special tools, test equipment, repair parts, documentation, and training devices.

Insensitive munition

An insensitive munition is a munition (energetic device) that reliably fulfills its performance, readiness, and operational requirements on demand, but which minimizes the probability of inadvertent initiation and severity of subsequent collateral damage to weapons platforms, logistics systems, and personnel when subjected to unplanned stimuli.

Integrated Concept Team

An integrated team made up of people from multiple disciplines formed for the purposes of developing concepts, determining DTLOMS solutions to FOCs, developing materiel requirements documents, and developing other DTLOMS requirements documents, when desired.

Integrated Product Team

A working level team of representatives from all appropriate functional disciplines working together to build successful and balanced programs, identify and resolve issues, provide recommendations to facilitate sound and timely decisions. IPTs may include members from both government and industry, including program contractors and sub-contractors. Mandatory procedures for IPTs in the oversight and review process are described in DOD Reg 5000.2-R.

Integrated product and process development
A management technique that simultaneously integrates all essential activities through the use of multidisciplinary teams to optimize the design, manufacturing, and supportability processes. IPPD facilitates meeting cost and performance objectives from product concept through production, including field support. One of the key IPPD tenets is multidisciplinary teamwork through IPTs.

Integration
The process of bringing (consolidating, combining) all parts or pieces together into a whole; to unify. Involves the identification, development, and fielding of the right combinations of "capabilities" which cross branch, battle dynamics, Battlefield Operating Systems, mission areas, and DTLOMS domain interests, and the harmonization of Army capabilities with that of sister Services and Allies. The integration process is also to ensure that both the non-tactical and the tactical requirements are IAW the Army's communications architectures to ensure interoperability among systems.

Interactive multimedia instruction (IMI)
A group of computer-based training and training support products. IMI includes source materials that are commonly used in IMI products, electronic products used in the delivery of or supporting the delivery of instruction, and software management tools used to support instructional programs.

Interoperability
The ability of systems, units, or forces to provide Services to and accept Services from other systems, units, or forces, and to use these Services to enable them to operate effectively together.

Joint Requirements Oversight Council
Council responsible to the Vice Chairman of the Joint Chiefs of Staff for the requirements generation system IAW CJCSI 3170.01.

Joint Technical Architecture
Identifies a common set of mandatory information technology standards and guidelines to be used in all new and upgraded C4I IT.

Joint Vision
The Chairman of the Joint Chiefs of Staff (CJCS) issues a Joint Vision that provides a conceptual overview of the armed forces in the future. The Joint Vision establishes the initial conceptual template for how the Services will channel the vitality of their people and leverage technological opportunities to achieve new levels of effectiveness in joint warfighting.

Key performance parameter
That capability or characteristic so significant that failure to meet the threshold can be cause for the materiel concept or system selection to be reevaluated or the program to be reassessed or terminated. KPPs are extracted from the ORD and included in the APB.

Leader development
A continuous, progressive, and sequential process through which leaders acquire the skills, knowledge, and behavior necessary to maintain a trained and ready Army in peacetime to deter war.

Logistician
A command or agency responsible for the independent logistic surveillance and evaluation of material acquisition programs. The logistician is appointed by the DCSLOG.

Major Automated Information System Acquisition Program
An AIS acquisition program that is (1) designated by the ASD(C3I) as a MAISAP, or (2) estimated to require program costs in any single year in excess of $30 million in FY 1996 constant dollars, total program costs in excess of $120 million in FY 1996 constant dollars, or total life-cycle costs in excess of $360 million in FY 1996 constant dollars.

Major Defense Acquisition Program
An acquisition program that is not a highly sensitive, classified program (as determined by the Secretary of Defense) and that is (1) designated by the USD(A&T) as an MDAP, or (2) estimated by the USD(A&T) to require an eventual total expenditure for research, development, test, and evaluation of more than $355 million in FY 1996 constant dollars, or for procurement of more than $2.1 billion in FY 1996 constant dollars.

Major system
A combination of elements that shall function together to produce the capabilities required to fulfill a mission need, to include hardware, equipment, software, or any combination thereof, but excluding construction or other improvements to real property. System shall be considered a major system if it is estimated by the USD(A&T) to require an eventual total expenditure for RDTE of more than $140 million in FY 1996 constant dollars, or for procurement of more than $645 million in FY 1996 constant dollars.

Manpower and personnel integration
The comprehensive technical effort to identify and integrate all relevant information and considerations regarding the full range of manpower, personnel capabilities, training development and delivery, human factors engineering, system safety, health hazards, and soldier survivability into the system development and acquisition process to improve soldier performance, total systems performance, and reduce the cost of ownership to an acceptable level throughout the entire life cycle of a system. MANPRINT is the Army's Human Systems Integration process for systems acquisition.

MANPRINT Domains

a. Manpower (MP) - The personnel strength (military and civilian) available to the Army. Manpower refers to the consideration of the net effect of Army systems on overall human resource requirements and authorizations (spaces), to ensure that each system is affordable from the standpoint of manpower. It includes analysis of the number of people needed to operate, maintain, and support each new system being acquired, including maintenance and supply personnel, and personnel to support and conduct training. It requires a determination of the Army manpower changes generated by the system, comparing the new manpower needs with those of the old system(s) being replaced, and an assessment of the impact of the changes on the total manpower limits of the Army.

b. Personnel (PER) - Military and civilian persons of the aptitudes and grades required to operate, maintain, and support a system in peacetime and war. Personnel refers to the consideration of

the ability of the Army to provide qualified people in terms of specific aptitudes, experiences, and other human characteristics needed to operate, maintain, and support Army systems. It requires detailed assessment of the aptitudes that soldiers must possess to complete training successfully and operate, maintain, and support the system to the required standard. Iterative analyses must be accomplished for the system being acquired, comparing projected quantities of qualified personnel with the requirements of the new system, any system(s) being replaced, and overall Army needs for similarly qualified people. Personnel analyses and projections are needed in time to allow orderly recruitment, training, and assignment of personnel in conjunction with system fielding.

c. Training - Consideration of the necessary time and resources required to impact the requisite knowledge, skills, and abilities to qualify Army personnel for operation, maintenance, and support of Army systems. It involves (1) the formulation and selection of engineering design alternatives that are supportable from a training perspective; (2) the documentation of training strategies; and (3) the timely determination of resource requirements to enable the Army training system to support system fielding. It includes analyses of the tasks that must be performed by the operator, maintainer, and supporter; the conditions under which they must be performed; and the performance standards, which must be met. Training is linked with personnel analyses and actions in that availability of qualified personnel is a direct function of the training process.

d. Human (factors) Engineering (HE) - The technical effort to integrate design criteria, psychological principles, and human capabilities and limitations as they relate to the design, development, test, and evaluation of systems. The HE goals are to maximize the ability of soldiers to perform at required levels by eliminating design-induced errors, and to ensure system operation, maintenance, and support are compatible with the capabilities and limitations of the range of fully-equipped soldiers who would be using such systems. HE provides an interface between the other MANPRINT domains and system engineers. HE supports the MANPRINT goal of developing equipment that will permit effective soldier-machine interaction within the allowable, established limits of training time, soldier aptitudes and skill, physical endurance, physiological tolerance limits, and soldier physical standards. HE provides this support by determining the soldier's role in the system, and by defining and developing soldier-machine interface characteristics, workplace layout, and work environment.

e. System Safety (SS) - The application of engineering and management principles, criteria, and techniques to optimize safety within the constraints of operational effectiveness, time, and cost throughout all phases of the system or facility life cycle.

f. Health Hazards (HH) - The inherent conditions in the use, operation, maintenance, support and disposal of a system (e.g., acoustical energy, biological substances, chemical substances, oxygen deficiency, radiation energy, shock, temperature extremes, trauma, and vibration) that can cause death, injury, illness, disability, or reduce job performance of personnel.

g. Soldier Survivability (SSv) - SYSTEM: The characteristics of a system that can reduce fratricide, as well as reduce detectability of the soldier, prevent attack if detected, prevent damage if attacked, minimize medical injury if wounded or otherwise injured, and reduce physical and mental fatigue. SOLDIER: Those characteristics of soldiers that enable them to withstand (or avoid) adverse

military action or the effects of natural phenomena that would result in the loss of capability to continue effective performance of the prescribed mission.

Materiel developer
The RDA command, agency, or office assigned responsibility for the system under development or being acquired. The term may be used generically to refer to the RDA community in the material acquisition process (counterpart to the generic use of CBTDEV).

Materiel developments
The conception, development, and execution of solutions to materiel requirements identified and initiated through the combat developments process, translating equipment requirements into executable programs within acceptable performance, schedule, and cost parameters.

Materiel requirements
Changes or additions to any of the Army's families of weapon systems, support systems, or TADSS. They range from modernizing existing materiel through parts replacement; major product improvements of existing materiel; one for one replacement of old materiel with new materiel designed to do the same job; to completely new families of materiel designed to do something that has not been done before.

Materiel requirements documents
A document specifically written to articulate the user's operational requirements for a materiel system. The MNS, CRD, and ORD are the Army's materiel requirements documents.

Measure of effectiveness
A quantitative indicator of the ability of a human, human/materiel, or materiel system to accomplish the mission for that which it was designed. For a military force, it is a measure of the ability of the force to accomplish its combat mission, that is, its combat or operational effectiveness. MOEs are system or force attributes.

Measure of performance
The quantitative indicator of the performance capabilities of a system. MOPs are system attributes.

Milestone
A milestone is the major decision point that initiates the next phase of an acquisition program. MDAP milestones may include, for example, the decisions to begin engineering and manufacturing development, or to begin either low-rate initial or full-rate production. MAISAP milestones may include, for example, the decision to begin program definition and risk reduction.

Milestone Decision Authority
The individual designated IAW criteria established by the USD(A&T), or the ASD(C3I) for AIS acquisition programs, to approve entry of an acquisition program into the next phase.

Mission Critical System
A system whose operational effectiveness and operational suitability are essential to successful completion or to aggregate residual combat capability. If this system fails, the mission likely will not be

completed. Such a system can be an auxiliary or supporting system, as well as a primary mission system.

National Security System IT
DOD IT/NSS policy defines NSS IT as any information technology in support of telecommunications or information systems operated by the U.S. Government, the function, operation, or use of which involves: (a) intelligence activities; (b) cryptologic activities related to national security; (c) command and control of military forces; (d) equipment that is an integral part of a weapon or weapons system; or (e) is critical to the direct fulfillment of military or intelligence missions.

Nondeployable
IT not listed on organizational TOE and not taken with the unit to support an assigned mission. Nondeployable IT is needed to support the exchange of warfighting information between garrison TDA organizations, between tactical TOE units operating in garrison, or between TDA organizations and TOE units operating within garrison or at deployed locations.

Objective value ORD requirement
That desired by the user (CBTDEV/TNGDEV) and which the PM is attempting to obtain. The objective value could represent an operationally meaningful, time critical, and cost effective increment above the threshold. Program objectives may be refined based on the results of each program phase. The spread between the objective and the threshold shall be individually set based on characteristics of the program (e.g., maturity, risk).

Operational architecture
OA contains text and graphic models to show functions and information required, graphic representations of how the Army organizes and equips to execute C4 processes, and a database to provide detailed characteristics about information exchanges, such as format (voice/data/imagery), speed of Service, perishability, and criticality. The OA will show relationships among organizations and functions in terms of the information they need, use, and exchange.

Operational facility
The OPFAC is the Army's tool for C4 appetite suppression. Items listed in the OPFAC have had their need validated by doctrine. Validated OPFAC requirements support the development of TOE.

Organizational requirements
Changes or additions to any of the Army's TOE. These range from modifying the numbers or types of equipment in a current organization to documenting an entirely new organization through the force design process.

Overarching Integrated Product Team
The OIPT is a team led by the appropriate OSD technical director, and composed of the PM, PEO, component staff, and USD(A&T) staff, the Joint Staff, and other OSD staff principals, or their representatives, involved in the oversight and review of a particular MDAP for which the USD(A&T) is MDA. The OIPT provides strategic guidance for the early resolution of issues, as well as oversight and review as the program proceeds through its acquisition life-cycle.

Preplanned product improvements
Planned future evolutionary improvement of developmental systems for which design considerations are accomplished during development to enhance future applications of projected technology. It includes improvements planned for ongoing systems that go beyond the current performance envelope to achieve a needed operational capability.

Production requirement
The single official documentation of a customer's intelligence requirement.

Program directive
Documentation used to identify and validate requirements for new, revised, and changed doctrinal literature. The program directives establish an audit trail for establishment of doctrinal work requirements.

Program, project, product manager
A HQDA board-selected manager for a system or program. A PM may be subordinate to either the AAE, PEO, or a materiel commander. Refers to the management level of intensity the Army assigns to a particular weapon system or information system. As a general rule, a program manager is a general officer or Senior Executive Service (SES); a project manager is a colonel or GS-15; a product manager is a lieutenant colonel or GS-14.

"Red Teaming"
"Red Teaming" is an independent vulnerability assessment activity that targets information or information-based systems and their associated information support infrastructure for the purpose of assessing system vulnerabilities, conducts risk management in analyzing those vulnerabilities, implements appropriate fixes, and thereby increases the commander's ability to conduct combat operations.

Required capabilities
Operational abilities needed to perform the range of future military operations as described in the capstone concept and subordinate concepts. Capabilities may be explicitly stated in concepts or derived through analyses of one or more concepts or facets of military operations. Capabilities are attained through changes to or development of new doctrine, training, leader development, organization, materiel, and/or soldier support.

Requirements
Modifications to current Army or joint DTLOMS structure to achieve a desired future operational capabilities.

Soldier requirements
Changes or additions to the Army's MOS structure. These range from changes in the numbers of soldiers needed in a MOS to the creation of an entirely new MOS and identifying the skills desired of these soldiers.

Specified proponent
Commander or chief of any agency responsible for a designated area that does not fall within the purview of branch proponent. They have the same responsibilities as branch proponents.

Standardization
The process of developing concepts, doctrines, procedures, and designs to achieve and maintain the most effective levels of compatibility, interoperability, interchangeability, and commonality in the fields of operations, administration, and materiel. Standardization is the process by which nations achieve the closest practicable cooperation among forces, and the most efficient use of research, development, production resources, and items.

Systems architecture
SA is the physical layout, depicted graphically, showing the relationship of the information exchange and connectivity requirements. The SA identifies components, capabilities, and establishes interconnections among C4 components of systems. The SA can be developed for an individual system or at higher levels to depict the integration of numerous systems into a "system of systems" architecture.

Systems Employment Concepts
Systems employment concept documents describe how a system operationalizes future operational capabilities (FOCs) and supports TRADOC Pam 525-series subordinate concepts.

Technical architecture
TA is comparable to a building code, not dictating what to build (OA), or how to build (SA), but rather delineating the standards to build and to pass inspection. The TA identifies a framework of standards and includes top level system specifications and architectural diagrams for technical interface specifications.

Technical architecture framework for information management
Identifies information technology standards that promote interoperability, portability, and scalability.

Technology
The application of science to achieve an objective or develop a new skill.

Threat
Ability of an enemy, or potential enemy, to limit, neutralize, or destroy effectiveness of current or projected mission, organization, or item of equipment. A statement of that threat is prepared in sufficient detail to support Army planning and development of concepts, doctrine, training, and material. A statement of a capability prepared in necessary detail, in context of its relationship to a specific program or project, to provide support for Army planning and development of concepts, doctrine, and materiel.

Threshold value ORD requirement
The minimum acceptable value that in the user's (CBTDEV's/TNGDEV's) judgment, is necessary to satisfy a need. If threshold values are not achieved, program performance is seriously degraded, the program may be too costly, or the program may no longer be timely.

Total package fielding (TPF)
TPF is the Army's standard materiel fielding process (see AR 700-142 and DA Pam 700-142). Successful implementation of TPF requires that:

a. Each gaining command defines how it supports the system (prepare and submit the Mission Support Plan).

b. The MATDEV generates and coordinates the materiel requirements list (MRL). The MRL identifies the materiel and support requirements to each gaining and supporting unit. The MRL contains the initial ASL/PLL, which is calculated using sparing to availability.

c. The fielding and gaining commands coordinate directly to determine the required contents of the total package.

Trainer
The agency that trains personnel to operate and maintain development items or systems. For most equipment, this is TRADOC.

Training developer
Command or agency that formulates, develops, and documents or produces training concepts, strategies, requirements (materiel and other), and programs for assigned mission areas and functions. Serves as user (trainer and trainee) representative during acquisitions of their approved training materiel requirements (MNS and ORDs) and training program developments.

Training development
The conception, development, and execution of solutions to training requirements identified through the combat development process. The solutions may include new or revised training programs, material, methods, media, and system and nonsystem training devices.

Training devices
TADSS that simulate or demonstrate the function of equipment or weapon systems. These items are categorized as follows:

a. Stand-alone TADSS. An autonomous item of training equipment designed to enhance or support individual or collective training.

b. Embedded. Training that is provided by capabilities designed to be built into or added onto operational systems to enhance and maintain the skill proficiency necessary to operate and maintain that system. Embedded training capabilities encompass four training categories:

(1) Category A - Individual/Operator. To attain and sustain individual, maintenance, and system orientation skills.

(2) Category B - Crew. To sustain combat ready crews/teams. This category builds on skills acquired from Category A.

(3) Category C - Functional. To train or sustain commander, staffs, and crews/teams within each functional area to be utilized in their operational role.

(4) Category D - Force Level (Combined Arms Command and Battle Staff). To train or sustain combat-ready commanders and battle staffs utilizing the operational system in its combat operational role.

c. System Training Device (STD). Designed for use with specific system, family of systems, or item of equipment, including subassemblies and components. STDs may be designed/configured to support individual, crew, collective or combined arms training tasks.

d. Nonsystem TADSS (NSTD). Designed to support general military training and nonsystem specific training requirements.

e. Simulators. A training medium that replicates or represents the functions of a weapon, weapon system, or item of equipment generally supporting individual, crew, or crew subset training. Simulators may stand alone or be embedded.

f. Simulations. A training medium designed to replicate or represent battlefield environments in support of command and staff training. Simulations may stand alone or be embedded.

Training/leader development requirements
Changes or additions to any of the Army's training or professional development programs. These range from institutional training conducted at TRADOC schools to individual self-development and unit training programs conducted in the field.

Training Support Package (TSP)
A complete, exportable package integrating training products, materials, and/or information necessary to train one or more critical tasks. Its contents will vary depending on the training site or user. A TSP for individual training is a complete, exportable package integrating training products/materials necessary to train one or more critical individual tasks. A TSP for collective training is a package that can be used to train critical collective and supporting critical individual tasks (including leader and battle staff).

User
TOE or TDA command, unit, element, agency, crew, or person (soldier or civilian) operating, maintaining, and/or otherwise applying DTLOMS products in accomplishment of a designated mission.

User functional description
A vehicle used by CBTDEVs with users, MATDEVs, testers, and evaluators to refine and amplify operational requirements for automated capabilities.

User interface requirement
The UIR is the combat developer's "official" statement of user information exchange requirements. The UIR is a stand-alone document and is the basis for interface specification development by the materiel developer. A UIR is developed for each objective interface.

User representative
Presents the user viewpoint during DTLOMS requirements determination, documentation, and acquisition processes.

Validation
The review of documentation by an operational authority, other than the user, to confirm the need or operational requirement. As a minimum, the operational validation authority reviews the MNS, confirms that a nonmateriel solution is not feasible, assesses the joint Service potential, and forwards a recommendation to the MDA for MS 0 action.

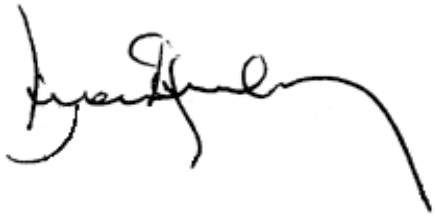
Vision
A rudimentary abstract description of a desired endstate.

Warfighting requirements
Requirements for DTLOMS products in direct use by or support of the Army warfighter in training for and conducting operational missions (tactical or other), or connecting that warfighter to the sustaining base.

FOR THE COMMANDER:

OFFICIAL:

CHARLES W. THOMAS
Major General, GS
Chief of Staff



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