

**Army Regulation 70–75**

**Research, Development, and Acquisition**

# **Survivability of Army Personnel and Materiel**

**Headquarters  
Department of the Army  
Washington, DC  
2 May 2005**

**UNCLASSIFIED**

# ***SUMMARY of CHANGE***

AR 70-75

Survivability of Army Personnel and Materiel

This major revision, dated 2 May 2005--

- o Implements changes regarding the updated DOD 5000 series publications and AR 70-1 (throughout).
- o Updates the nuclear survivability and nuclear, biological, and chemical contamination survivability waiver process (para 1-5).
- o Updates organizational responsibilities and names within Army headquarters, major commands, and heads of other Army elements (chap 2, secs II, III, and IV).
- o Adds system of systems survivability information (para 4-3).

Research, Development, and Acquisition

Survivability of Army Personnel and Materiel

By Order of the Secretary of the Army:

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General, United States Army  
Chief of Staff

Official:



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Administrative Assistant to the  
Secretary of the Army

**History.** This publication is a major revision.

**Summary.** This regulation, which provides policies, responsibilities, and procedures for ensuring the materiel acquisition process and addresses the combat survivability of Army personnel, has been revised to implement acquisition policy changes directed by Department of Defense Instruction (DODI) 5000.2, Operation of the Defense Acquisition System, the Interim Defense Acquisition Guidebook, and Army Regulation 70–1.

**Applicability.** This regulation applies to the Active Army, the Army National Guard of the United States (ARNGUS)/Army National Guard (ARNG), and the U.S. Army Reserves.

**Proponent and exception authority.** The proponent for this regulation is the

Assistant Secretary of the Army for Acquisition, Logistics and Technology (ASA(ALT)). The proponent has the authority to approve exceptions or waivers to this regulation that are consistent with controlling law and regulations. The proponent may delegate this approval authority, in writing, to a division chief within the proponent agency or a direct reporting unit or field operating agency of the proponent agency in the grade of colonel or the civilian equivalent. The proponent does not have authority to approve exceptions dealing with nuclear survivability and nuclear, biological, and chemical contamination survivability; insensitive munitions; or live fire. Activities may request a waiver to this regulation by providing justification that includes a full analysis of the expected benefits and must include formal review by the activity's senior legal officer. All waiver requests will be endorsed by the commander or senior leader of the requesting activity and forwarded through their higher headquarters to the policy proponent. Additionally, activities seeking exceptions concerning nuclear, biological, and chemical contamination survivability, insensitive munitions, or live fire, should submit such requests in writing through ASA(ALT) to the Assistant Secretary of the Army (Acquisition, Logistics, and Technology), SAAL–SMA, Attn: Chief, NBC Branch, 2511 Jefferson Davis Highway, Arlington, VA 22202–3911. Refer to AR 25–30 for specific guidance.

**Army management control process.**

This regulation contains management control provisions and identifies key management controls that must be evaluated (see app B).

**Supplementation.** Supplementation of this regulation and establishment of command and local forms are prohibited without prior approval from the Assistant Secretary of the Army for Acquisition, Logistics, and Technology ATTN: SAAL–SMA, 2511 Jefferson Davis Highway, Arlington, VA 22202–3911.

**Suggested improvements.** Users are invited to send comments and suggested improvements on DA Form 2028 (Recommended Changes to Publications and Blank Forms) directly to the Assistant Secretary of the Army for Acquisition, Logistics, and Technology, ATTN: SAAL–SMA, 2511 Jefferson Davis Highway, Arlington, VA 22202–3911.

**Distribution.** Distribution of this publication is available in electronic media only and is intended for command level D for the Active Army, the Army National Guard of the United States, and the U.S. Army Reserve.

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## **Chapter 1 Introduction**

### **1–1. Purpose**

This regulation implements survivability as outlined in DODI 5000.2 and the Interim Defense Acquisition Guidebook within the Army. It prescribes combat survivability policies, responsibilities, and procedures for the sustainment of operational effectiveness and warfighting capability through the life cycle of survivable systems, personnel, equipment, and support. Combat survivability is the capability of a system to avoid (susceptibility) or withstand (vulnerability) man-made hostile environments. The term “survivability” includes both soldier and equipment unless otherwise specified.

### **1–2. References**

Required and related publications and prescribed and referred forms are listed in appendix A.

### **1–3. Explanations of abbreviations and terms**

Abbreviations and special terms used in this regulation are explained in the glossary.

### **1–4. Responsibilities**

Responsibilities are listed in sections I through IV of chapter 2.

### **1–5. Exemptions**

This regulation does not apply to personnel conducting acquisitions of—

- a.* Information systems in the sustaining base information mission area (IMA), software, hardware, services, and supplies that are acquired under AR 25–1.
- b.* National Foreign Intelligence Program capabilities, such as the Consolidated Cryptologic Program and the Department of Defense Intelligence Information System.
- c.* Base level commercial equipment.
- d.* Stand alone training devices, test instrumentation, and training and threat simulators.
- e.* Textile uniforms, equipment, and other materiel that are resistant to decontamination by individual decontamination kits until they can be exchanged, but that, inherently, on the basis of safety requirements, cannot be decontaminated for continued reuse.
- f.* Host nation lease equipment.

### **1–6. Policy**

- a.* The survivability of personnel and materiel is an essential requirement during the life cycle of systems that must perform critical functions, whether they are developmental materiel, non-developmental items (NDIs), or materiel modifications. Survivability will be addressed in acquisition strategies for all Army materiel. DODI 5000.2 and the Interim Defense Acquisition Guidebook provide survivability considerations at milestone decision points. Survivability will be considered during all acquisition phases.
- b.* The initial capabilities document (ICD) will define the shortfalls or deficiencies of existing capabilities, the mission’s expected operational environment, and the level of desired mission capability in these environments.
- c.* The System Manpower and Personnel Integration Management Plan (SMMP) will identify and track the resolution of soldier survivability concerns throughout the acquisition process. The System Safety Management Plan (SSMP) will similarly identify the method to track and resolve safety concerns.
- d.* The capabilities development document (CDD) and capabilities production document (CPD) incorporate system survivability requirements, identifying survivability thresholds and objectives, and specify whether or not the need is mission critical. Initial survivability requirements, supported by criteria, are developed by milestone B and incorporated into the draft CDD/CPD. The CDD/CPD survivability characteristics should be stated in terms of measurable quantitative parameters. The acquisition program baseline will include survivability characteristics. Critical survivability characteristics and parameters that require test and evaluation (T&E) will be identified and included in the Test and Evaluation Master Plan (TEMP).
- e.* Analyses of survivability against each threat, to include trade-off analysis, are done in the context of all threats and balanced across all survivability disciplines to maintain overall mission performance. Fratricide due to the collateral effects of friendly systems is considered a vulnerability. Failure to control fratricide is a soldier survivability issue and will be managed according to System Manpower and Personnel Integration (MANPRINT) Management Plan procedures, as described in AR 602–2. The integrated survivability analysis is maintained for use as a survivability audit trail of requirements, trade-off decisions, and quantitative measures of effectiveness.
- f.* Survivability features of system and soldier survivability must be designed to be maintainable throughout the life cycle. Additionally, when the system is modified, the threat changes, or there is a change in the doctrine of system

deployment, a survivability review by the combat developer (CBTDEV), materiel developer (MATDEV), and independent evaluator is required to verify that the changes do not adversely affect the survivability of the system or soldier.

*g.* MATDEVs will provide an assessment of the survivability of the system in the anticipated battlefield environment at milestone reviews and in-process reviews (IPRs).

*h.* Shortfalls in the satisfaction of survivability requirements must be substantiated by the MATDEV, in coordination with the CBTDEV (see AR 70–1 and AR 71–9), and submitted to the Milestone Decision Authority (MDA) during the milestone review process. The rationale for failure to meet requirements, as well as risk analysis and risk mitigation approaches, is included as part of the substantiation process. Shortfalls that introduce safety hazards must enter the system safety risk management process (see AR 385–16) for mitigation of the risk or appropriately documented risk acceptance.

*i.* If an item is designated as mission critical/mission essential or is a critical component of one or more mission critical end items, it will be nuclear and nuclear, biological, and chemical (NBC) contamination survivable. If this critical item or component is electronic equipment, at a minimum, it will be survivable to high-altitude electromagnetic pulse (HEMP). If this critical item is a weapon system (including all mission critical/mission essential equipment/components of the weapon system), it will also survive the initial nuclear weapon effects of blast, thermal radiation, initial nuclear radiation, and source region EMP (SREMP). The use of critical commercial-off-the-shelf/non-developmental items (COTS/NDI) does not preclude this requirement. However, waiver processes exist for nuclear survivability criteria, NBC contamination survivability criteria, and related testing procedures by AR 15–41. This waiver process does not change the need to meet the survivability requirement.

*j.* If this critical item or component is electronic equipment, it will be survivable to electromagnetic environment criteria and survivable in an electronic attack environment (including directed energy weapons).

*k.* Critical components of one or more mission critical end items will possess the same level of survivability as the most survivable end item.

## **Chapter 2 Responsibilities**

### **Section I Headquarters, Department of the Army**

#### **2–1. Assistant Secretary of the Army (Acquisition, Logistics and Technology)**

The Assistant Secretary of the Army (Acquisition, Logistics and Technology (ASA(ALT))) will—

- a.* Establish and manage Army survivability policy and guidance in Army research, development, and acquisition.
- b.* Provide technical and funding guidance for the survivability technology base.
- c.* Represent HQDA on boards and committees concerning materiel survivability matters.
- d.* Provide the vice chairman for the NCSC and a representative to the NCSCS.

#### **2–2. Assistant Secretary of the Army (Manpower and Reserve Affairs)**

The Assistant Secretary of the Army (Manpower and Reserve Affairs) (ASA(M&RA)) will coordinate with ASA (ALT) in support of individual soldier survivability issues.

#### **2–3. Deputy Chief of Staff, G–1**

The Deputy Chief of Staff, G–1 (DCS, G–1) will—

- a.* Coordinate survivability aspects of the Army Soldier-Oriented Research and Development (SORD) program and other soldier survivability matters, as appropriate.
- b.* Develop policy and provide guidance for the assessment of soldier survivability as a domain of MANPRINT.

#### **2–4. Deputy Chief of Staff, G–2**

The Deputy Chief of Staff, G–2 (DCS, G–2) will—

- a.* Establish threat information policy and guidance according to AR 381–11.
- b.* Approve and validate threat documentation for designated systems according to DOD 5200.1–M, Defense Acquisition Systems Protection Program, and AR 381–11. Coordinate with the Defense Intelligence Agency (DIA) for validation of major programs or programs with DOD oversight.
- c.* Examine system vulnerabilities identified by other staff elements and agencies to determine if adversaries or potential adversaries possess the capability and intent to exploit our vulnerabilities.
- d.* Provide a representative for the NCSC and NCSCS.

### **2-5. Deputy Chief of Staff, G-3**

The Deputy Chief of Staff, G-3 (DCS, G-3) will—

- a.* Establish policies, requirements, guidelines, and priorities that will ensure the development of survivable materiel and enhance individual soldier survivability.
- b.* Ensure that both system and force level survivability issues, to include requirements and criteria, have been considered in all changes to system threats, mission, or hardware.
- c.* Represent Headquarters, Department of the Army (HQDA) on interdepartmental working groups, boards, and meetings on nuclear and NBC contamination survivability policy and criteria.
- d.* Provide a chairman for the NCSC and serve as approval authority for proposed modifications or waivers to nuclear survivability and NBC contamination survivability criteria and related testing procedures.
- e.* Provide a representative to the NCSCS.

### **2-6. Deputy Chief of Staff, G-4**

The Deputy Chief of Staff, G-4 (DCS, G-4) will—

- a.* Ensure that survivability requirements are considered in all configuration changes of materiel.
- b.* Evaluate the application of the logistics requirements of the Department of Defense (DOD) 5000 series directives, AR 70-1, and AR 700-127 by the MATDEV in the systems life cycle development.
- c.* Provide a representative for the NCSC and NCSCS.

### **2-7. Deputy Chief of Staff, G-6/Chief Information Officer**

The Deputy Chief of Staff, G-6/Chief Information Officer (DCS, G-6/CIO) will—

- a.* Provide computer resources survivability oversight for all systems, and communications survivability for command, control, communications, computers and information technology (C4IT) systems.
- b.* Ensure MATDEVs consider computer resources and communications survivability in their development plans.

### **2-8. Deputy Chief of Staff, G-8**

The Deputy Chief of Staff, G-8 (DCS, G-8) will—

- a.* Ensure that both system and force level survivability issues have been considered during the transitioning of approved Army requirements to solutions.
- b.* Provide a representative for the NCSC and NCSCS.

### **2-9. Director of Army Safety**

The Director of Army Safety will—

- a.* Develop, coordinate, and disseminate system safety policies that integrate safety with survivability of Army personnel and materiel.
- b.* Ensure the Army automated safety information database is accessible to CBTDEVs and MATDEVs.

### **2-10. The Surgeon General**

The Surgeon General will—

- a.* Exercise Army staff responsibility for medical research, development, testing, and evaluation (RDT&E).
- b.* Exercise staff responsibility for the Health Hazard Assessment (HHA) Program according to AR 40-10.

### **2-11. Chief of Engineers**

The Chief of Engineers (COE) will manage survivability efforts for those RDT&E projects within the COE's areas of responsibility and ensure compliance with this regulation.

## **Section II**

### **Commanders of Major Army Commands**

#### **2-12. Commanding General, U.S. Army Materiel Command**

The Commanding General, U.S. Army Materiel Command (CG, AMC) will—

- a.* Maintain through the U.S. Army Research, Development, and Engineering Command (RDECOM) the Army focal point for survivability and provide the capability for integrated technical analysis of the survivability of all Army systems.
- b.* Coordinate with U.S. Army Space and Missile Defense Command (USASMDC) for matters pertaining to ballistic missile defense (BMD) survivability.
- c.* Provide technical expertise, advice, and recommendations to the Commanding General, U.S. Army Training and Doctrine Command (CG, TRADOC) (and other CBTDEVs) on combat survivability and vulnerability.

- d.* Provide technical expertise, advice, and recommendations to the Army Acquisition Executive (AAE) and MAT-DEVs. Develop survivability strategies for systems being developed by AMC MATDEVs.
- e.* Provide survivability modeling and simulation support to MATDEVs and CBTDEVs.
- f.* Ensure that hardened equipment and components, when fielded, receive standardized markings that identify the hardening applied.
- g.* Through the Army Research Laboratory (ARL), provide survivability, lethality, and vulnerability analysis to Army Test and Evaluation Command for Army materiel programs.
- h.* Coordinate with the Commanding General, U.S. Army Medical Command (CG, MEDCOM)/Surgeon General) on health hazard assessments.
- i.* Provide a representative for the NCSC and NCSCS.

**2-13. Commanding General, U.S. Army Space and Missile Defense Command/U.S. Army Forces Strategic Command**

The Commanding General, U.S. Army Space and Missile Defense Command/U.S. Army Forces Strategic Command (CG, USASMDC) will—

- a.* Ensure that Army space and BMD systems achieve acceptable mission effectiveness in the defense suppression threat environment and other operating environments through compliance with this regulation.
- b.* Conduct and maintain survivability RDT&E efforts, including the identification of survivability technologies and systems analysis expertise necessary to support Army space and BMD acquisition and operational programs. Manage and maintain the Army space and BMD survivability database.
- c.* Coordinate with the TRADOC, other CBTDEVs, and MATDEVs on the integration of survivability technology into Army space and BMD systems.
  - (1) Assist in establishing quantitative survivability criteria for requirements documents for those systems.
  - (2) Provide technical expertise, advice, and recommendations to the TRADOC, other CBTDEVs, and MATDEVs on the survivability of Army space and BMD systems.
  - (3) Support the TRADOC battle laboratories in the survivability of space and BMD systems.
- d.* Provide technical advice and recommendations to Army space and BMD MATDEVs.
  - (1) Support development of survivability strategies for Army space and BMD systems.
  - (2) Ensure effective technology transfer into the acquisition process.
- e.* Provide survivability modeling and simulation support to the Army space and BMD system MATDEVs and CBTDEVs, and conduct assessments of Army space and BMD system and element survivability.
- f.* Coordinate with CG, AMC and CG, TRADOC to ensure that Army space and BMD survivability capability is focused toward overall Army requirements, eliminates duplication of effort, and facilitates transfer of common survivability technologies between AMC and USASMDC.
- g.* Provide test data from two SMDC major range and test facility base activities:
  - (1) U.S. Army Kwajalein Atoll/Reagan Test Site (USAKA/RTS)
  - (2) High Energy Laser Systems Test Facility (HELSTF).

**2-14. Commanding General, U.S. Army Training and Doctrine Command**

The Commanding General, U.S. Army Training and Doctrine Command (CG, TRADOC) will—

- a.* Develop strategy, policies, procedures, and training to ensure that survivability requirements are considered early in the concept phase and that these requirements are balanced and integrated with the characteristics of other associated systems.
- b.* Ensure survivability tactics, techniques, and procedures are included in training programs and doctrinal literature.
- c.* In coordination with CG, AMC and USASMDC, ensure that the survivability technology base is focused on Army requirements.
- d.* Support AMC and USASMDC in providing survivability modeling and simulation support to MATDEV and CBTDEV.
- e.* Provide a representative for the NCSC and NCSCS.

**Section III**

**Heads of Other Army Elements**

**2-15. Director, U.S. Army Nuclear and Chemical Agency**

The Director, U.S. Army Nuclear and Chemical Agency (USANCA) will—

- a.* Establish preliminary nuclear survivability and NBC contamination survivability criteria that specify nuclear and NBC contamination survivability for items declared as mission critical/mission essential in the initial capabilities document (ICD). (See AR 10-16.)

- b.* Establish final nuclear survivability and NBC contamination survivability criteria for requirements contained in CDDs/CPDs that specify nuclear and NBC contamination survivability.
- c.* Assist CBTDEVs with the application of nuclear survivability and NBC contamination survivability criteria for systems and assist in the evaluation of system survivability shortfalls.
- d.* Provide two directors and two members to the NCSCS and administrative support to both the NCSC and NCSCS.
- e.* Monitor the Army's nuclear and NBC contamination survivability programs.

## **2-16. Commanding General, U.S. Army Research, Development and Engineering**

The Commanding General, U.S. Army Research, Development and Engineering (CG, RDECOM) will—

- a.* Execute command responsibilities for combat survivability under CG, AMC.
- b.* Support ASA(ALT) in their role of managing facilities essential to NBC defense research, development, and acquisition (RDA).
- c.* Evaluate materiel against performance standards derived from survivability criteria.
- d.* Through the ARL/Survivability—Lethality Analysis Directorate (SLAD), provide survivability analysis input to TRADOC for inclusion in analysis of alternatives (AoA).
- e.* Address soldier survivability issues by performing G-1 MANPRINT domain assessments and by working with the program manager, HQDA, G-1, and USATEC communities.
- f.* Through ARL, develop potential methodology to assess and evaluate survivability in the context of system of systems.
- g.* Develop and maintain procedures and standards to support Army materiel survivability.
- h.* Conduct and maintain survivability research and development, including the identification of survivability technologies and systems analysis expertise necessary to support acquisition of survivable materiel systems and to support TRADOC battle laboratories.
- i.* Coordinate with TRADOC on the integration of survivability technology into the enhanced concept-based requirements system.
- j.* Provide a representative for the NCSC and NCSCS.

## **2-17. Commanding General, U.S. Army Test and Evaluation Command**

The Commanding General, U.S. Army Test and Evaluation Command (CG, USATEC) will—

- a.* Support the acquisition and force development processes through overall management of the Army's test and evaluation programs.
- b.* Plan, conduct, and report the results of developmental and operational testing and life-cycle testing, including live fire testing; and develop and maintain the modeling and simulation (M&S) tools and test facilities.
- c.* Provide the independent system evaluation report for all milestone decision reviews, the materiel release decision, and at other occasions upon request. (This must include system of systems evaluation and test efforts.)
- d.* Provide survivability, vulnerability, and lethality analysis and survivability enhancement assessment expertise for Army materiel programs.
- e.* Provide one representative for the NCSC and two representatives for the NCSCS.

## **2-18. Commanding General, U.S. Army Medical Command**

The Commanding General, U.S. Army Medical Command (CG, MEDCOM) will—

- a.* Assess health hazard assessment (HHA) data, establish and issue all medical policies, health standards, exposure limits, or other policies that relate to exposure of personnel to actual or potential health hazards.
- b.* Coordinate with CG, AMC on HHAs.
- c.* Maintain coordination with other MATDEVs and test organizations for all matters pertaining to the health and performance of individual soldiers.
- d.* Provide guidance on medical aspects of systems T&E requirements, including safety criteria (in concert with safety personnel) and the use of human test subjects and biomedical instrumentation.
- e.* Issue and maintain interim standards for health hazards and threshold effect levels for NBC contaminants, electromagnetic environments, and directed energy levels for safe exposure of friendly soldiers until long-term standards are developed.
- f.* Issue and maintain criteria and instrumentation requirements to support assessment of crew casualties during system T&Es.
- g.* Function as MATDEV and MDA for medical programs related to NBC matters.

## **Section IV**

### **Milestone Decision Authorities and Materiel Developers**

#### **2–19. Milestone decision authorities**

The milestone decision authorities (MDA) (see AR 70–1 for identification of MDAs for the various acquisition categories) will—

*a.* Ensure that Army acquisition provides systems that achieve acceptable mission effectiveness in an operational environment.

*b.* Review the assessment of the survivability of each system at the Army Systems Acquisition Review Council (ASARC) or IPR, and in the AoA or other economic analyses.

*c.* Retain approval authority for waivers to survivability requirements, except as specified in AR 15–41 for nuclear and NBC contamination survivability criteria, AR 73–1, and the Army Insensitive Munitions Plan for insensitive munitions. A waiver process exists for full-up live fire testing (see AR 73–1). This waiver process does not change the need to meet the survivability requirement.

#### **2–20. Materiel developers**

Program executive officers (PEOs) and direct reporting program managers (PMs) for materiel developers (MATDEVs) will—

*a.* Ensure that assigned systems achieve acceptable mission effectiveness in a man-made hostile environment through compliance with this regulation.

*b.* Develop and implement a survivability strategy as part of the acquisition strategy for assigned programs. These strategies should use existing Army and Government resources whenever feasible.

*c.* Provide an assessment of the survivability of all required systems and report survivability accomplishments and issues to the MDA as part of the milestone review process. Issues related to nuclear survivability and NBC contamination survivability should be forwarded to the Nuclear and Chemical Survivability Committee (NCSC) and Nuclear and Chemical Survivability Committee Secretariat (NCSCS).

*d.* Support the CBTDEV as required in the development of survivability requirements.

*e.* Provide relevant and current information on nuclear survivability and NBC contamination survivability studies and analyses to the Director, Nuclear and Chemical Survivability Committee (NCSC) Secretariat prior to each milestone decision. Requests for waivers for nuclear and NBC survivability will be made to the NCSC for approval prior to milestone C. (See AR 15–41.)

*f.* Document survivability test and evaluation/analysis, and improvements that mitigate deficiencies, providing an audit trail throughout the acquisition life cycle of the item.

*g.* Ensure appropriate survivability requirements are included and funded in the TEMP, Quality Assurance Plan, Integrated Logistics Support Plan (ILSP), and the Life-Cycle Survivability Maintenance Plan.

*h.* Provide formal feedback to the combat developer, MATDEV, logistician, and other organizations (for example, USASC for safety issues) on the risks accepted at milestone decision reviews and in-process reviews for all assigned systems.

## **Chapter 3 Procedures**

### **3–1. Shared responsibility for survivability goals**

CBTDEVs and MATDEVs share responsibility for the survivability of Army materiel and personnel. This regulation, together with AR 602–2, delineates procedures that enable CBTDEVs and MATDEVs to achieve their survivability goals.

### **3–2. Survivability in the requirements process**

Materiel survivability is addressed in the ICD in terms of the threat to be countered, the operational threat environment, and an assessment that the item is or is not mission critical/mission essential. Soldier survivability is the integration of the survivability of the individual soldier and how the system affects the soldier's survivability. Concepts and alternatives considered in the pre-acquisition phase will address methods to enhance low observable capabilities, hit avoidance, hit survivability, and system reconstitution (including battle damage repair) in all threat environments. The CDD/CPD includes a list of proposed survivability thresholds and objectives, as appropriate. Key parameters represent minimum acceptable levels (thresholds) of survivability.

### **3–3. Survivability and the threat process**

The CBTDEVs and MATDEVs consider the threat from milestone A throughout the entire life cycle of each

acquisition program. CBTDEVs and MATDEVs, with support from AMC, USASMDC, or other survivability analysts, define their threat assessment requirements through the respective threat support activity. The intelligence community and appropriate threat support activities provide assessment for operational threat environments and system specific threats, and they assist in predicting reactive threats to the MATDEV's system. The intelligence community should be informed of the results of vulnerability analyses, so it can determine if any adversaries possess the capability and intent to exploit our vulnerabilities.

### **3-4. Survivability analysis**

Survivability analysis is a process that starts during the pre-acquisition phase and continues throughout the life cycle of the system. CBTDEVs and MATDEVs will integrate survivability analysis over the full spectrum of battlefield threats and ensure that synergistic threat effects are adequately addressed. Analysis will include consideration of training; doctrine; tactics, techniques, and procedures; and materiel capabilities.

### **3-5. Survivability in system design**

Training, doctrine, and materiel survivability objectives are refined as the design progresses. MATDEVs will establish a process to balance design specifications, conduct trade-offs, and optimize the system design with the various survivability technologies. Systems are to be assessed as likely to be survivable and meet existing survivability standards or have waivers considered by the appropriate decision forum prior to milestone C. If a system cannot meet the nuclear survivability or NBC contamination survivability requirements, the MATDEV will process waiver requests according to AR 15-41.

### **3-6. Survivability testing**

The integration of testing focuses on comprehensive tests to ensure the development of survivable equipment, system and system-of-system while minimizing testing to reduce cost and time. Modeling and simulation are used in combination with physical testing where practical and advisable in order to conserve time and money.

### **3-7. Survivability evaluation and assessment**

Evaluation and assessment plans will address all survivability elements applicable to the program or project, their integration, and required trade-offs within the context of the system's overall required performance and effectiveness. They will also address critical survivability issues, include measures of performance and effectiveness, and identify data sources.

## **Chapter 4 Survivability Considerations**

### **4-1. Soldier survivability**

Soldier survivability is that characteristic of soldiers that enables them to withstand (or avoid) adverse military action (both from friend and foes) or the effects of natural phenomena that would result in the loss of capability to continue effective performance of the prescribed mission. (See the glossary for a further definition of soldier survivability.)

### **4-2. Force survivability**

Survivability must be considered at the force level, to include multinational forces, as well as at the system level. While individual systems within the force may be highly survivable, others may not be. Survivability of support items, including mission essential resupply and sustainment assets, must be balanced and integrated with the survivability goals of individual systems. Force protection, whereby individual systems provide mutual defense by sharing survivability assets, will be considered. CBTDEVs must consider force survivability in the concept development phase.

### **4-3. System of systems survivability**

The traditional definition of survivability is the capability of a system and crew to avoid or withstand a man-made hostile environment without suffering an abortive impairment of their ability to accomplish their designated missions. This definition is inadequate to describe the survivability of systems of systems (SoS). SoS, for the purpose of this document, is a collection of systems (with their associated platforms) deployed in a collaborative aspect. SoS survivability is more accurately defined at the following four levels:

- a. Mission survivability—the ability to accomplish the designated mission during and after exposure to a man-made hostile environment.
- b. Functional survivability—the ability to maintain a capability through and after exposure to a man-made hostile environment. Completing the mission may not be possible, but a contribution toward it can still be made by providing one or more of the platform's/system's original capabilities.
- c. Platform survivability—the ability of a platform to avoid or withstand a man-made hostile environment without

suffering an abortive impairment of its ability to contribute to the collaborative accomplishment of the SoS designated mission; or the ability to contribute again after repair or reconstitution of the SoS.

*d. Personnel survivability*— the integration of the survivability of the individual soldier and the how the system affects the soldier's survivability (in situations where individual soldiers continue to be the focus of a close fight, and as crewmembers of manned weapons systems).

## **Appendix A References**

### **Section I Required Publications**

#### **AR 10-16**

U.S. Army Nuclear and Chemical Agency. (Cited in para 2-15a.)

#### **AR 15-41**

Nuclear and Chemical Survivability Committee. (Cited in paras 1-6i, 1-19c, 2-20e, and 3-5.)

#### **AR 25-1**

Army Knowledge Management and Information Technology Management. (Cited in para 1-5.)

#### **AR 40-10**

Health Hazard Assessment Program in Support of the Army Materiel Acquisition Decision Process. (Cited in para 2-10.)

#### **AR 70-1**

Army Acquisition Policy. (Cited in paras 1-6h, 2-6b, and 2-19.)

#### **AR 73-1**

Test and Evaluation Policy. (Cited in para 2-19c.)

#### **AR 381-11**

Production Requirements and Threat Intelligence Support to the U.S. Army. (Cited in para 2-4.)

#### **AR 385-16**

System Safety Engineering and Management. (Cited in para 1-6h.)

#### **AR 602-2**

Manpower and Personnel Integration (MANPRINT) in the System Acquisition Process. (Cited in paras 1-6e and 3-1.)

#### **AR 700-127**

Integrated Logistics Support. (Cited in para 2-6.)

### **Section II Related Publications**

A related publication is merely a source of additional information. The user does not have to read it to understand this publication.

#### **AR 5-12**

Army Management of the Electromagnetic Spectrum

#### **AR 25-30**

The Army Publishing Program

#### **AR 71-9**

Materiel Requirements

#### **AR 380-86**

Classification of Chemical Warfare, Chemical and Biological Defense, and Nuclear, Biological, and Chemical Contamination Survivability Information

#### **DA Pam 73-1**

Test and Evaluation in Support of Systems Acquisition

#### **DA Pam 385-16**

System Safety Management Guide

**DOD 5200.1-M**

Defense Acquisition Systems Protection Program (Available at <http://www.dtic.mil/whs/directives/corres/html/52001m.htm>.)

**DODI 5000.2**

Operation of the Defense Acquisition System (Available at <http://www.dtic.mil/whs/directives/corres/html/50002.htm>.)

**Interim Defense Acquisition Guidebook**

(Available at <http://akss.dau.mil/dag/DoD5000.asp?view=document>.)

**MIL-HDBK-2069**

Aircraft Survivability (Available at <http://assist2.daps.dla.mil/quicksearch/>.)

**Section III****Prescribed Forms**

This section contains no entries.

**Section IV****Referenced Forms**

The forms listed below are available at the Army Publishing Directorate Web site at <http://www.apd.army.mil>.

**DA Form 2028**

Recommended Changes to Publications and Blank Forms

**DA Form 11-2-R**

Management Control Evaluation Certification Statement

**Appendix B****Management Control Evaluation Process for Evaluating Survivability of Army Personnel and Materiel Function****B-1. Function**

The function of the management control evaluation process is to evaluate survivability of Army personnel and materiel.

**B-2. Key management controls**

The key controls for this functional area are the following:

- a. Inclusion of survivability considerations by developers in an ICD or CDD/CPD.
- b. Review by MDAs at milestone decision points.
- c. Documentation of the decision by an appropriate review authority (ASARC or similar panel).

**B-3. Management control evaluation process.**

Management assessment of the key controls identified above does not require the use of a checklist. These key management controls must be evaluated at least once every 5 years. Certification must be accomplished on DA Form 11-2-R (Management Control Evaluation Certification Statement).

## **Glossary**

### **Section I Abbreviations**

#### **AAE**

Army Acquisition Executive

#### **ACAT**

acquisition category

#### **ACR**

advanced concepts and requirements

#### **AMC**

U.S. Army Materiel Command

#### **AR**

Army Regulation

#### **ASA**

Assistant Secretary of the Army

#### **ASA(ALT)**

Assistant Secretary of the Army (Acquisition, Logistics and Technology)

#### **ASA(M&RA)**

Assistant Secretary of the Army (Manpower and Reserve Affairs)

#### **ATEC**

U.S. Army Test and Evaluation Command

#### **BMD**

ballistic missile defense

#### **CDD**

capabilities development document

#### **CG**

commanding general

#### **COE**

Chief of Engineers

#### **CIO**

Chief Information Officer

#### **COTS**

commercial-off-the-shelf

#### **CPD**

capabilities production document

#### **C4/IT**

command, control, communications and computers/information technology

#### **DA**

Department of the Army

#### **DASAF**

Director of Army Safety

**DCS, G-1**

Deputy Chief of Staff, G-1

**DCS, G-2**

Deputy Chief of Staff, G-2

**DCS, G-3**

Deputy Chief of Staff, G-3

**DCS, G-4**

Deputy Chief of Staff, G-4

**DCS, G-6/CIO**

Deputy Chief of Staff, G-6/Chief Information Officer

**DCS, G-8**

Deputy Chief of Staff, G-8

**DOTLMPF**

doctrine, organizations, training, leadership and education, materiel, personnel, and facilities

**FRP**

full rate production

**DIA**

Defense Intelligence Agency

**DOD**

Department of Defense

**DODI**

Department Of Defense Instruction

**HQDA**

Headquarters, Department of the Army

**ICD**

initial capabilities document

**ILS**

integrated logistics support

**ILSP**

integrated logistics support plan

**IMA**

information mission area

**INR**

initial nuclear radiation

**IPR**

in-process review

**MANPRINT**

manpower and personnel integration

**MEDCOM**

U.S. Army Medical Command

**MDA**

milestone decision authority

**MRA**

Manpower and Reserve Affairs

**NBC**

nuclear, biological, and chemical

**PWS**

performance work statement

**RDA**

research, development, and acquisition

**RDECOM**

U.S. Army Research Development and Engineering Command

**RDT&E**

research, development, testing, and evaluation

**SORD**

soldier-oriented research and development

**SoS**

systems of systems

**SREMP**

source region electromagnetic pulse

**SSMP**

system safety management plan

**T&E**

test and evaluation

**TEMO**

training, exercises, and military operations

**TRADOC**

U.S. Army Training and Doctrine Command

**USANCA**

U.S. Army Nuclear and Chemical Agency

**USASMDC**

U.S. Army Space and Missile Defense Command

**USATEC**

U.S. Army Test and Evaluation Command

**Section II****Terms****Airworthiness**

A demonstrated capability of an aircraft or aircraft subsystem or component to function satisfactorily when used within prescribed limits.

**Analysis of alternatives (AoA)**

An analysis normally conducted by Training and Doctrine Command (TRADOC) to assist the MDA to determine at

the milestone A review whether any of the proposed alternatives to an existing system offer sufficient military or economic benefit to warrant a new program start.

**Army Systems Acquisition Review Council (ASARC)**

The top-level DA review body for acquisition category (ACAT) IC, IAC, and II programs, chaired by ASA(ALT) and convened at formal milestone or other program reviews to provide information and develop recommendations for decisions by the Army Acquisitions Executive.

**Capability development document (CDD)**

A document that captures the information necessary to develop a proposed program, normally using an evolutionary acquisition strategy. The CDD outlines an affordable increment of militarily useful, logistically supportable, and technically mature capability.

**Capability production document (CPD)**

A document that addresses the production elements specific to a single increment of an acquisition program.

**Combat developer (CBTDEV)**

The command or agency that formulates warfighting requirements for doctrine, organization, training, materiel, leadership and education, personnel, and facilities. The term may be used generically to represent the user and user maintainer community role in the materiel acquisition process (counterpart to generic use of MATDEV).

**Combat survivability**

The capability of a system to avoid (susceptibility) or withstand (vulnerability) man-made hostile environments.

**Critical system characteristics**

Those design features that determine how well the proposed concept or system will function in its intended environment.

**Critical system functions**

Those functions that the system must perform in order to carry out its intended mission.

**Fratricide**

The employment of friendly weapons and munitions with the intent to kill the enemy or destroy his equipment or facilities that results in unforeseen and unintentional death or injury to friendly personnel.

**Health hazard assessment (HHA)**

The Army's formal process used to identify, control, or eliminate health hazards associated with the development and acquisition of new materiel.

**High-altitude electromagnetic pulse (HEMP)**

An electromagnetic pulse produced by the detonation of a nuclear device above the source region of the atmosphere (20–40 km above the earth). This early time radiated field induces currents and voltages that can be strong enough to cause temporary upset and even catastrophic failure of electronic systems.

**Individual equipment**

Equipment designed to protect or support the soldier in battlefield situations (for example, load-bearing equipment, helmets, skis, and canteens). Individual equipment is requisitioned, issued, repaired, cleaned, and replaced using OMA funds based on allowances related to the organizational mission and environment.

**Information technology (IT)**

The shared computers, ancillary equipment, software, firmware and similar procedures, services, people, business processes, facilities (to include building infrastructure elements), and related resources used in the acquisition, storage, manipulation, protection, management, movement, control, display, switching, interchange, transmission, or reception of data or information in any format including audio, video, imagery, or data.

**Initial capabilities document (ICD)**

Documents the need for a materiel approach to a specific capability gap derived from an initial analysis of materiel approaches executed by the operational user and, as required, an independent analysis of materiel alternatives.

**Insensitive munitions (IM)**

A munition (energetic device) that reliably fulfills its performance, readiness, and operational requirements on demand,

but that 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 logistics support (ILS)**

A unified and iterative approach to the management and technical activities to influence the operational and materiel requirements, system specifications, and the ultimate design or selection (in the case of NDI/COTS); to define the support requirements best related to system design and to each other; to develop and acquire the required support; to provide required operational phase support for best value; and to seek readiness and cost improvements in the materiel system and support systems throughout the operational life cycle.

**In-process review (IPR)**

Review of a project or program at critical points and formal milestones to evaluate status and make recommendations to the MDA.

**Live-fire testing and evaluation (LFT&E)**

A test event within an overall LFT&E strategy that involves the firing of actual munitions at target components, target sub-systems, target sub-assemblies, and/or sub-scale or full-scale targets to examine personnel casualty, vulnerability, and/or lethality issues.

**Manpower and personnel integration (MANPRINT)**

The entire process of integrating the full range of manpower, personnel, training, human factors, system safety, health hazards, and survivability throughout the materiel development and acquisition process.

**Materiel developer (MATDEV)**

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 materiel acquisition process (counterpart to the generic use of CBTDEV).

**Milestone decision authority (MDA)**

The person who has the authority to make milestone decisions. This may be the Defense Acquisition Executive, the component acquisition executive (for the Army, this is the Army Acquisition Executive), or the program executive officer.

**Mission critical/mission essential system**

A system whose operational effectiveness and operational suitability are essential to the successful completion/outcome of the current or subsequent combat action; a system used by soldiers on the battlefield to perform their primary or secondary functions. Loss of the system could result in an unfavorable outcome of the combat action.

**Modeling and simulation (M&S)**

The development and use of live, virtual, and constructive models including simulators, stimulators, emulators, and prototypes to investigate, understand, or provide experiential stimulus to either conceptual systems that do not exist, or real life systems that cannot accept experimentation or observation because of resource, range, security, or safety limitations.

**NBC contamination**

The deposit, adsorption, and/or absorption of residual radioactive material or biological or chemical agents on or by structures, areas, personnel, or objects.

**NBC contamination survivability (NBCCS)**

The capability of a system (and its crew) to withstand a NBC-contaminated environment and relevant decontamination without losing the ability to accomplish the assigned mission. A NBC contamination-survivable system is hardened against NBC contamination and decontaminant; is decontaminable, and is compatible with individual protective equipment.

**NBC contamination survivability criteria**

Engineering design quantitative criteria expressed in terms of decontaminability, hardness, and compatibility to ensure that systems developed to perform mission-essential functions can be used by personnel wearing protective clothing and equipment to survive the effect of contamination by chemical and biological agents, radioactive contaminants and neutron induced gamma activity, and decontamination processes.

**NBC survivability**

Encompasses all aspects of nuclear, biological, and chemical survivability. It includes surviving all contamination effects and all initial nuclear effects (blast, thermal, initial nuclear radiation (INR), and EMP).

**Nondevelopmental item (NDI)**

Any previously developed item of supply used exclusively for governmental purposes by a Federal agency.

**Nuclear survivability**

The capability of a system to withstand initial nuclear weapon effects, to include HEMP, and still accomplish its mission. Nuclear survivability may be accomplished by hardening to designated criteria, rapid and timely resupply, redundancy, mitigation techniques, or a combination thereof.

**Nuclear and Chemical Survivability Committee (NCSC)**

The committee represents the Chief of Staff, U.S. Army, on nuclear survivability and NBC contamination survivability matters.

**Nuclear and Chemical Survivability Committee Secretariat (NCSCS)**

The secretariat is the reviewing, coordinating, and recommending body to the committee. It provides the NCSC with technical support and advice in the review of nuclear hardening and NBC contamination survivability criteria and requests for modification or waiver of nuclear and NBC contamination survivability criteria.

**Nuclear survivability criteria**

Quantitative equipment hardening criteria to initial nuclear weapon effects. These criteria for manned platforms are derived on the basis of the percentage of soldiers (as determined by the CBTDEV) who are able to survive the nuclear detonation and continue to perform their mission; for unmanned systems, these criteria are primarily driven by system mission requirements levied on the system.

**Program executive officer (PEO)**

A general officer or senior executive who has responsibility for directing several major defense acquisition programs and for assigned major and non-major system acquisition programs.

**Program manager (PM)**

A HQDA command select list (CSL) manager for a system or program.

**Quality assurance surveillance plan (QASP)**

A Government-developed and -applied document used to make sure that systematic quality assurance methods are used in administration of the performance-based contract. It details how and when the Government will survey, observe, test, sample, evaluate, and document contractor performance according to the performance work statement.

**Soldier-oriented research and development (SORD)**

A program providing scientific and technological information necessary to the Army for selecting, assigning, training, leading and developing soldiers, sustaining their careers, and organizing and equipping them to carry out their missions and role.

**Soldier survivability**

That characteristic of soldiers that enables them to withstand (or avoid) adverse military action (both friend and foe) or the effects of natural phenomena that would result in the loss of capability to continue effective performance of the prescribed mission.

**Source region electromagnetic pulse (SREMP)**

The electromagnetic pulse produced when a nuclear detonation occurs on or near the earth's surface; also known as endoatmospheric EMP.

**Survivability**

The capability of a system to avoid or withstand manmade hostile environments without suffering an abortive impairment of its ability to accomplish its designated mission.

**Susceptibility**

The inability of a system to avoid being hit by a threat mechanism.

**System MANPRINT Management Plan (SMMP)**

The Army's planning and management tool and audit trail to identify tasks, analyses, tradeoffs and decisions that must be made in order to address manpower and personnel integration issues during concept development, system development, and the acquisition process.

**Test and Evaluation Master Plan (TEMP)**

The basic planning document for a system life cycle test and evaluation.

**Vulnerability**

The characteristics of a system that cause it to suffer a definite degradation (loss or reduction of capability to perform the designated mission) as a result of having been subjected to a certain, defined level of effects in an unnatural or manmade hostile environment. Vulnerability is considered a subset of survivability.

**Section III****Special Abbreviations and Terms**

There are no entries in this section.

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