

**Army Regulation 70–75**

**Research, Development, and  
Acquisition**

# **Survivability of Army Personnel and Materiel**

**Headquarters  
Department of the Army  
Washington, DC  
29 April 2019**

**UNCLASSIFIED**

# ***SUMMARY of CHANGE***

AR 70–75

Survivability of Army Personnel and Materiel

This major revision, dated 29 April 2019—

- o Adds chemical agent resistant coating and nuclear command, control, and communications facilities to exemption list (paras 1–6*f* and 1–6*h*, respectively).
- o Adds updated language regarding chemical agent resistant coating (para 1–7*g*).
- o Updates responsibilities (chap 2).
- o Updates insensitive-munition language (para 2–16*c*).
- o Implements updates in accordance with DODI 5000.02, the Defense Acquisition Guidebook, and AR 70–1 (throughout).
- o Implements and synchronizes with survivability requirements set forth in DODI 3150.09 (throughout).
- o Replaces “nuclear, biological, and chemical” with “chemical, biological, and radiological and nuclear” (throughout).
- o Updates relevant committee and secretariat names (throughout).
- o Implements policy changes to hardness maintenance and hardness surveillance policy (throughout).

Effective 29 May 2019

**Research, Development, and Acquisition**  
**Survivability of Army Personnel and Materiel**

By Order of the Secretary of the Army:

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

**Summary.** This regulation prescribes Armywide policies and responsibilities for ensuring the materiel acquisition process addresses the combat survivability of Army personnel. It implements DODI 5000.02, the Defense Acquisition Guidebook, AR 70-1, and DODI 3150.09.

**Applicability.** This regulation applies to the Regular Army, the Army National

Guard/Army National Guard of the United States, and the U.S. Army Reserves, unless otherwise stated.

**Proponent and exception authority.**

The proponent for this regulation is the Assistant Secretary of the Army (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 its direct reporting unit or field operating agency, in the grade of colonel or the civilian equivalent. 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. Refer to AR 25–30 for specific guidance.

**Army internal control process.** This regulation contains internal control provisions in accordance with AR 11–2 and identifies key internal controls that must be evaluated (see appendix 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 (SAAL–SAC), 2530 Crystal Drive, 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 (SAAL–SAC), 2530 Crystal Drive, Arlington, VA 22202–3911.

**Distribution.** This regulation is available in electronic media only and is intended for the Regular Army, the Army National Guard/Army National Guard of the United States, and the U.S. Army Reserve.

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### **Glossary**

## **Chapter 1**

### **Introduction**

#### **1–1. Purpose**

This regulation implements survivability as outlined in DODI 5000.02, the Defense Acquisition Guidebook and DODI 3150.09 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 personnel and materiel, unless otherwise specified.

#### **1–2. References**

See appendix A.

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

See the glossary.

#### **1–4. Responsibilities**

Responsibilities are listed in chapter 2.

#### **1–5. Records management (recordkeeping) requirements**

The records management requirement for all record numbers, associated forms, and reports required by this regulation are addressed in the Army Records Retention Schedule-Army (RRS-A). Detailed information for all related record numbers, forms, and reports are located in ARIMS/RRS-A at <https://www.arims.army.mil>. If any record numbers, forms, and reports are not current, addressed and/or published correctly in ARIMS/RRS-A, see DA Pam 25–403 for guidance.

#### **1–6. Exemptions**

This regulation does not apply to personnel conducting acquisitions of—

- a.* Defense business systems in the sustaining base information mission area, software, hardware, services, and supplies (see 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.* Standalone 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.* Chemical agent resistant coating (see AR 750–1).
- g.* Host nation lease equipment.
- h.* Nuclear command, control, and communications facilities.

#### **1–7. 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), commercial-of-the-shelf (COTS), or materiel modifications. Survivability will be addressed in acquisition strategies for all Army materiel. DODI 5000.02 and DODI 3150.09 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 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 will be identified and included in the Test and Evaluation Master Plan. The Systems Engineering Plan (SEP) will describe—

(1) How the design incorporates susceptibility and vulnerability reduction as well as chemical, biological, radiological, and nuclear (CBRN) survivability requirements, when applicable.

(2) How the materiel developer (MATDEV) will track the progress toward meeting the capability document survivability requirements over the acquisition life cycle.

(3) How the MATDEV will implement a reliability growth program to develop and acquire reliable systems that will result in reducing the costs to operate and sustain in the field.

*d.* Analyses of survivability against each threat, to include trade-off analysis, are done in the context of all threats to maintain overall mission performance. Risks to personnel will be assessed and addressed in terms of system design, protection from direct threat events and accidents (such as chemical, biological, and nuclear threats). Design consideration will include primary and secondary effects from these events and consider any special equipment necessary for egress and survivability. The integrated survivability analysis is maintained for use as survivability audit trail of requirements, trade-off decisions, and quantitative measures of effectiveness.

*e.* Survivability features of system 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 capability developer (CAPDEV), MATDEV, and independent evaluator is required to verify that the changes do not adversely affect the survivability of the system or personnel.

*f.* If the CAPDEV designates a system as mission critical, it must be chemical, biological, and radiological (CBR) contamination survivable. If this critical item or component is an electronic equipment, at a minimum, it will be survivable to high-altitude electromagnetic pulse (HEMP) and an electronic attack environment, including directed energy weapons. If this critical item is a weapon system (including all mission critical components of the weapon system), it will also survive the initial nuclear weapon effects of blast, thermal radiation, initial nuclear radiation, and source region electromagnetic pulse. The use of critical COTS/NDI does not preclude this requirement. However, waiver processes exist for nuclear survivability criteria, CBR contamination survivability criteria, and related testing procedures (see AR 15–41). This waiver process does not change the need to meet the survivability requirement.

*g.* CBR contamination survivability is provided in large part by the chemical agent resistant coating system. The chemical agent resistant coating system will be specified for use on all ground combat systems; combat support and combat service support equipment; tactical vehicles; aircraft, including unmanned; essential ground support equipment; repairable containers such as engine, transmission, and all ammunition containers; and appropriate kits, except those applications exempted (see AR 750–1).

## **Chapter 2**

### **Responsibilities**

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

The ASA (ALT) will—

*a.* Establish and manage Army survivability policy and guidance in Army research, development, and acquisition (RDA).

*b.* Provide technical and funding guidance for the survivability technology base.

*c.* Represent Headquarters, Department of the Army (HQDA) on boards and committees concerning materiel survivability matters.

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

The ASA (M&RA) will coordinate with ASA (ALT) in support of individual Soldier survivability issues.

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

The DCS, G–1 will—

*a.* Coordinate survivability aspects and other Soldier survivability matters, as appropriate (see AR 602–2).

(1) Review applicable concept and capability documents throughout the acquisition system life cycle to ensure Soldier survivability requirements have been properly addressed.

(2) Coordinate with MATDEVs and source selection authorities to ensure that human systems integration (HSI) requirements have been cross-walked for inclusion in solicitation documentation.

(3) Coordinate with MATDEVs and the test community to ensure HSI considerations have been included in test planning documentation (see AR 602–2).

*b.* Develop policy and provide guidance for the assessment of Soldier survivability as a domain of HSI (see AR 602–2). Prior to the convening of a key in-process review or milestone decision review, issue a HSI assessment for the materiel developer (MDA) with copies to the MATDEV. This final HSI assessment will identify the critical issues requiring resolution prior to a recommendation being made for the system to proceed to the next acquisition phase.

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

The DCS, G–2 will—

- a.* Establish threat information policy and guidance (see AR 381–11).
- b.* Approve and validate threat documentation for designated systems (see AR 381–11). Coordinate with the Defense Intelligence Agency 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.

#### **2–5. Deputy Chief of Staff, G–3/5/7**

The DCS, G–3/5/7 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 protection issues, to include requirements and criteria, have been considered in all changes to system threats, mission, or hardware.
- c.* Represent HQDA on interdepartmental working groups, boards, and meetings on nuclear and CBR contamination survivability policy and criteria.
- d.* Through the Director, U.S. Army Nuclear and Countering Weapons of Mass Destruction Agency will—
  - (1) Establish preliminary nuclear survivability and CBR contamination survivability criteria that specify nuclear and CBR contamination survivability for items declared as mission critical in the capability document (see AR 10–16).
  - (2) Establish final nuclear survivability and CBR contamination survivability criteria for requirements contained in CDDs and/or CPDs that specify nuclear and CBR contamination survivability.
  - (3) Assist CAPDEVs with the application of nuclear survivability and CBR contamination survivability criteria for systems, and assist in the evaluation of system survivability shortfalls.
  - (4) Monitor the Army’s nuclear and CBR contamination survivability programs.

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

The DCS, G–4 will—

- a.* Ensure that survivability requirements are considered in all configuration changes of materiel.
- b.* Maintain policy and guidelines for Armywide implementation of the Hardness Maintenance (HM) and Hardness Surveillance (HS) Program (see AR 750–1).

#### **2–7. Chief Information Officer/G–6**

The CIO/G–6 will—

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

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

The DCS, G–8 will ensure that both system and force level survivability issues have been considered and required funding programmed during the transition of approved Army requirements to solutions.

#### **2–9. Director of Army Safety**

The DASAF 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 CAPDEVs and MATDEVs.

#### **2–10. The Surgeon General**

TSG 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 (see AR 40–10).

- c. Exercise staff responsibility for interim health-based standards for health hazards and threshold effect levels for CBRN contaminants, electromagnetic environments, and directed energy.
- d. Through the Commanding General, U.S. Army Medical Command (CG, MEDCOM) will—
  - (1) Assess 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.
  - (2) Coordinate with the CG, U.S. Army Materiel Command (AMC) on HHAs.
  - (3) Maintain coordination with CAPDEVs and other MATDEVs and test organizations for all matters pertaining to the health and performance of individual Soldiers.
  - (4) Provide guidance on medical aspects of systems testing and evaluation requirements, including safety criteria (in concert with safety personnel) and the use of human test subjects and biomedical instrumentation.
  - (5) Issue and maintain criteria and instrumentation requirements to support assessment of crew casualties during system test and evaluations.
  - (6) Issue and maintain interim standards for health hazards and threshold effect levels for CBR contaminants, electromagnetic environments, and directed energy levels for safe exposure of friendly Soldiers until long-term standards are developed.
  - (7) Function as MATDEV, in support of the Joint Program Executive Office for Chemical and Biological Defense, the MDA for medical programs related to CBRN matters.

## **2–11. Chief of Engineers**

The COE will manage survivability efforts for those military and civil works research and development projects within the COE's areas of responsibility and ensure compliance with this regulation.

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

The CG, AMC will—

- a. Coordinate with the U.S. Army Space and Missile Defense Command (SMDC) for matters pertaining to ballistic missile defense (BMD) survivability.
- b. In coordination with the MATDEV, provide technical expertise, advice, and recommendations to the CG, U.S. Army Training and Doctrine Command (TRADOC) CAPDEVs on combat survivability and vulnerability.
- c. Provide technical expertise, advice, and recommendations to the Army acquisition executive and MATDEVs.
- d. Provide survivability modeling and simulation support to MATDEVs and CAPDEVs.
- e. Ensure that hardened equipment and components, when fielded, receive standardized markings that identify the hardening applied.
- f. Through the CG, U.S. Army Research, Development and Engineering—
  - (1) Execute command responsibilities for combat survivability, under CG, AMC.
  - (2) Maintain the Army focal point for survivability and provide the capability for integrated technical analysis of the survivability of all Army systems.
  - (3) Support ASA (ALT) in their role of managing facilities essential to RDA.
  - (4) Evaluate materiel against performance standards derived from survivability criteria.
  - (5) Provide survivability analysis input to TRADOC for inclusion in the Analysis of Alternatives.
  - (6) Address Soldier survivability issues by performing HSI domain assessments and by working with the program manager; DCS, G–1; and U.S. Army Test and Evaluation Command (ATEC) communities.
  - (7) Develop potential methodology to assess and evaluate survivability in the context of system of systems.
  - (8) Develop and maintain procedures and standards to support assessment of Army materiel survivability.
  - (9) 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.
  - (10) Coordinate with the MATDEV and TRADOC on the integration of survivability technology into the requirements development system.
- g. Through the U.S. Army Research Laboratory, provide survivability, lethality, and vulnerability analysis support to ATEC for Army materiel programs.
- h. Coordinate with the CG, MEDCOM/TSG on health hazard assessments and interim standards for health hazards and threshold effect levels.

## **2–13. Commanding General, U.S. Army Training and Doctrine Command**

The CG, TRADOC will—

- a. As the Army's CAPDEV, determine and develop capabilities required to fulfill Army and Joint required capabilities.



- b.* Develop strategy, policies, procedures, and training to ensure that survivability requirements are considered in the concept phase and that these requirements are balanced and integrated with the characteristics of other associated systems.
- c.* Ensure survivability tactics, techniques, and procedures are included in training programs and doctrinal literature.
- d.* In coordination with ASA (ALT); CG, AMC; and SMDC ensure that the survivability technology base is focused on Army requirements.
- e.* Coordinate with MATDEVs to ensure HSI considerations are included in the development of capabilities.

## **2–14. Commanding General, U.S. Army Test and Evaluation Command**

The CG, ATEC 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 independent developmental and operational testing and life cycle testing, including live-fire testing; and develop and maintain the modeling and simulation 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.

## **2–15. Commanding General, U.S. Army Space and Missile Defense Command/U.S. Army Forces Strategic Command**

The CG, SMDC 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 CAPDEVs, 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 CAPDEVs, 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 CAPDEVs, 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 SMDC.
- g.* Provide test data from two SMDC major range and test facility base activities—
  - (1) U.S. Army Reagan Test Site.
  - (2) High Energy Laser Systems Test Facility.

## **2–16. Milestone decision authorities**

The 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 and analyze the survivability assessment throughout the system's life cycle.
- c.* Retain approval authority for waivers to survivability requirements, except as specified for nuclear and CBR contamination survivability criteria (see AR 15–41) and insensitive munitions (see AR 70–1). 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.

## **2–17. Materiel developers**

MATDEVs will—

*a.* Ensure that assigned systems achieve acceptable mission effectiveness in a natural and 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. The strategy must balance programmatic needs with the risks to better understand the cost and time required to obtain credible and trusted models, simulations, and digital artifacts to support necessary capabilities.

*c.* Develop and implement a reliability growth strategy as part of the SEP for assigned programs. This strategy should include the use of reliability test and evaluation tools such as Highly Accelerated Life Testing and Highly Accelerated Stress Screening (see the Defense Acquisition Guidebook).

*d.* 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 CBR contamination survivability should be forwarded to the CBRN Survivability Committee (CSC) and CSC Secretariat (CSCS).

*e.* Assess risks to personnel and address, in terms of system design, protection from direct threat events and accidents, such as CBRN threats (see DODI 5000.02).

*f.* Support the CAPDEV as required in the development of survivability requirements.

*g.* Provide relevant and current information on nuclear and CBR contamination survivability studies and analyses to the Chair, CSCS prior to each milestone decision. Requests for waivers for nuclear and CBR survivability will be made to the CSC for approval prior to Milestone C (see AR 15–41.)

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

*i.* Ensure appropriate survivability and reliability growth requirements are included in the Human Systems Integration Plan (HSIP), Test and Evaluation Master Plan, Quality Assurance Plan, Life Cycle Sustainment Plan, and the Systems Engineering Plan.

*j.* In coordination with the DCS, G–8, include funding required to support survivability requirements in budget submissions.

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

*l.* In coordination with the CAPDEV and DCS, G–1 staff, will plan for and implement HSI early in the acquisition process and throughout the product life cycle (see DODI 5000.02 and AR 602–2). The MATDEV will develop a HSIP or HSIP-like tracking device to identify and track the resolution of Soldier survivability concerns throughout the acquisition process (see AR 602–2). The MATDEV will develop a System Safety Management Plan to similarly identify the method to track and resolve safety concerns.

*m.* Provide an assessment of the system survivability in the anticipated battlefield environment at milestone reviews and in-process reviews provided to the MDA.

*n.* Shortfalls in the satisfaction of survivability requirements must be substantiated by the MATDEV, in coordination with the CAPDEV (see AR 70–1 and AR 71–9), and submitted to the 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 for mitigation of the risk or appropriately documented risk acceptance (see AR 385–10 and DA Pam 385–16).

*o.* May seek a waiver, if testing shows it cannot meet the nuclear survivability requirements.

## **Chapter 3 Survivability Considerations**

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

CAPDEVs and MATDEVs share responsibility for the survivability of Army materiel and personnel. This regulation, together with AR 602–2, delineates procedures that enable CAPDEVs 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. 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 CAPDEVs and MATDEVs consider the threat from milestone A throughout the entire life cycle of each acquisition program. CAPDEVs and MATDEVs, with support from AMC, SMDC, 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. CAPDEVs 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 all doctrine, organization, training, materiel, leadership and education, personnel and facilities enablers.

*a. 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.)

*b. Force protection.* Survivability must be considered at the force level, to include multinational forces. Force protection, whereby individual systems provide mutual defense by sharing survivability assets, will be considered. CAPDEVs must consider force protection in the concept development phase.

*c. 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:

(1) Mission survivability - the ability to accomplish the designated mission during and after exposure to a man-made hostile environment.

(2) 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/system's original capabilities.

(3) 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.

(4) 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). Personnel survivability should be addressed through dedicated measures of evaluation as well as the potential operational impact of such casualties on the ability of the platform to accomplish its mission after a threat engagement, when appropriate. It must also be addressed even in cases where the platform cannot survive.

### **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. If the system incorporates hardening to meet its HEMP survivability requirements, it must comply with HM/HS program (see AR 750–1). 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 or CBR contamination survivability requirements, the MATDEV will process waiver requests (see AR 15–41).

### **3–6. Survivability testing**

The integration of testing focuses on ensuring the development of survivable and reliable equipment, system, and SOS. The MATDEV, in coordination with the CAPDEV and test community, should develop a test strategy that enables DOD to acquire systems that work, and provide engineers and decision-makers with knowledge to assist in managing risks; measure technical progress; and characterize operational effectiveness, operational suitability, and survivability (including cybersecurity), or lethality of the system in the intended operational environment. The test strategy must balance program-

matic needs with the risks, to better understand the cost and time required to obtain credible and trusted models, simulations, and digital artifacts to support necessary capabilities. 10 USC 2366(e)(3) defines realistic survivability testing in the case of a covered system (or a covered product improvement program for a covered system).

### **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.

## **Appendix A**

### **References**

#### **Section I**

##### **Required Publications**

###### **AR 10–16**

U.S. Army Nuclear and Combating Weapons of Mass Destruction Agency (Cited in para 2–5*d*(1).)

###### **AR 15–41**

Chemical, Biological, Radiological, and Nuclear Survivability Committee (Cited in para 1–7*f*.)

###### **AR 25–1**

Army Information Technology (Cited in para 1–6*a*.)

###### **AR 40–10**

Health Hazard Assessment Program in Support of the Army Acquisition Process (Cited in para 2–10*b*.)

###### **AR 70–1**

Army Acquisition Policy (Cited in para 2–16.)

###### **AR 71–9**

Warfighting Capabilities Determination (Cited in para 2–17*n*.)

###### **AR 73–1**

Test and Evaluation Policy (Cited in para 2–16*c*.)

###### **AR 381–11**

Intelligence Support to Capability Development (Cited in para 2–4*a*.)

###### **AR 385–10**

The Army Safety Program (Cited in para 2–17*n*.)

###### **AR 602–2**

Human Systems Integration in the System Acquisition Process (Cited in para 2–3*a*.)

###### **AR 750–1**

Army Materiel Maintenance Policy (Cited in para 1–6*f*.)

###### **DA Pam 385–16**

System Safety Management Guide (Cited in para 2–17*n*.)

##### **Defense Acquisition Guidebook**

System Engineering/Human Systems Integration (Cited in the title page.) (Available at <https://www.dau.mil/>.)

###### **DODI 3150.09**

The Chemical, Biological, Radiological, and Nuclear (CBRN) Survivability Policy (Cited in the title page.) (Available at <http://www.esd.whs.mil/>.)

###### **DODI 5000.02**

Operation of the Defense Acquisition System (Cited in the title page.) (Available at <http://www.esd.whs.mil/>.)

#### **Section II**

##### **Related Publications**

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

###### **AR 5–12**

Army Use of the Electromagnetic Spectrum

###### **AR 11–2**

Managers' Internal Control Program

###### **AR 25–30**

Army Publishing Program

**AR 380–86**

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

**AR 700–127**

Integrated Product Support

**DA Pam 25–403**

Guide to Recordkeeping in the Army

**DA Pam 70–3**

Army Acquisition Procedures

**DA Pam 73–1**

Test and Evaluation in Support of Systems Acquisition

**MIL–HDBK–2069**

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

**10 USC 2366(e)(3)**

Major Systems and munitions programs: survivability testing and lethality testing required before full-scale production (Available at <http://uscode.house.gov/>.)

**PL 108–375**

Ronald W. Reagan National Defense Authorization Act for Fiscal Year 2005, Section 1053: Survivability of critical systems exposed to chemical or biological contamination (Available at <https://www.govinfo.gov/>.)

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

This section contains no entries.

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

Unless otherwise indicated, DA Forms are available on the Army Publishing Directorate website (<https://armypubs.army.mil/>).

**DA Form 11–2**

Internal Control Evaluation Certification

**DA Form 2028**

Recommended Changes to Publications and Blank Forms

## Appendix B

### Internal Control Evaluation

#### B–1. Function

The function covered by this evaluation is the administration of the Army’s personnel and materiel survivability program.

#### B–2. Purpose

The purpose of this appendix is to assist in the evaluation of the key internal controls outlined below. It is not intended to cover all controls.

#### B–3. Instructions

These key internal controls must be formally evaluated at least once every 5 years, or as necessary. Certification that this evaluation has been conducted must be accomplished on DA Form 11–2 (Internal Control Evaluation Certification). Evaluation test questions are outlined in paragraph B–4 and are intended as a start point for each applicable level of internal control evaluation. Answers must be based on the actual testing of key internal controls (for example, document analysis, direct observation, sampling, simulation, or other). Answers that indicate deficiencies must be explained and corrective action indicated in supporting documentation.

#### B–4. Test questions

- a. Is the regulation being reviewed once every 5 years and updated, as necessary?
- b. *System acquisition planning.*
  - (1) Are survivability analyses done in the context of all threats and balanced across all survivability disciplines?
  - (2) Are survivability considerations included in the development of capability documents?
  - (3) Were relevant and justifiable survivability thresholds and objectives identified during concept development?
  - (4) Was a survivability strategy implemented as part of the acquisition strategy for assigned programs?
  - (5) Does the design incorporate susceptibility and vulnerability reduction as well as CBRN survivability requirements, when applicable?
  - (6) Have the system’s survivability features been designed to be maintainable throughout the life cycle?
  - (7) Is sufficient funding programmed to perform the survivability actions planned?
- c. *Survivability considerations for Army systems before fielding.*
  - (1) Are survivability requirements, funding, and constraints considered in program documents and reviews?
  - (2) Does the survivability strategy use existing Army and Government resources, whenever feasible?
  - (3) Are survivability issues being incorporated in appropriate testing and evaluation plans?
  - (4) Is an assessment of the system survivability, to include risk accepted in the anticipated battlefield environment, provided at milestone reviews and in-process reviews to the MDA?
  - (5) Do evaluation and assessment plans address all survivability elements within the context of the system’s overall required performance and effectiveness?
  - (6) Are system modifications, due to threat or doctrine changes, being evaluated to ensure they do not adversely affect survivability?
  - (7) Is progress being tracked toward meeting the capability document survivability requirements, over the acquisition life cycle?
  - (8) Is the integrated survivability analysis maintained for use as a survivability audit trail of requirements, trade-off decisions, and quantitative measures of effectiveness?
  - (9) Are waiver requests being submitted?
  - (10) Does the waiver request affect the need to meet the survivability requirement?
  - (11) Is there a process to manage the Army HM/HS program and track issues on all systems?
  - (12) Are issues related to nuclear survivability and CBR contamination survivability being forwarded to the CSC and CSCS in a timely manner?
- d. *Survivability considerations after fielding.*
  - (1) Is the requirement for post-fielding survivability analyses identified and resourced?
  - (2) Are unresolved survivability issues being addressed in planned system modifications or product improvements and disposal issues being addressed in planned system modifications or product improvements?

#### B–5. Supersession

This evaluation replaces the management control evaluation checklist previously published in AR 70–75.

**B-6. Comments**

Help to make this a better tool for evaluating internal controls. Submit comments to the Assistant Secretary of the Army (Acquisition, Logistics and Technology) (SAAL-SAC), 2530 Crystal Drive, Arlington, VA 22202-3911.



## **Glossary**

### **Section I**

#### **Abbreviations**

**ACAT**

acquisition category

**AIS**

automated information system

**AMC**

U.S. Army Materiel Command

**AR**

Army Regulation

**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

**CAE**

component acquisition executive

**CAPDEV**

capability developer

**CBR**

chemical, biological and radiological

**CBRN**

chemical, biological, radiological and nuclear

**CDD**

capabilities development document

**CG**

commanding general

**CIO/G-6**

Chief Information Officer/G-6

**COE**

Chief of Engineers

**COTS**

commercial-off-the-shelf

**CPD**

capabilities production document

**CSC**

CBRN Survivability Committee

**CSCS**

CSC Secretariat

**DA**

Department of the Army

**DASAF**

Director of Army Safety

**DCS**

Deputy Chief of Staff

**DOD**

Department of Defense

**DODI**

Department of Defense instruction

**EMP**

electromagnetic pulse

**HEMP**

high-altitude electromagnetic pulse

**HHA**

health hazard assessment

**HM**

hardness maintenance

**HQDA**

Headquarters, Department of the Army

**HS**

hardness surveillance

**HSI**

human systems integration

**HSIP**

Human Systems Integration Plan

**ICD**

initial capabilities document

**MATDEV**

materiel developer

**MAIS**

major automated information systems

**MDA**

milestone decision authority

**MDAP**

major defense acquisition program

**MEDCOM**

U.S. Army Medical Command

**NDI**

non-developmental item

**RDA**

research, development, and acquisition

**RDT&E**

research, development, testing, and evaluation

**SEP**

Systems Engineering Plan

**SMDC**

U.S. Army Space and Missile Defense Command

## **SOS**

systems of systems

## **TRADOC**

U.S. Army Training and Doctrine 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**

An analysis normally conducted by 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.

#### **Acquisition category I**

Programs that are major defense acquisition programs (MDAPs). A MDAP is a program that is not a highly sensitive classified program and that is designated by the Under Secretary of Defense for Acquisition, Technology and Logistics as a MDAP; or that is estimated to require eventual expenditure for RDT&E, including all planned increments, of more than \$480 million (Fiscal Year (FY) 2014 constant dollars) or procurement, including all planned increments, of more than \$2.79 billion (FY 2014 constant dollars).

#### **Acquisition category II**

Programs are defined as those acquisition programs that do not meet the criteria for an ACAT I or IA program, but do meet the criteria for a major system. A major system is defined as a program estimated by the DOD component head to require the eventual total expenditure for RDT&E of more than \$185 million in FY 2014 constant dollars, or for procurement of more than \$835 million in FY 2014 constant dollars or those designated by the DOD component head to be ACAT II. The MDA is the DOD component acquisition executive (CAE) or the individual designated by the CAE.

#### **Acquisition category IA**

Programs that are major automated information systems (MAIS). A MAIS is a DOD acquisition program for an automated information system (AIS) that is either designated by the MDA as a MAIS, or estimated to exceed—

- a. \$40 million (FY 2014 constant dollars), for all increments, regardless of appropriation or fund source, directly related to the AIS definition, design, development, and deployment, and incurred in any single FY; or
- b. \$165 million (FY 2014 constant dollars), for all expenditures, for all increments, regardless of appropriation or fund source, directly related to the AIS definition, design, development, and deployment, and incurred from the beginning of the materiel solution analysis phase through deployment at all sites; or
- c. \$520 million (FY 2014 constant dollars) for all expenditures, for all increments, regardless of appropriation or fund source, directly related to the AIS definition, design, development, deployment, operations and maintenance, and incurred from the beginning of the materiel solution analysis phase through sustainment for the estimated useful life of the system.

#### **Acquisition category IAC**

MAIS programs for which the MDA is the DOD component head or, if delegated, the DOD CAE. The “C” (in ACAT IAC) refers to component.

#### **Acquisition category IC**

Programs are MDAPs for which the MDA is the DOD component head or, if delegated, the DOD component acquisition executive (CAE). The “C” refers to component.

#### **Army Systems Acquisition Review Council**

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

#### **Capability developer**

A person who is involved in analyzing, determining, prioritizing, and documenting requirements for doctrine, organizations, training, leader development and education, materiel and materiel-centric requirements, personnel, facilities and policy implications within the context of the force development process. Also responsible for representing the end user

during the full development and lifecycle process and ensures all enabling capabilities are known, affordable, budgeted, and aligned for synchronous fielding and support (counterpart to generic use of MATDEV).

**Capability development document**

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**

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

**Chemical biological radiological contamination**

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

**Chemical, biological, radiological, and nuclear 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, and electromagnetic pulse (EMP)).

**Chemical, Biological, Radiological, and Nuclear Survivability Committee**

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

**Chemical, Biological, Radiological, and Nuclear Survivability Committee Secretariat**

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

**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.

**Electromagnetic pulse**

The electromagnetic radiation from a strong electronic pulse, most commonly caused by a nuclear explosion that may couple with electrical or electronic systems to produce damaging current and voltage surges. Also called EMP.

**Force protection**

Preventive measures taken to mitigate hostile actions against DOD personnel (to include Family members), resources, facilities, and critical information.

**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**

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

**High-altitude electromagnetic pulse**

An electromagnetic pulse produced by the detonation of a nuclear device above the source region of the atmosphere (20 to 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.

**Human system integration**

A comprehensive management and technical strategy, initiated early in the acquisition process, to ensure that human performance, the burden the design imposes on manpower, personnel, and training, and safety and health aspects are considered throughout the system design and development processes. Human factor engineering requirements are also established to develop effective human-machine interfaces, and minimize or eliminate system characteristics that require extensive cognitive, physical, or sensory skills; to require excessive training or workload for intensive tasks; or to result in frequent or critical errors or safety and/or health hazards. The capabilities and limitations of the operator, maintainer, repairer,

trainer, and other support personnel will be identified prior to program initiation (usually materiel development decision and/or Milestone A), and refined during the development process. Army HSI incorporates Soldier survivability considerations into that process as well (see DODI 5000.02).

### **Human System Integration Plan**

Required for ACAT I and II programs. It is the Army's recommended strategy and plan for tracking issues and disposition and is designed to assist the program manager in meeting the requirements of DODI 5000.02 for all programs. It serves as a planning and management tool and an audit trail to identify tasks, analyses, trade-offs, and decisions that must be made in order to address HSI issues during concept development, system development, and the acquisition process. Data from the HSIP (for example, HSI issues and manpower, personnel, and training constraints) will be used in developing requirements documents, test plans, and contractual documents.

### **Human systems integration assessment**

Prepared under the authority of the DCS, G-1 and address unresolved critical HSI issues to the MDA for Army systems acquisition review councils, information technology overarching integrated process and product teams, and other acquisition decision reviews. Assessments will normally assign a RED, AMBER, or GREEN rating.

*a. Red.* Critical problems identified (showstopper) with no solution identified or solution being implemented with less than satisfactory results projected by the next milestone date.

*b. Amber.* Significant, major, or minor problems identified, with a solution or work-around plan expected to be completed by the next major milestone date.

*c. Green.* No problems. All actions on schedule.

### **Information technology**

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**

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.

### **In-process review**

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

### **Insensitive munitions**

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**

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.

### **Live-fire testing and evaluation**

A test event within an overall live-fire testing and evaluation 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.

### **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 materiel acquisition process (counterpart to the generic use of CAPDEV).

### **Milestone decision authority**

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**

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**

The discipline that comprises the development and/or use of models and simulations. The use of models, including emulators, prototypes, simulators, and stimulators, either statically or over time, to develop data as a basis for making managerial or technical decisions.

**Non-developmental item**

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 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 CAPDEV) 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**

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**

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

**Quality assurance surveillance plan**

A Government-developed and Government-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**

In this regulation refers to military personnel.

**Soldier 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). Personnel survivability should be addressed through dedicated measures of evaluation as well as the potential operational impact of such casualties on the ability of the platform to accomplish its mission after a threat engagement, when appropriate. It must also be addressed even in cases where the platform cannot survive.

**Soldier survivability assessment**

Assesses the system's effects in regard to Soldier survivability. Data from this report and subsequent updates are put into the HSIP or HSIP-like tracking document and the HSI assessment.

**Source region electromagnetic pulse**

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 hostile threat mechanism. Susceptibility is a subset of survivability.

**System of systems**

Multiple systems that must interact with each other to achieve design capabilities. Illustrative is the Army Battle Command Systems, which consist of a series of individual command, control, communications, computers, intelligence, surveillance, and reconnaissance systems that must be integrated horizontally and possess common hardware and software to ensure total system effectiveness.

**Test and Evaluation Master Plan**

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

**Vulnerability**

The characteristics of a system that cause that result in its inability to avoid degradation (loss or reduction of capability) after being subjected to a specified level of effects from a hostile threat mechanism. Vulnerability is a subset of survivability.

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

There are no entries in this section.





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