

**BY ORDER OF THE SECRETARY  
OF THE AIR FORCE**

**AIR FORCE INSTRUCTION 10-2607**

**9 AUGUST 2018**



**Operations**

**CHEMICAL, BIOLOGICAL,  
RADIOLOGICAL, AND  
NUCLEAR SURVIVABILITY**

**COMPLIANCE WITH THIS PUBLICATION IS MANDATORY**

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This Air Force Instruction (AFI) implements Air Force Policy Directive (AFPD) 10-26, *Countering Weapons of Mass Destruction Enterprise*. It establishes the guidelines and procedures for implementing chemical, biological, radiological, and nuclear (CBRN) survivability requirements. It applies to all Regular Air Force, Air National Guard, and Air Force Reserve personnel who develop, manage or operate CBRN mission-critical systems and/or infrastructure, and to all Air Force mission-critical systems and infrastructure regardless of Acquisition Category, classification, compartmentalization or “special access program” designation. Ensure that all records created as a result of processes prescribed in this publication are maintained in accordance with (IAW) Air Force Manual 33-363, *Management of Records*, and disposed of IAW the Air Force Records Disposition Schedule located in the Air Force Information Management System. Refer recommended changes and questions about this publication to the Office of Primary Responsibility using Air Force Form 847, *Recommendation for Change of Publication*; route Air Force Forms 847 from the field through the appropriate functional chain of command. The authorities to waive wing/unit level requirements will be identified by Tier Number (“T-0”, “T-1”, “T-2”, “T-3”) following the compliance statement. See AFI 33-360, *Publications and Forms Management*, for a description of the authorities associated with the Tier numbers. Submit requests for waivers through the chain of command to the appropriate Tier waiver approval authority, or alternately, to the requestor’s commander for non-tiered compliance items. This publication may not be supplemented or further implemented/extended.

## ***SUMMARY OF CHANGES***

This document has been substantially revised and should be reviewed in its entirety. Unnecessary verbiage and less-common acronyms were deleted, reference to the Air Force Requirements Review Group was removed, and definitions were added for “hardness assurance”, “hardness maintenance”, and “hardness surveillance.”

### **1. Overview**

1.1. The Air Force must be able to survive and/or operate in chemical, biological, and radiological (CBR) contamination and/or nuclear environments in order to deter adversaries from using weapons of mass destruction (WMD) while also guaranteeing mission assurance if WMD is used. This concept is known as CBRN Survivability.

1.2. CBRN Survivability consists of CBR contamination survivability and nuclear survivability. Where CBR contamination survivability is primarily concerned with the principles of CBR hardness, CBR decontaminability, and CBR compatibility, nuclear survivability is concerned with surviving initial nuclear effects (including electromagnetic pulse).

1.3. The Air Force addresses CBRN survivability by identifying mission-critical systems and infrastructure required to survive and/or operate in CBRN environments and ensuring their availability through hardening, timely resupply, redundancy, mitigation (i.e., tactics, techniques, and procedures), or a combination thereof.

1.4. CBRN Survivability considerations apply throughout a system’s and/or infrastructure’s life cycle.

### **2. Roles and Responsibilities**

#### **2.1. Assistant Secretary of the Air Force for Acquisition, Technology, and Logistics (SAF/AQ) :**

2.1.1. Oversees the acquisition and sustainment of mission-critical systems ensuring compliance with CBRN survivability requirements, when applicable.

2.1.2. Ensures CBRN survivability requirements (as described in DoD Instruction (DoDI) 3150.09, *The Chemical, Biological, Radiological, and Nuclear (CBRN) Survivability Policy*, and this instruction) are incorporated into applicable acquisition guidance.

2.1.3. Ensures system and joint program offices support the Lead Command (as prescribed in AFPD 10-9, *Lead Command Designation and Responsibilities for Weapon Systems*) or Sponsor (as prescribed in AFI 10-601, *Operational Capability Requirements Development*) in assessing the vulnerability of legacy and development-phase CBRN mission critical systems.

2.1.4. Ensures program managers implement hardness assurance programs, as well as, continuing hardness maintenance and hardness surveillance programs if the system requires hardening to survive against nuclear, ballistic, chemical, biological, high-power microwave, or laser threats IAW AFI 63-101/20-101, *Integrated Life Cycle Management*.

2.1.5. Collects and provides CBRN mission-critical system and infrastructure data to Deputy Chief of Staff, Strategic Deterrence and Nuclear Integration (AF/A10) in support of the Mission Critical Report.

**2.2. Deputy Chief of Staff, Logistics, Engineering and Force Protection (AF/A4) :**

2.2.1. Ensures Air Force CBRN Defense Systems concerns are addressed in Joint Requirements Office capability requirements documents.

2.2.2. Ensures CBRN Survivability considerations are addressed in military construction guidance documents.

2.2.3. Assists AF/A10 with gathering data on CBRN mission-critical systems and infrastructure in support of the Mission Critical Report as prescribed in DoDI 3150.09.

**2.3. Deputy Chief of Staff, Strategic Plans and Requirements (AF/A5/8) :**

2.3.1. Oversees operational CBRN survivability requirements integration in the Air Force operational capability requirements process.

2.3.2. As required, reviews and approves “CBRN Mission Critical” determinations and associated CBRN Survivability requirements in Capability Development Documents and Capability Production Documents.

2.3.3. Assists AF/A10 with gathering data on CBRN mission-critical systems and infrastructure in support of the Mission Critical Report.

**2.4. Deputy Chief of Staff, Strategic Deterrence and Nuclear Integration (AF/A10) :**

2.4.1. Validates operational survivability requirements for CBRN mission-critical systems and infrastructure managed under the Nuclear Deterrent Operations Panel.

2.4.2. Represents the Air Force at the CBRN Survivability Oversight Group (CSOG) and supporting working groups.

2.4.3. Reviews Joint Capabilities Integration and Development System documents to ensure CBRN Survivability is adequately addressed.

2.4.4. Works with the Air Force Requirements and Acquisition communities to ensure CBRN Survivability requirements (as prescribed in DoDI 3150.09 and this instruction) are incorporated into applicable requirements and acquisition policy.

2.4.5. Compiles the Air Force’s Mission Critical Report, and forwards it to the Assistant to the Secretary of Defense for Nuclear, Chemical, and Biological Defense (ASD(NCB)).

**2.5. Director of Air Force Test and Evaluation (AF/TE).** Oversees the testing and evaluation of system survivability IAW AFI 99-103, *Capabilities-Based Test and Evaluation*.

**2.6. Lead Command or Sponsor:**

2.6.1. Considers CBRN threats when determining desired operating environment(s) for mission critical systems IAW established DoD procedures.

2.6.2. Describes the concept of operations for the desired capability likely to be employed in the CBRN environment and plans for CBRN survivability validation and verification.

- 2.6.2.1. Includes CBRN mission critical determinations and justifications in Capability Development Documents and Capability Production Documents (see CBRN Mission Critical Decision Matrix at **Figure 1.**). **(T-0)** Justifications should fully explain CBRN Survivability requirements and/or planned mitigation strategies.
- 2.6.2.2. For mission-critical systems and infrastructure determined to be “CBRN Mission Critical” (See **Figure 1.**), includes a CBRN Threat Analysis in the Threat Summary sections of applicable Joint Capabilities Integration and Development System documents. **(T-0)**
- 2.6.3. Provides an assessment of the mission-critical system’s or infrastructure’s CBRN survivability in the anticipated battlefield environment to support milestone decisions and in-process reviews. Collaborates with the system program manager to address any shortfalls identified in meeting CBRN survivability requirements; provides a plan for meeting the requirements.
- 2.6.4. Conducts a review to assess the impact to the system’s CBRN survivability during capability document updates.
- 2.6.5. For legacy systems, provides explicit CBRN survivability parameters for inclusion in required modification documents per AFI 63-101/20-101.
- 2.6.6. Ensures changes to requirements, including a decision to lessen nuclear command and control survivability requirements, are approved IAW DoDI 3150.09, *The Manual for The Operation of the Joint Capabilities Integration and Development System*, and AFI 10-601. **(T-0)**
- 2.6.7. Works with the system program manager to identify the architecture and the modeling and simulation required for the mission critical system's acquisition, operations, testing, training, and sustainment.
- 2.6.8. Works with the system program manager to regularly assess the vulnerability of legacy CBRN mission-critical systems through system testing, according to applicable DoD Standards (e.g., military standards, etc.). For legacy CBRN mission-critical systems assessed as vulnerable, works with the system program manager to ensure appropriate actions are taken that include, but are not limited to: identification of lessons learned; development of tactics, techniques, and procedures to mitigate risks; identification of materiel limitations; and development of schedules and funding plans to reduce vulnerabilities, as appropriate.
- 2.6.9. Identifies CBRN mission-critical systems and infrastructure that require hardening for CBRN survivability. **(T-0)**
- 2.6.9.1. Ensures compliance with established hardness assurance, hardness maintenance and hardness surveillance programs for CBRN mission critical systems hardened for nuclear survivability IAW DoDI 3150.09 and AFI 63-101/20-101. **(T-0)**
- 2.6.9.2. Ensures compliance with established preventive maintenance checks and services programs for systems and infrastructure hardened for CBR contamination survivability, and monitors facility effectiveness IAW local operations, provided maintenance manuals for installed systems, and/or applicable technical data, as appropriate. **(T-0)**

2.6.10. Works with the system program manager to address CBRN survivability at each acquisition milestone for all CBRN mission critical systems under development, as a part of a DoD Acquisition Program, IAW DoDI 5000.02, *Operation of the Defense Acquisition System*.

2.6.11. Provides data to AF/A10 on mission-critical systems and infrastructure in support of Mission Critical Report requirements.

## 2.7. Using Command :

2.7.1. Ensures compliance with established hardness assurance, hardness maintenance and hardness surveillance programs for CBRN mission critical systems hardened for nuclear survivability IAW DoDI 3150.09 and AFI 63-101/20-101. **(T-0)**

2.7.2. Ensures compliance with established preventive maintenance checks and services programs for systems and infrastructure hardened for CBR contamination survivability; monitors facility effectiveness IAW local guidance, provided maintenance manuals for installed systems, and/or applicable technical data, as appropriate. **(T-0)**

2.7.3. Provides data to AF/A10 on mission-critical systems and infrastructure in support of Mission Critical Report requirements.

2.8. **Commander, Air Force Materiel Command** ensures the Air Force Nuclear Weapons Center and the Air Force Research Laboratory comply with their responsibilities identified in this instruction.

2.8.1. **Air Force Nuclear Weapons Center** . Assists system, command, and joint program offices with legacy and development-phase modeling, simulation, experimentation, testing, evaluation, analysis, scientific research, and technology demonstrations for nuclear systems and infrastructure. Provides scientific and technological support to the development and implementation of nuclear risk mitigation tactics, techniques, and procedures and nuclear weapon effects hardness requirement recommendations. These tasks are accomplished when formally requested and when funding is provided (subject to resource constraints).

2.8.2. **Air Force Research Laboratory (AFRL)**. Advances Air Force CBRN survivability through system modeling, simulation, testing, analysis, evaluation, scientific research, and technology demonstration support to the development and implementation of AF CBRN risk mitigation technologies, methodologies and tactics, techniques, and procedures. Performs these tasks for system, command, and joint program offices when formally requested and when funding is provided (subject to resource constraints).

2.9. **Commander, Air Force Operational Test and Evaluation Center**. Ensures operational test and evaluation planning, execution, and reporting for all Acquisition Category I and II programs, as well as for all Office of the Secretary of Defense operational test and evaluation oversight programs IAW AFI 99-103. If operational test and evaluation is required, the report evaluates system effectiveness, suitability, and mission capability, to include CBRN survivability.

### 3. Chemical, Biological, Radiological, and Nuclear Survivability Implementation

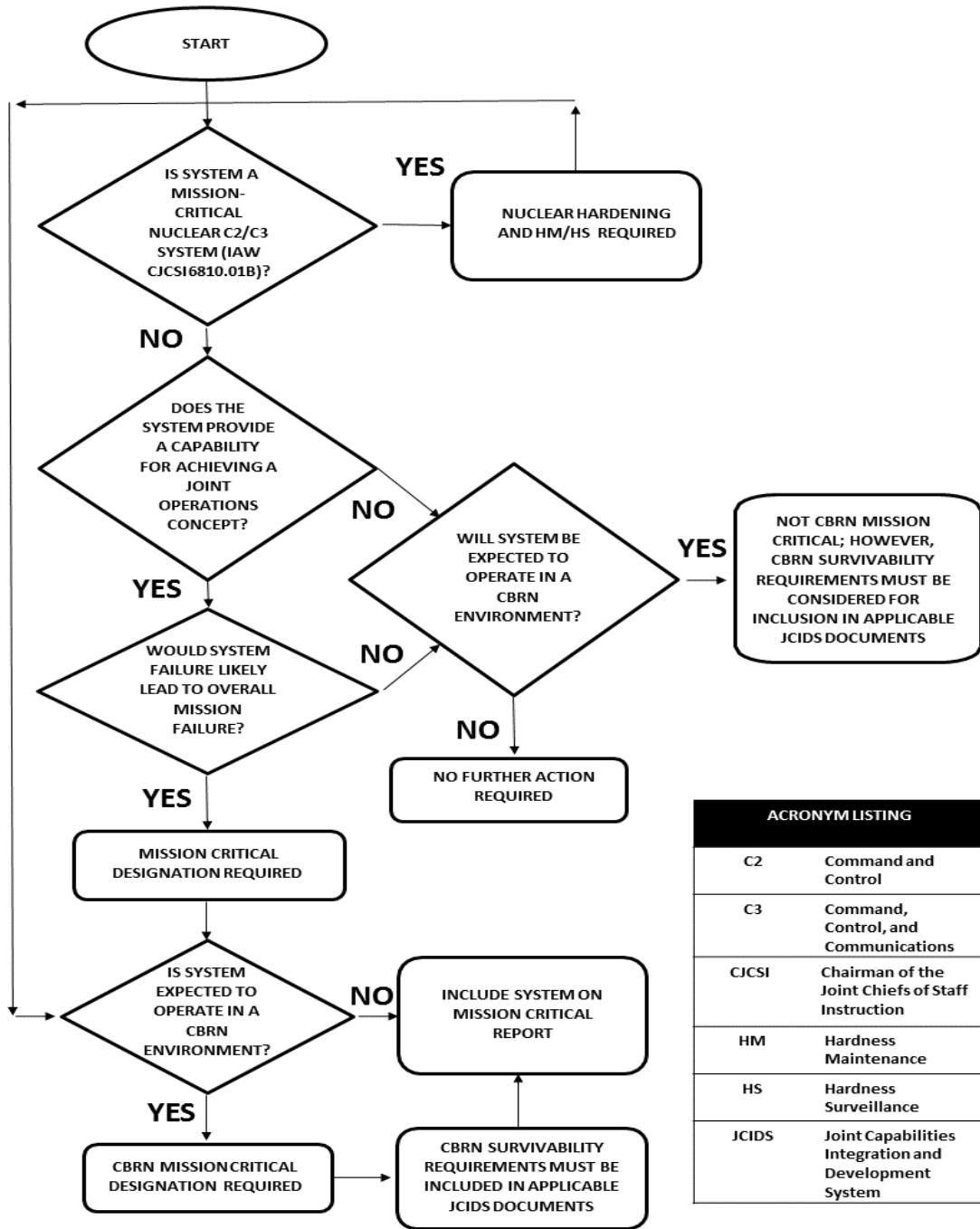
3.1. The Lead Command or Sponsor will include a CBRN threat analysis in the “Threat Summary” section of all Initial Capability Documents, Capability Development Documents, and Capability Production Documents generated through the Joint Capabilities Integration and Development System. **(T-0)** Additionally, a “mission critical” determination will be included in all Capability Development Documents and Capability Production Documents. **(T-0)** Mission-critical systems and infrastructure expected to survive and/or operate in CBR contamination and/or nuclear environments will be designated “CBRN Mission Critical” **(T-0)**; use **Figure 1.** to help guide “Mission Critical” and “CBRN Mission Critical” decisions. “Mission Critical” and “CBRN Mission Critical” designations determined by Lead Commands or Sponsors for Air Force systems are subject to review and approval by the Air Force Requirements Oversight Council and/or the Joint Requirements Oversight Council.

3.2. Lead Command or Sponsor must harden systems required to survive and operate in nuclear environments. **(T-0)** Lead Command or Sponsor will ensure hardness assurance during system acquisition. **(T-0)** In addition, Lead and Using Commands will apply hardness maintenance and hardness surveillance programs throughout the system’s life cycle. **(T-0)**

3.3. If command and control systems and/or infrastructure require hardening to survive in nuclear environments, Lead and Using Command(s) shall ensure applicable hardness assurance, hardness maintenance and hardness surveillance programs are in place IAW AFI 63-101/20-101. **(T-0)**

3.4. Lead and Using Commands will also maintain preventive maintenance checks and services programs for systems and infrastructure hardened for CBR contamination survivability and monitor facility effectiveness IAW local guidance, provided maintenance manuals for installed systems, and/or applicable technical data, as appropriate. **(T-0)**

Figure 1. Mission Critical Decision Tool.



JACK WEINSTEIN, Lt Gen, USAF  
 DCS, Strategic Deterrence and Nuclear Integration

**Attachment 1****GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION*****References***

AFPD 10-26, *Countering Weapons of Mass Destruction Enterprise*, 17 June 2015

Air Force Manual 33-363, *Management of Records*, 1 March 2008

AFI 33-360, *Publications and Forms Management*, 1 December 2015

DoDI 3150.09, *The Chemical, Biological, Radiological, and Nuclear (CBRN) Survivability Policy*, 8 April 2015

AFPD 10-9, *Lead Command Designation and Responsibilities for Weapon Systems*, 8 March 2007

AFI 10-601, *Operational Capability Requirements Development*, 6 November 2013

AFI 63-101/20-101, *Integrated Life Cycle Management*, 9 May 2017

AFI 99-103, *Capabilities-Based Test and Evaluation*, 6 April 2017

*Manual for the Operation of the Joint Capabilities Integration and Development System (JCIDS Manual)*, 12 February 2015. Document available from OPR (202-404-6540 or DSN 754-6540)

DoDI 5000.02, *Operation of the Defense Acquisition System*, 7 January 2015

CJCSI 6810.01B, *Critical Nuclear Command and Control (NC2) Equipment and Facilities*, 21 Jun 13. Document available from Joint Staff/J3 (703-697-3776/7223 or DSN 227-3776/7223)

Allied Engineering Publication-7 (AEP-7), *Chemical, Biological, Radiological, and Nuclear (CBRN) Contamination Survivability Factors in the Design, Testing and Acceptance of Military Equipment*, Edition 5, April 2012. Document available from OPR (202-404-6540).

***Abbreviations and Acronyms***

**AFI**—Air Force Instruction

**AFPD**—Air Force Policy Directive

**AFRL**—Air Force Research Laboratory

**CBR**—Chemical, Biological, and Radiological

**CBRN**—Chemical, Biological, Radiological, and Nuclear

**CJCSI**—Chairman of the Joint Chiefs of Staff Instruction

**CSOG**—CBRN Survivability Oversight Group

**DoD**—Department of Defense

**DoDD**—Department of Defense Directive

**DoDI**—Department of Defense Instruction

**IAW**—In Accordance With



*Terms*

**CBR Compatibility**—The ability of a system to be operated, maintained, and resupplied by personnel wearing the full individual protective equipment in climates for which the system is designed and for the time period specified in the system requirements. (AEP-7)

**CBR Contamination Survivability**—The capability of a system and its crew to withstand a CBR contaminated environment, including decontamination, without losing the ability to accomplish the assigned mission. The three main principles of CBR contamination survivability are hardness, decontaminability, and compatibility. (AEP-7)

**CBR Decontaminability**—The ability of a system to be rapidly and effectively decontaminated using standard CBR decontaminates and procedures available in the field to the point that any remaining contaminant poses no casualty-producing hazard to unprotected personnel exposed for the duration of the mission. (AEP-7)

**CBR Environment**—The environment created by chemical, biological, or radiological contamination. (DODI 3150.09)

**CBR Hardness**—The capability of materiel or a system to withstand damaging effects from CBR contamination, applicable decontaminates, and/or decontamination procedures. (AEP-7)

**CBRN Mission-Critical**—That subset of mission-critical systems with operational concepts requiring employment and survivability in a CBR environment or a nuclear environment.

**CBRN Survivability**—The capability of a system to avoid, withstand, or operate during and/or after exposure to a CBRN environment (and decontamination process) without losing the ability to accomplish the assigned mission. CBRN survivability is concerned with contamination that includes fallout and initial nuclear weapons effects, including blast, EMP and other initial radiation and shockwave effects. (DoDI 3150.09)

**Electromagnetic Pulse (EMP)**—The electromagnetic radiation from a nuclear explosion caused by Compton-recoil electrons and photoelectrons from photons scattered in the materials of the nuclear device or in a surrounding medium. The resulting electric and magnetic fields may couple with electrical/electronic systems to produce damaging current and voltage surges. Depending on the burst type, can cause power spikes ranging from several hundred volts per meter up to more than one million volts per meter. Can cause component or sub-system burnout or degradation and system upset. (DODI 3150.09)

**EMP Survivability**—The capability of a system to withstand exposure to an EMP environment without losing the ability to accomplish its designated mission throughout its life cycle. EMP survivability may be accomplished by hardening, timely resupply, redundancy, mitigation techniques (including operational techniques), or a combination thereof. (DODI 3150.09)

**Hardness Assurance**—The procedures applied during production of a hardened system (and through periodic validation testing, as required) to make sure that the hardness built into the system is retained throughout the life of the system. (DODI 3150.09)

**Hardness Maintenance**—Procedures applied during the operational phase of a hardened system to make sure that the hardness built into the system is retained throughout the life of the system. (DODI 3150.09)

**Hardness Surveillance**—Inspection and test procedures that are conducted during the operational life of the system to ensure that the designed hardness of the system is not degraded through operational use, logistic support, or maintenance actions. (DODI 3150.09)

**Lead Command**—The command that serves as the using command's interface with the Program Manager for a system as prescribed by AFPD 10-9. Lead Command designation is not exclusive to Major Commands; Field Operating Agencies and Direct Reporting Units may also be designated.

**Mission Critical System**—A system whose operational effectiveness and operational suitability are essential to successful mission completion or to aggregate residual combat capability. If this system fails, the mission likely cannot be completed. Such a system can be an auxiliary or supporting system, as well as a primary mission system. (DODI 3150.09)

**Mission Critical Report**—A report required by DoDI 3150.09 that identifies a Service's Mission Critical Systems and Infrastructure. It includes CBRN survivability assessments for those systems expected to survive and/or operate in chemical, biological, radiological contamination and/or nuclear environments.

**Nuclear Command & Control System**—The combination of facilities, equipment, communications, procedures, and personnel essential for planning, directing, and controlling nuclear weapons, weapons systems, and associated operations. (DODI 3150.09)

**Nuclear Environment**—The environment created by nuclear weapon effects (i.e., air blast, thermal radiation, nuclear radiation, fallout, and electromagnetic pulse) and by radiation in space. (DODI 3150.09)

**Nuclear Hardening**—The employment of any design or manufacturing technique or component applied to an item or system that allows it to avoid failure or destruction, resist malfunction (temporary or permanent) and/or prevent degraded performance induced by nuclear weapon effects. Such systems are considered to be nuclear hardened. (DODI 3150.09)

**Nuclear Survivability**—The capability of a system or infrastructure to withstand exposure to nuclear environments without suffering loss of ability to accomplish its designated mission throughout its life cycle. Nuclear survivability may be accomplished by hardening, timely resupply, redundancy, mitigation techniques (including operational techniques), or a combination. Includes EMP survivability. (DODI 3150.09)

**Sponsor**—The organization responsible for documentation, periodic reporting, and funding actions necessary to support needed capabilities (AFI 10-601).

**Using Commands**—Those commands operating a system, subsystem, or item of equipment related to a weapon system procured by a Lead Command.