

**BY ORDER OF THE COMMANDER
AIR FORCE SPACE COMMAND**

**AIR FORCE SPACE COMMAND
INSTRUCTION 62-0201**

2 FEBRUARY 1998

Developmental Engineering

**HARDNESS MAINTENANCE/HARDNESS
SURVEILLANCE (HM/HS) PROGRAM FOR
SURVIVABILITY OF AIR FORCE SPACE
COMMAND (AFSPC) SYSTEMS**



COMPLIANCE WITH THIS PUBLICATION IS MANDATORY

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This instruction implements AFPD62-2, System Survivability, and AFI62-201, System Survivability. This publication applies to the Air National Guard (ANG) when published in the ANGIND2. This publication does not apply to Air Forces Reserves Command (AFRC) units. This instruction gives guidance for managing the life-cycle of survivable AFSPC Systems, establishes guidance for nuclear survivability of AFSPC and assigns responsibilities for implementing AFSPC Hardness Maintenance/Hardness Surveillance (HM/HS) Program. It applies to all AFSPC organizations, subordinate units, and contractors who design, plan, acquire, install, modify, operate, maintain, or support AFSPC assets having established nuclear survivability requirements. Wings and subordinate units should supplement this instruction. All supplements to this instruction should be coordinated with HQ AFSPC/SCX prior to publication.

SUMMARY OF REVISIONS

Establishes HEMP protection policy and guidance for AFSPC hardened assets. Combines requirements listed in AFSPCI62-20101 and AFSPCI62-20102, 1 April 1997, into one instruction.

1. References:

- 1.1. Chairman of the Joint Chiefs of Staff Instructions (CJCSI) 3222.01, CJCS Prioritization of Command, Control and Communications (C3) Nodes For High Altitude Electromagnetic Pulse (HEMP) Protection.
- 1.2. CJCSI 5119.01, Charter for the Central Direction, Management, Operation, and Technical Support of the Nuclear Command, Control, and Communications System.
- 1.3. CJCSI 6210.02, Attack Information and Operational Architecture of the Integrated Tactical Warning and Attack Assessment System.

1.4. CJCSI 6811.01, Nuclear Command and Control Technical Performance Criteria.

2. Introduction:

2.1. Purpose. This instruction establishes survivability guidance for AFSPC hardened systems. It covers compatibility, interoperability, and integration requirements for all current, new systems, and modifications to existing AFSPC system that must meet survivability requirements in support of North American Aerospace Defense (NORAD), United States Space Command (USSPACECOM), and United States Strategic Command (USSTRATCOM).

2.2. Scope. Compliance with this survivability guidance is mandatory for all survivable systems. It applies to all AFSPC and ANG assets which have established nuclear survivability, and HEMP hardness criteria. Assets define those facilities or equipment which AFSPC or ANG owns, operates, and or maintains. These assets include sensor sites; correlation centers; and survivable communications subsystems which provide connectivity among space vehicles, sensors, correlation centers and command posts. This instruction does not address ICBMs HM/HS responsibilities at this time. As ICBM HM/HS responsibilities are transferred to AFSPC, this instruction will be updated as appropriate.

3. General Guidance:

3.1. Survivability Protection Approach. Protection of hardened facilities requires a "balanced survivability" approach. This approach tailors survivability to required levels without over or under emphasizing threats. The impact of these requirements on other programmatic considerations (i.e., cost, performance, reliability, maintainability and logistics support) should be considered to ensure maximum operational effectiveness. The HM/HS program defined herein requires maintenance of assets to uphold the designed levels of protection.

3.1.1. The "balanced survivability" approach ensures hardness to all nuclear and nonnuclear effects of concern is commensurate with mission requirements. It precludes efforts in one area from negating efforts in another through neglect or conflict. (For example, if filtering is used to eliminate fallout contamination, it should be of quality to provide protection against chemical and biological agents as well.) Also a balanced survivability approach:

3.1.1.1. Addresses survivability issues in a timely manner.

3.1.1.2. Ensures hardness measures are based on a defined threat environment. These protective measures should reflect proven state-of-the-art capabilities.

3.1.1.3. Ensures a HM/HS program with the appropriate personnel and test equipment is available. This ensures protective measures are installed correctly and do not degrade through improper operational use, maintenance actions or by natural causes, etc. (See AFI62-201)

3.1.1.4. Provides a centralized repository for all survivability documentation and information.

3.1.1.5. These assets (i.e., Air Force manned satellite communications facilities, missile warning sensor sites, correlation centers, etc.) must be protected against other threats (conventional attack, terrorism, and sabotage) by virtue of being Priority A resources. These protection requirements are detailed in AFI31-101V1.

3.2. HEMP Protection Design Requirements. HEMP protection should be designed into a facility in accordance with Military Standard (MIL-STD) 188-125 (as listed in the latest revision of the Department of Defense Index of Specifications and Standards (DODISS)). This approach is known as

volumetric shielding. Volumetric shielding is considered first whenever possible. HEMP-hardened facilities are designed, constructed, and modified according to referenced standards and established practices to protect against MIL-STD 2169 HEMP environments (as listed in the latest revision of the DODISS). Regardless of protection scheme(s), protective measures must reflect proven, state-of-the-art capabilities. MIL-STD 188-125 requirements will also be used to evaluate a facility's hardness at the organizational and depot level.

3.3. HM/HS Program Composition. The HM/HS program consists of three major parts: a hardness baseline, maintenance methodologies to maintain the hardness baseline, and periodic depot-level inspections, or surveillance, to ensure the maintenance program is effective. The hardness baseline is provided by the acquiring or modifying agency. During the systems life-cycle, AFSPC, the operating command, and the sites will configuration manage the hardness baseline to ensure the baseline is not violated due to improper modification or maintenance actions. When AFSPC is the acquiring or modifying agency, the baseline is developed or revised by the appropriate HQ AFSPC Directorate, with the assistance of designated outside agencies. The operating command or agency is responsible for accomplishment of day-to-day maintenance actions.

3.4. HM/HS Program Requirements. Sites with hardness requirements shall implement a Hardness Configuration management program and the HM/HS program. Sites should track hardness critical articles (HCAs), hardness critical items (HCIs), and hardness critical processes (HCPs). This set of actions, in conjunction with periodic depot-level testing, constitutes a site-level HM/HS program.

3.4.1. Sites should aggressively pursue their HM/HS programs to prevent the inadvertent or intentional bypassing of hardness features. Maintenance and repair involving HCAs/HCIs/HCPs is coordinated with the Chairman, HM/HS Working Group or maintenance officer.

3.5. HEMP Awareness. Sites should emphasize HEMP awareness and conduct initial and recurring organizational level training to ensure all personnel maintain HEMP protection features. Sites should identify a survivability office of primary responsibility (OPR) to the AFSPC focal point (HQ AFSPC/SCX). (System Program Directors (SPDs) will develop and periodically assess the Hardness Assurance, Maintenance, Surveillance (HAMS) program to include ensuring awareness training is received. (See AFI62-201, paragraph 3.7.6.)

3.6. AFSPC Survivability Program: The AFSPC Survivability Program covers the design, testing, and maintenance of protection measures for following effects:

3.6.1. HEMP and source region electromagnetic pulse (SREMP).

3.6.2. Ground shock (both nuclear and naturally produced) and overpressure (blast).

3.6.3. Radioactive dust (to include nuclear, biological, and chemical (NBC) protection).

3.7. Cheyenne Mountain Air Station (CMAS) Protected Volume. The CMAS protected volume is the chamber and tunnel area subject to "button-up." However, certain protection measures extend outside this CMAS environment to areas in the tunnels and immediate vicinity of the portals. From a balanced design standpoint, the hardness of these external interfaces must be considered.

3.8. Survivability Program Objectives. The program objectives provide ways to:

3.8.1. Develop hardness measures.

3.8.2. Identify the impact of proposed facility changes on existing hardness.

- 3.8.3. Establish installation practices to maintain or improve hardness.
- 3.8.4. Re-evaluate survivability when the threat or mission changes.
- 3.8.5. Maintains a HM/HS program and documents all efforts to evaluate, maintain or upgrade protection measures.

4. Responsibilities:

4.1. HQ AFSPC, Directorate of Communications and Information (SC):

- 4.1.1. Acts as the Command focal point for survivability issues per AFI62-201.
- 4.1.2. Serves as the Command focal point for the application of:
 - 4.1.2.1. Defense Special Weapons Agency (DSWA) (formerly the Defense Nuclear Agency (DNA)) Electromagnetic Pulse (EMP) -1 to provide consistent guidance on classification issues.
 - 4.1.2.2. MIL-STD 188-125 and MIL-STD 2169 (as listed in the latest revision of the DODISS) to ensure this standard is consistently applied to new and existing systems.
- 4.1.3. Represents AFSPC interests on the Secretary of the Air Force (SAF) Nuclear Survivability Steering Group (NSSG).
- 4.1.4. Recommends corrective actions to System Program Directors (SPD), survivability Office of Primary Responsibility (OPR), and other appropriate agencies.
- 4.1.5. Collects and analyzes quality control test, acceptance test and verification test information from the organizations responsible for the construction or modification of hardened facilities. Assists in the development or modification of the hardiness assurance baseline for facilities.
- 4.1.6. Chairs the AFSPC Survivability Steering Group (SSG).
- 4.1.7. Ensures HM/HS practices applied to AFSPC systems are consistent with other DoD facilities and systems.
- 4.1.8. Directs the AFSPC HM/HS program through this instruction.
- 4.1.9. Develops plans to correct identified deficiencies.
- 4.1.10. Resolves, with staff coordination, conflicts that arise between this program and related DoD efforts.
- 4.1.11. Programs funds to support HM/HS requirements. Validates new HM/HS plans.
- 4.1.12. Requests Air Force Materiel Command (AFMC) conduct periodic depot-level hardiness surveillance evaluations. Reviews depot-level hardiness surveillance results against the original system baselines. Identifies the system degradation trends and concerns.
- 4.1.13. Monitors HEMP awareness programs and HEMP organizational level training courses for accuracy.
- 4.1.14. Evaluates existing or potential problems. Brings them to the attention of the proper project officer or agent for corrective action. Resolves survivability issues before any changes are made.

- 4.1.15. Consolidates inputs for the annual Nuclear Survivability Status Report (NSSR).
- 4.1.16. Coordinates with responsible agencies on all topics which relate directly to their hardness programs.
- 4.1.17. Coordinates with the Director of Long-Range Power Projection, Special Operations Forces, Airlift and Training Programs (SAF/AQQ) Survivability Review Group (SRG) on the development and definition of hardness criteria. Recommends review of hardness criteria and revision of hardness methodologies in coordination with the SRG as the threat or mission changes.

4.2. HQ AFSPC, Directorate of The Civil Engineer (CE):

- 4.2.1. Serves as a SSG member.
- 4.2.2. Is responsible for ensuring hardness requirements for new facilities and modifications of existing AFSPC facilities are validated as part of the military construction program approval process.
- 4.2.3. Ensures compliance with applicable construction/modification regulations and standards.
- 4.2.4. Provides engineering assistance to wings and sites, as required, necessary to ensure protective construction or modifications will maintain or upgrade AFSPC facility HEMP protection.
- 4.2.5. Identifies to HQ AFSPC/SC focal point, in writing, points of contact (POC) to work day-to-day survivability issues.
- 4.2.6. Furnishes engineering assistance to wings and sites, as needed to establish survivability requirements and hardness methodologies for industrial support systems.

4.3. HQ AFSPC, Directorate of Requirements (DR):

- 4.3.1. Serves as a SSG member.
- 4.3.2. Develops survivability requirements for new systems.
- 4.3.3. Ensures validated nuclear hardness requirements are included in the acquisition of AFSPC systems.
- 4.3.4. Works with HQ AFSPC/SC to ensure HM/HS plans for new AFSPC systems are adequate and this documentation is provided at Initial Operational Capability (IOC).
- 4.3.5. Reviews AFMC and Defense Special Weapons Agency (DSWA) emerging system concepts and technology and helps develop new concepts for maintaining or improving HM/HS program effectiveness.
- 4.3.6. Staffs program management documentation affecting the survivability of AFSPC systems in a wartime environment.
- 4.3.7. Represents AFSPC on the SAF/AQQ SRG.
- 4.3.8. Identifies to HQ AFSPC/SC, as required, writing, POCs to work issues.

4.4. HQ AFSPC, Directorate of Operations (DO):

- 4.4.1. Serves as a SSG member.
- 4.4.2. Works with HQ AFSPC/SC to determine the impact of operational procedures on the hardness of AFSPC systems.

4.4.3. Establishes operational procedures that take full advantage of protection measures. Identifies the operational impact of implementing protective techniques.

4.4.4. Identifies to the HQ AFSPC/SC focal point, in writing, POCs to work day-to-day survivability issues.

4.4.5. Ensures operational capabilities are considered during development of survivability requirements and design criteria.

4.4.6. Provides threat assessments to HQ AFSPC/SC, as needed, to determine protection requirements and employment concepts for protective devices.

4.4.7. Furnishes updated threat assessments when a facility mission or the hostile environment changes. The updated threat assessments are sent to HQ AFSPC/SC for action.

4.4.8. Identifies survivability needs for intelligence mission systems.

4.5. HQ AFSPC, Inspector General (IG):

4.5.1. Evaluates compliance with this instruction, but primarily focuses on sites' HM/HS programs.

4.6. AFSPC Communications Support Squadron (CSS):

4.6.1. Coordinates site visits for technical evaluations and performance tests at facilities with space wings and other organizations.

4.6.2. Ensures support for verification tests, as required.

4.6.3. Responds to wings' and units' requests for assistance. Identifies requests for guidance or assistance beyond their capability to higher headquarters.

4.6.4. Ensures maintenance of a classified database of facility deficiencies.

4.6.5. Ensures HM/HS practices are applied to AFSPC systems having hardness requirements.

4.6.6. Manages the AFSPC HM/HS program through this instruction. Identifies HM/HS program funding requirements to HQ AFSPC/SC.

4.6.7. Evaluates HEMP awareness programs and organizational level training courses on HEMP protection.

4.6.8. Evaluates existing or potential problems. Elevates survivability issues to higher headquarters for resolution as required.

4.6.9. Coordinates inputs for the annual NSSR.

4.6.10. Ensures documentation of all efforts to evaluate, maintain, or improve AFSPC facilities or systems survivability are on file in HQ AFSPC/SC and information copies are available in HQ AFSPC/HO, as appropriate.

4.6.11. Serves as SSG technical advisor.

4.6.12. Identifies to the HQ AFSPC/SC focal point, in writing, POCs to work day-to-day survivability issues.

4.7. 21st Space Wing (SW) and 50 SW: Commanders of wings with responsibility over units having nuclear-hardened facilities or subsystems:

- 4.7.1. Help identify the operational impact of implementing protective techniques.
- 4.7.2. Establish procedures in AFSPC operational facilities that take full advantage of protective measures.
- 4.7.3. Serves as SSG members.
- 4.7.4. Identify to the AFSPC CSS focal point, in writing, an OPR to assure subordinate units comply with provisions of this instruction and expedite the resolution of hardness issues.
- 4.7.5. Ensures HCAs, HCIs and HCPs are clearly identified on all engineering drawings. Maintains documentation of all penetrations of the integral shield for HEMP-hardened facilities.
- 4.7.6. Supplement this instruction as necessary.
- 4.7.7. Respond to subordinate units' requests for assistance and refer requests for guidance or assistance beyond their capability to higher headquarters.
- 4.7.8. Upchannel changes in site hardness status to AFSPC CSS.

4.8. 821st Space Group (821 SG):

- 4.8.1. Helps identify the operational impact of implementing protective techniques.
- 4.8.2. Establishes procedures in AFSPC operational facilities that take full advantage of protective measures.
- 4.8.3. Identify to the AFSPC CSS focal point, in writing, an OPR to assure subordinate units comply with provisions of this instruction and expedite the resolution of hardness issues.
- 4.8.4. Supplement this instruction as necessary.
- 4.8.5. Responds to subordinate units' requests for assistance and refers requests for guidance or assistance beyond their capability to higher headquarters.
- 4.8.6. Upchannels changes in site hardness status to AFSPC CSS.
- 4.8.7. May serve as SSG member.
- 4.8.8. Identifies and elevates survivability problems to appropriate higher headquarters agencies.
- 4.8.9. Ensures the implementation of the command's HM/HS program. Furnishes the necessary maintenance, logistics support, and personnel for the program. Ensures published maintenance guidelines and procedures do not jeopardized and hinder proper HM/HS practices to maintain or improve the sites under its purview.

4.9. 721st Support Group (721 SPTG):

- 4.9.1. Manages the CMAS Survivability Program in accordance with the overall AFSPC Command Survivability Program, as directed by AFI62-201.
- 4.9.2. Identifies CMAS survivability problems.
- 4.9.3. Implements the CMAS HM/HS program. Furnishes the necessary maintenance, logistics support, and personnel for the program. Implements published CMAS maintenance guidelines and procedures to ensure hardness is not jeopardized and proper practices are followed to maintain or improve the CMAS.

4.9.4. Identifies survivability issues and concerns for CMAS Facilities Utilization Board action. The CMAS Facilities Utilization Board addresses infrastructure, maintenance and oversees CMAS survivability.

4.9.5. Serves as a SSG member.

4.10. 721st Civil Engineer Squadron (721 CES):

4.10.1. Conducts the CMAS HEMP surveillance program for facility and equipment operated and or maintained by 721 CES personnel.

4.10.2. Semiannually updates the facility-related portions (power and utilities) of the CMAS point-of-entry (POE) list.

4.10.3. Implements raised floor criteria and equipment tie-down techniques to meet CMAS survivability requirements. The 721 CES is responsible for technical evaluation of raised floor criteria and ensuring tie-down in accordance with SPACECOM (SYCR)-Technical Report (TR)-85-1. The 721 CES reviews the completed tie-down designs of any other equipment to ensure compliance with SYCR-TR-85-1. AFSPC command and program managers are responsible for ensuring tie-down of all computer and communications equipment (that is, all non-facility related equipment) installed or relocated by their programs, according to SYCR-TR-85-1.

4.10.4. Performs preventive maintenance inspections (PMI) for the blast protection system; NBC filters; and shock isolation system.

4.11. 721st Communications Squadron (721 CS):

4.11.1. Conducts the CMAS HEMP surveillance program for communications and data processing equipment operated and/or maintained by 721 CS personnel.

4.11.2. Works with HQ AFSPC/SC to ensure current and future CMAS communication systems designs satisfy appropriate HEMP protection criteria.

4.11.3. Documents survivability requirements and design specifications for CMAS communications and data processing equipment. Semiannually updates the computer- and communications-related portions of the CMAS POE list.

4.11.4. Furnishes engineering support to evaluate hardness of CMAS communications and data processing equipment, and develops technical solutions for deficiencies.

4.12. Other Organizations . Organizational commanders of other organizations with responsibility over units having nuclear-hardened facilities or subsystems:

4.12.1. Help identify the operational impact of implementing protective techniques.

4.12.2. Assist in establishing procedures in AFSPC operational facilities that take full advantage of protective measures.

4.12.3. May serve as SSG members.

4.12.4. Identify to the AFSPC CSS focal point, in writing, OPRs to assure subordinate units comply with provisions of this instruction and expedite the resolution of hardness issues.

4.12.5. Supplement this instruction as necessary.

4.12.6. Upchannel site hardness status reports received.

4.13. Field Units. Hardness facility managers operating or maintaining nuclear-hardened facilities or subsystems will:

- 4.13.1. Implement the Command's HM/HS program. Furnish the necessary maintenance, logistics support, and personnel for the program. Implement published maintenance guidelines and procedures to ensure hardness is not jeopardized and proper practices are followed to maintain or improve the site's hardness.
- 4.13.2. Designate, in writing, an OPR to implement, manage, and coordinate the site-level HM/HS program. The site survivability OPR administers the site HEMP awareness program and organizational level training to the appropriate site personnel. They provide input to the AFSPC CSS focal point about the adequacy of their program. *NOTE:* Site contractors can be assigned as hardened facility managers. Facilities run by contractors are required to maintain the same standards as military supported facilities.
- 4.13.3. Disseminate information on site survivability.
- 4.13.4. Elevate issues requiring command-wide review.
- 4.13.5. Obtain technical advice and assistance, as required.
- 4.13.6. Ensure maintenance actions do not permanently degrade or bypass site protection features.
- 4.13.7. Incorporate procedures into existing operations checklists to ensure protection devices are in place and operating during periods of increased defense conditions (DEFCON). Report the site's hardness status to higher headquarters on a periodic basis or change of DEFCON.
- 4.13.8. Implement the command developed configuration control process to preclude degradation of protection because of modification.
- 4.13.9. Conduct inspections, evaluations and assessments of the system throughout its life as specified by workcards and Technical Orders (TOs).
- 4.13.10. Ensure adequate sparing of HCAs to meet mission requirements.
- 4.13.11. Identifies and recommends repairs, changes and/or modifications which affects a site's hardness status to the site's HM/HS Working Group.
- 4.13.12. Maintain a HM/HS publications library.
- 4.13.13. Post HEMP visual aids, as required, in HEMP facilities.

5. Hardness Maintenance/Hardness Surveillance (HM/HS) Working Group. This group implements procedures and guidance for, and addresses issues related to the implementation and execution of AFSPC survivability program. The HM/HS Working Group implements survivability guidance and direction in accordance with applicable directives. This HM/HS Working Group also evaluates, maintains, or upgrades site protection measures. All sites required to meet AFSPC survivability requirements should establish a HM/HS Working Group.

5.1. HM/HS Working Group Membership:

- 5.1.1. Chairperson - Site Commander or his designated representative.
- 5.1.2. Civil Engineer (CE).

- 5.1.3. Director of Operations (DO).
- 5.1.4. Communications Squadron (CS).
- 5.1.5. HM/HS Working Group Secretariat.
- 5.1.6. Other site agencies, as applicable.

5.2. Procedures. The HM/MS Working Group:

- 5.2.1. Meets quarterly or more often at the request of the chairperson to resolve survivability issues.
- 5.2.2. Establishes a formal review and documentation process for all site survivability efforts.
- 5.2.3. Publishes minutes of meetings to inform the staff of survivability matters. Monitors the status of corrective actions.
- 5.2.4. Gathers and disseminates information on site survivability
- 5.2.5. Makes recommendations on Commander-level actions.
- 5.2.6. Ensures HM/HS procedures are incorporated into existing operations checklists to ensure protection devices are in place and operational during increased DEFCONs. Ensure reports of the site's hardness status are forwarded to higher headquarters on a periodic basis or change of DEFCON.
- 5.2.7. Ensures implementation of AFSPC--developed configuration control process.
- 5.2.8. Ensures HM/HS inspections, evaluations, and assessments of the system are conducted in accordance with technical orders throughout its life.
- 5.2.9. Establishes procedures for obtaining assistance from higher headquarters on solving problems beyond the units' capabilities.
- 5.2.10. Ensures the site publications library is up-to-date.
- 5.2.11. Approves and ensures repairs, changes, and/or modifications which affects a site's hardness status are upchanneled to the appropriate Support Group or wing.

6. Command Survivability Steering Group (SSG). This group establishes procedures and guidance for, and addresses issues related to, the implementation and execution of the AFSPC survivability program. The SSG implements survivability guidance and direction in accordance with applicable directives. It is concerned specifically with nuclear survivability provided by hardening, avoidance, proliferation, and reconstitution for survivable AFSPC systems. As a result, it is charged with oversight and management of the AFSPC survivability program. The SSG meets quarterly or at the request of the chairperson. The membership is composed of senior officers from the organizations listed below:

6.1. SSG Membership:

- 6.1.1. Chairperson - HQ AFSPC/SC.
- 6.1.2. HQ AFSPC, Directorate of The Civil Engineer (CE).
- 6.1.3. HQ AFSPC, Directorate of Plans (XP).
- 6.1.4. HQ AFSPC, Directorate of Requirements (DR).

- 6.1.5. HQ AFSPC, Directorate of Operations (DO).
- 6.1.6. HQ AFSPC, Inspector General (IG).
- 6.1.7. 21 SW/CC.
- 6.1.8. 50 SW/CC.
- 6.1.9. 721 SPTG/CC.
- 6.1.10. 821 SG/CC.
- 6.1.11. SSG Technical Advisor: AFSPC CSS/CC.
- 6.1.12. SSG Secretariat - HQ AFSPC/SCX.

6.2. Procedures:

- 6.2.1. Any member can bring survivability issues to the SSG. The SSG provides recommended actions to resolve issues. The chairperson assigns action items for a respective organization to resolve.
- 6.2.2. The SSG functions as the designated approval authority for hardness baselines.
- 6.2.3. The SSG Secretariat provides meeting minutes within 15 days, tracks action item status, and schedules and publishes agendas for meetings. It also calls subgroup meetings at the request of the chairperson to address issues relevant to more than one member agency.
- 6.2.4. The SSG can request advice and support from other agencies. These agencies include, but are not limited to AFMC, DSWA and Defense Information Systems Agency (DISA).

JOHN L. WOODWARD, Maj Gen, USAF
Director Communications and Information

Attachment 1

GLOSSARY OF REFERENCES, ACRONYMS AND TERMS

References

Defense Nuclear Agency (DNA)-EM-1, *Capabilities of Nuclear Weapons (S)*

DNA-EMP-1, *Electromagnetic Pulse (EMP) Security Classification Guide (S-RD)*

AFPD31-1, *Physical Security*

AFI31-101, Volume 1, *The Air Force Physical Security Plan*

AFPD62-2, *System Survivability*

AFI62-201, *System Survivability*

AFMC Pamphlet 62-201, *The AFMC Generic Survivability Parameter Handbook*

AFWL-TR-74-102, *The Air Force Manual for Design and Analysis of Hardened Structures, (Third Edition)*

SPACECOM (SYCR)-Technical Report (TR)-85-1, *CMAS Mission Equipment Tie-Down Analysis*

HQ USAF/LEEEU Engineering Technical Letter (ETL) 88-7, *TEMPEST and High-Altitude Electromagnetic Pulse (HEMP) Protection for Facilities*

MIL-STD 100, *Engineering Drawing Practices*

MIL-STD 188-125, *High Altitude Electromagnetic Pulse (HEMP) Protection For Ground Based C4I Facilities Performing Critical Time-Urgent Mission, Volume 1: Transportable Facilities*

MIL-STD 188-125 (Draft), *High Altitude Electromagnetic Pulse (HEMP) Protection For Ground Based C4I Facilities Performing Critical Time-Urgent Mission, Volume 1: Transportable Systems, Revision 2*

MIL-STD 188-125A, *High Altitude Electromagnetic Pulse (HEMP) Protection For Ground Based C4I Facilities Performing Critical Time-Urgent Mission, Volume 1: Fixed Facilities*

MIL-STD 188-125B (Draft), *High Altitude Electromagnetic Pulse (HEMP) Protection For Ground Based C4I Facilities Performing Critical Time-Urgent Mission, Volume 1: Fixed Facilities, (Revised)*

MIL-HDBK 423, *High Altitude Electromagnetic Pulse (HEMP) Protection for Fixed and Transportable Ground-Based C4I Facilities, Volume 1 Fixed Facilities*

DoD-STD 1766B, *Nuclear Hardness and Survivability Program Requirements for ICBM Weapon System Program Management Directive (PMD) 2147(18)/64711F, Systems Survivability (Nuclear Effects)*

MIL-STD 2169B, *High-Altitude Electromagnetic Pulse (HEMP) Environment (S)*

DD Form 2639, *Hardness Critical Label*

DD Form 2640, *Hardness Critical Tag*

DoDD 3150.3, *Nuclear Force Security and Survivability (S2)*

CJCSI 3222.01, *CJCS Prioritization of Command, Control and Communications (C3) Nodes and Systems for High Altitude Electromagnetic Pulse (HEMP) Protection (S)*

DoDD 5000.1, *Defense Acquisition*

DoD Regulation 5000.2-R, *Mandatory Procedures for Major Defense Acquisition Programs (MDAPs) and Major Automated Information Systems (MAIS) Acquisition Programs*

CJCSI 6811.01, *Nuclear Command and Control System Technical Performance Criteria (S)-Integrated Attack Warning/Attack Assessment (ITW/AA) Security Classification Guide (SCG)*

USAF Handbook for the Design and Construction of HEMP/TEMPEST Shielded Facilities

Cheyenne Mountain Complex Engineering and Design Criteria Manual, Volume 1, and Volume 2

The Effects of Nuclear Weapons, Samuel Glasstone and Philip J. Dolan, ed.

Acronyms

AFI - Air Force Instruction

AFMC - Air Force Materiel Command

AFPD - Air Force Policy Directive

AFRC - Air Forces Reserves Command

AFSPC - Air Force Space Command

AFSPCI - Air Force Space Command Instruction

AFWL - Air Force Weapons Laboratory

ANG - Air National Guard

C3 - Command, Control and Communications

CJCS - Chairman, Joint Chiefs of Staff

CJCSI - Chairman, Joint Chiefs of Staff Instruction

CMAS - Cheyenne Mountain Air Station

DEFCON - Defense Condition

DNA - Defense Nuclear Agency

DoD - Department of Defense

DoDD - Department of Defense Directive

DoDI - Department of Defense Instruction

DODISS - Department of Defense Index of Specifications and Standards

DSWA - Defense Special Weapons Agency

ETL - Engineering Technical Letter

HCA - Hardness Critical Article

HCI - Hardness Critical Item

HCP - Hardness Critical Process

HEMP - High Altitude Electromagnetic Pulse

HM/HS - Hardness Maintenance/Hardness Surveillance
IOC - Initial Operational Capability
ITW/AA - Integrated Tactical Warning and Attack Assessment
JSCM - Joint Chiefs of Staff (JCS) Memorandum
MAIS - Major Automated Information Systems
MDAP - Major Defense Acquisition Program
MIL-STD - Military Standard
NBC - Nuclear, Biological and Chemical
NORAD - North American Aerospace Defense Command
NSSG - Nuclear Survivability Steering Group
NSSR - Nuclear Survivability Status Report
OPR - Office of Primary Responsibility
PMD - Program Management Directive
PMI - Preventive Maintenance Inspection
POC - Point of Contact
POE - Points of Entry
PPD - Penetration Protection Device
S2 - Security and Survivability
S-RD - Secret-Restricted Data
SAF - Secretary of Air Force
SAF/AQQ - Director of Long-Range Power Projection, Special Operations Forces, Airlift and Training Programs
SSG - Survivability Steering Group
SPD - System Program Director
SPTG - Support Group
SREMP - Source Region Electromagnetic Pulse
SRG - Survivability Review Group
SW - Space Wing
SWG - Survivability Working Group
TPD - Terminal Protection Device
USSPACECOM - United States Space Command

Terms

Architecture—A system of interrelated requirements which satisfy a mission need.

Endurability—The characteristic of a facility, system, or equipment to survive and operate, under specified conditions, for a period of time. For trans- and post-attack periods, enduring Integrated Tactical Warning and Attack Assessment facilities, systems and equipment must operate under nuclear, biological and chemical attack.

Field Unit—Organization or unit which has direct operations or maintenance responsibilities for facilities having nuclear survivability criteria.

Hardness—The ability of a system to withstand hostile environment. Hardness features may include filters, coatings, shielding and configurations.

Hardness Assurance—Actions taken to ensure that systems are produced with the required hardness.

Hardness Critical Article (HCA)—HCA is an assembly that contains one or more hardness critical items (HCI).

Hardness Critical Item (HCI)—HCI is defined as an item of hardware or software that satisfies one or more of the following rationales:

Table A1.1. Rationales.

1. Functionality required hardware (i.e., hardware included in system design to accomplish any engineering requirement other than nuclear hardening) whose response to the specified nuclear environments would cause a degradation in system survivability unless additional provisions for hardness are included in item specification, design, manufacture, item selection process, etc.
2. Functionally required hardware or software that inherently provides protection for the system or any of its elements against the specified nuclear environments, and which if removed or replaced by an alternate functional design could cause a degradation in system survivability.
3. Hardness dedicated hardware or software included in system design solely to help satisfy the specified hardness requirements.
4. Hardware items (at the level of application) to which a hardness critical process is applied.
5. A subassembly or higher level of assembly which contains one or more HCIs.

Hardness Critical Process (HCP)—HCP is any fabrication, manufacturing, assembly, installation, maintenance and repair, or other process or procedure which implements a hardness design feature and satisfies system hardness requirements.

Hardness Maintenance—Actions taken to ensure that hardness does not degrade below required levels over the life cycle of the system. Maintenance procedures, system changes, aging, and other factors can cause degradations. Hardness maintenance is a subset of hardness sustainment.

Hardness Surveillance—Actions taken to monitor the hardness status of a fielded system throughout its

life cycle, including identifying and locating degradations. Hardness surveillance is a subset of survivability surveillance.

High-Altitude Electromagnetic Pulse (HEMP)—A phenomenon produced from a nuclear explosion occurring at altitudes of 30 kilometers or higher. HEMP is characterized as a uniform electromagnetic wave which induces very large electrical potentials (on the order of 50,000 volts) on electrical and electronic systems. HEMP is generated both in the immediate (less than 1 second) and late (out to 1,000 seconds) time frames. HEMP is not harmful to living organisms. The precise, classified definition of HEMP is contained in MIL-STD 2169B.

Penetration Protection Devices (PPD)—Devices and methods used to treat HEMP-vulnerable penetrations through the boundary of a protected volume. These include aperture protection devices (APD) and terminal protection devices (TPD).

Survivability—The capability of a system to avoid or withstand man-made hostile environments without suffering an abortive impairment of its ability to accomplish its designated mission. (While this document concentrates on survivability to nuclear weapons effects, survivability to other threats such as natural disasters, some terrorism, chemical agents, etc., is provided by the same equipment.)

Survivable System—A combination of survivable and enduring information sources, correlation nodes, forward users, communications and facilities. The ITW/AA Survivable System will pass critical, timely information during peacetime and at least into the transattack period until physically destroyed. The enduring elements of the Survivable System will pass critical, timely information through the post-attack period. (See CJCSI 3222.01 and 6811.01 for the attributes of survivable and enduring systems.)

Terminal Protection Devices (TPD)—Devices or processes which treat or protect penetrations into a HEMP facility. Penetrations include communications lines (copper, coaxial and fiber optic), power lines, and piping (water, sewer). TPDs include electrical surge arrestors, isolation or attenuation transformers, and WBCs for communication line penetrations. Processes include circumferential welding of metallic piping or replacement of metallic piping with dielectric insulation sections.

Topology—The physical system of devices or networks which implement an architecture.

Vulnerability—The characteristics of a system which cause it to suffer definite degradation (incapability to perform its designated mission) as a result of having been subjected to a certain level of any effect in an unnatural (man-made) hostile environment.