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Acquisition Management
USAF SYSTEM SAFETY PROGRAMS

Attachment 1

This regulation explains policy on system safety programs and makes Air Force activities responsible for carrying out that policy throughout the system life cycle. It requires each major command (MAJCOM) to establish and conduct or support an effective USAF System Safety Program within existing command resources. It applies to all commands and implements DODI 5000.36, 6 December 1978, System Safety Engineering and Management. All MAJCOM and Separate Operating Agency (SOA) supplements to this regulation must be coordinated with AFISC/SES before publication.

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SECTION A—GENERAL INFORMATION

1. **System Safety Program Objective.** To minimize loss of personnel and material resources through mishaps and to preserve the combat capability of the Air Force by ensuring system safety is applied throughout a system life cycle.

2. **Basic Concept.** The basic concept of the overall USAF System Safety Program is to identify, evaluate, and eliminate or control hazards before the production and deployment phase of systems or the construction phase of facilities. Hazard analysis is emphasized during each development or modification

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program so that the results of the analyses will be considered during the system or facility design. The role of hazard analyses and studies is essentially that of bringing to the attention of management the potential risk factors. These factors must be considered in making logical and effective decisions to provide for the best system safety.

3. **Terms Explained:**

a. **System.** A composite of equipment, skills, and techniques capable of performing and/or supporting an operational role. A complete system includes related facilities, equipment, material, services, and personnel required for its operation to the degree that it can be considered a self-sufficient unit in its intended operational and/or support environment.

b. **System Safety.** The best degree of safety within the constraints of operational effectiveness, time, and cost attained through specific application of system safety management and engineering principles whereby hazards are identified and risk minimized throughout all phases of the system or facility life cycle.

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c. **System Safety Management.** An element of management that establishes the system safety program requirements and ensures the planning, implementation, and accomplishment of tasks and activities to achieve system safety, consistent with the overall program requirements.

d. **System Safety Engineering.** An element of systems engineering involving the application of scientific and engineering principles for the timely identification of hazards and initiation of those actions necessary to prevent or control hazards within the system. It draws upon professional knowledge and specialized skills in the mathematical, physical, and related scientific disciplines, together with the principles and methods of engineering design and analysis to specify, predict, and evaluate the safety of the system.

e. **System Safety Group.** A formally chartered group of persons organized to assist the program/system manager in achieving the system safety objectives.

f. **Hazard Analyses.** The methods used to identify and evaluate hazards. Analyses cover the complete spectrum from qualitative preliminary hazard studies to system logic diagrams containing quantitative probabilities of mishap.

g. **Quantified Safety Requirement.** A desired, predictable, and demonstrable level of safety, usually expressed as a hazard rate or probability of mishap.

h. **Mishap.** An unplanned event or series of events that result in death, injury, occupational illness, or damage to or loss of equipment or property.

i. **Hazard.** Any condition that has the potential of causing a mishap.

j. **Safety Critical Item.** Any component, equipment, or system which can fail and lead to a situation with a potential for major injury or damage.

k. **Major System Acquisition.** A major system acquisition program to be of such importance and priority as to require special management attention (AFR 800-2).

SECTION B—AIR FORCE POLICY

4. **System Safety Program Requirements.** System safety engineering and management controls must be applied to each program or project throughout the system or facility life cycle. The safety program requirements must be applied through appropriate tailoring of MIL-STD-882.

a. System safety requirements, criteria, and constraints must be considered by originators of each Statement of Operational Need (SON) document (AFR 57-1) in describing user needs. The SON initiator may state a quantified safety requirement. This quantitative safety requirement may be specified in the SON or jointly determined with the

implementing command before a program management directive (PMD) is issued.

b. System safety engineering will become a working part of the system engineering activity and will receive management attention as a part of the system engineering process.

c. Management and engineering personnel will review system safety requirements, criteria, and constraints when documenting Class I through V modification changes (AFR 57-4) to make sure system safety levels are not degraded.

5. **Contractual Provisions.** Requests for proposal and invitation for bid of systems or facilities acquisitions will require selected portions of MIL-STD-882 in the contract. As a minimum, the contract must include a:

a. Detailed description of system safety tasks.

b. Schedule for completion of hazard analyses. (Analyses must be available for review before the appropriate system review milestones.)

SECTION C—RESPONSIBILITIES ASSIGNED

6. HQ USAF:

a. Each HQ USAF office of primary responsibility for an operational system or facility development or modification must make sure that the PMD includes system safety program requirements. The system safety requirements must also be documented in each directive for an Advanced Development, Engineering Development, or Management and Support Research and Development program, when the program is expected to produce a prototype or facility. Safety risks must be addressed in the "for comment" Decision Coordination Papers (DCPs). For major system acquisition, furnish risk assessments to the Service Acquisition Review Councils. Moreover, inform the Assistant Secretary of Defense (Manpower, Reserve Affairs, and Logistics) of any significant hazards that relate to major systems before the Milestone II decision.

b. The Deputy Inspector General for Inspection and Safety has specific responsibility for developing policy and providing guidance on applying system safety management and engineering to Air Force systems and facilities.

7. Air Force Inspection and Safety Center (AFISC):

a. The Director of Aerospace Safety (AFISC/SE):

(1) Reviews Air Force technical and management documents to make sure the proper system safety requirements are included. These include

(a) SON documents.

(b) "for comment" DCP (for major

programs).

(c) PMDs.

(d) Modification directives.

(e) System Safety Program Plans.

(f) System Safety Group (SSG) charters (for major programs).

(g) System Operational Concepts.

(2) Provides representation for selected design and readiness reviews and management inspections.

(3) Represents the Air Force in system safety matters with other service, governmental and nongovernmental agencies.

(4) Attends selected SSG meetings and provides guidance to make sure the integrity of system safety management and engineering processes is achieved.

(5) Acts as reviewing and approving authority for the Nonnuclear Munitions Safety Board (NNMSB) reports on new or modified munitions (AFR 127-16).

b. The Directorate of Nuclear Surety (AFISC/SN) exercises staff supervision over the nuclear safety program, is OPR for the 122 series AFRs and performs the nuclear safety related tasks outlined in a(1) through (4) above.

8. **Using Commands.** These commands support Air Force Systems Command (AFSC) and Air Force Logistics Command (AFLC) conducted system safety programs and projects. They make sure that intracommand guidance identifies the safety organizations, objectives, and responsibilities necessary to support these programs. As a minimum, MAJCOMs:

a. Specify in the SON any required safety features that are not standard design practice (including safety considerations of supporting facilities or equipment). Hazards or system safety constraints peculiar to command mission, base, operations, support, or meteorological environments must be identified.

b. Assess safety risks at program initiation to define the scope and detail of system safety program requirements.

c. Help formulate and review acquisition, operations, and test program planning documentation to make sure that it includes adequate system safety criteria.

d. Participate as an SSG member and, when appropriate, as a System Safety Working Group (SSWG) member.

e. Review engineering change proposals, deviations, and waivers for impact on system safety.

f. Make sure that historical safety data (lessons learned) are collected, documented, considered, and used where applicable.

g. Ensure that system operational concepts, when required, adequately address safety factors.

9. **Implementing Commands.** These commands:

a. Establish and maintain a capability to conduct system safety programs by:

(1) Defining system safety program responsibilities and objectives for intracommand guidance.

(2) Ensuring organizational structures and resources are adequate to perform required system safety program actions. Designate full-time, primary duty system safety managers within system program or project offices to act as focal points for system safety efforts. If a specific program does not require a full-time system safety manager, assure adequate staff assistance and engineering support is made available to perform specified system safety tasks.

b. Establish and maintain suitably tailored system safety programs for each system or facility development and modification for which the implementing command has responsibility.

c. Integrate system safety milestones into the total system acquisition program to be consistent with other engineering and program management milestones by:

(1) Assessing safety risks at program initiation to define the scope and detail of system safety program requirements.

(2) Including the system safety program requirements and criteria in directives, planning and acquisition documentation, requests for proposals, specifications, and statements of work.

(3) Ensuring laboratories document safety criteria, critical items, and hazards identified during their efforts. These criteria are to become a part of the project when it transitions to the development phase. Laboratories should keep the safety community aware of their progress in development of devices, equipment, and materials that enhance safety.

(4) Ensuring system safety hazard assessments are presented at design and program reviews.

(5) Considering system safety in all testing. Where normal testing is not sufficient to demonstrate safe operation, prepare and monitor special safety tests and evaluations.

(6) Providing AFLC with all system safety analyses and documentation of outstanding safety issues at Program Management Responsibility Transfer (PMRT), including identification of safety critical items.

(7) Developing procedures for the safe and environmentally acceptable disposal or demilitarization of any hazardous materials associated with the system.

d. Establish procedures to ensure timely follow up on identified hazards and to take corrective action or

document management decisions to accept the risks associated with an identified hazard.

e. Make sure that historical safety data (lessons learned) from previous system acquisitions are collected, documented, and considered in designing systems or facilities.

f. Plan for developing data required to identify hazardous materials and items as prescribed by DOD 6030.5-M, available through normal Air Force distribution channels.

g. Apply system safety to in-house development, construction, production, modification, and test programs. Assure GFE to contracts is accompanied by appropriate safety analyses.

h. Keep AFISC/SE and AFISC/SN, as appropriate, informed of the schedule for all major program design reviews, inspections, and SSG meetings. Forward copies of SSG charters for major programs to AFISC/SE and AFISC/SN, as appropriate, for coordination.

i. Review engineering change proposals, deviations, and waivers for impact on system safety.

j. In conjunction with using commands, establish quantitative system safety design criteria when practical. A combined management and engineering choice should be based on:

(1) Whether the anticipated system hazards will present potential risk to a substantial part of a mission capability or endanger large numbers of personnel, or safety analysis is necessary for national confidence and acceptance of a system.

(2) Investment cost and feasibility of obtaining and analyzing quantitative data.

(3) Feasibility of allocating mishap potential to elements of the total system.

(4) The available means (test or analysis) to obtain confidence that contractual design goals or requirements for system safety have been successfully met.

10. Air Force Logistics Command (AFLC). This command:

a. Establishes and maintains a capability to conduct system safety programs by:

(1) Explaining system safety program responsibilities and objectives for intracommand guidance.

(2) Making sure that organizational structures and resources are adequate to carry out system safety programs. Assign at least one full-time, primary duty system safety engineer within the AFLC Air Logistics Center to act as focal point for the system safety effort. When a specific program does not require full-time support, ensure that adequate staff assistance and engineering support are provided to accomplish the

safety engineering tasks

(3) Integrating the system safety effort with the material safety program.

b. Establishes and maintains suitably tailored system safety programs for:

(1) Engineering feasibility studies;

(2) Engineering contracts;

(3) Contract engineering;

(4) Engineering change proposals;

(5) Engineering of any material improvements project or noncontracted engineering project that changes form, fit, or function; and

(6) Any system modification (AFRs 57-4 and 57-1) for which AFLC has responsibility.

c. Integrates a system safety program into each AFSC program so that it is consistent with other engineering and program management activities by:

(1) Establishing procedures to ensure prompt followup on identified hazards and to take corrective action or document management decisions to accept the risks associated with an identified hazard.

(2) Maintaining a system safety critical items listing by additions or deletions based on experience during operations and maintenance phases of the system.

(3) Applying system safety to off-the-shelf procurement items with potential for critical or catastrophic failures and to "in house" development, production, modification, and test program.

(4) Requiring a follow-on system safety effort to make sure that changes made after deployment do not introduce hazards or degrade existing levels of system safety.

(5) Making sure that historical safety data (lessons learned) are used when appropriate.

(6) Making sure that system safety is considered in all testing. If normal testing is not sufficient to demonstrate safe operation, prepare and monitor special safety tests and evaluations.

(7) Furnishing AFSC information on design deficiency and inadequacy derived from the US Air Force product improvement program (AFR 66-30) and other sources for possible use in follow-on systems and design handbooks.

d. Keeps AFISC/SE and AFISC/SN, as appropriate, informed of the schedule for system safety meetings, reviews, and inspections.

e. Establishes quantitative system safety design criteria when practicable. A combined management and engineering choice should be based on the same criteria as in paragraph 9.

SECTION D—SYSTEM SAFETY GROUPS

11. General Requirements. SSGs should be formed as early as practical in the system's life cycle. During the conceptual phase, the project or program manager should consider forming an SSG to supplement the projects' or systems' safety personnel resources. Once established, each group will:

a. Draft a charter in the form of a joint agreement that designates member responsibilities.

b. Be chaired by the program or system manager or designated representative.

c. As a rule, meet at the request of the program or system manager; however, the using command, AFSC, AFLC, or any other member may request that the manager convene the group.

d. Assist the project, program, or system manager to carry out the system safety program by:

(1) Reviewing and making recommendations on safety issues submitted to program managers at technical reviews, and during design and test through completion of operational test and evaluation.

(2) Evaluating major modifications that involved a safety concern before the Configuration Control Board acts on the modification.

e. List AFISC/SE and AFISC/SN, as appropriate, as advisory members.

f. Coordinate the draft charter with all System Safety Group member organizations, including AFISC/SE and AFISC/SN, as appropriate, for major programs.

12. Implementing Commands. These commands will establish an SSG for appropriate systems under development, whether an operational system development (AFR 800-2) or engineering development (AFR 80-1), if:

a. The system resulting may involve hazards to personnel or property, and

b. The effort involves agencies, commands, other program offices (POs), or organizations outside the authority of the implementing command. NOTE: These groups will consist of representatives from the using command, AFSC, AFLC, AFTEC (for major programs), and appropriate DOD and industry organizations.

13. Air Force Logistics Command (AFLC). This command:

a. Directs the system manager or designated

representative to chair the SSG and convene it within 1 year after PMRT. An earlier meeting should be considered when volume or importance of outstanding safety issues at PMRT warrants. The SSG will consist of representatives from the using command, AFSC, and other appropriate Air Force and industry organizations. If an SSG existed under the implementing command engineering management, organization membership should be retained for continuity after PMRT. Conversion to an SSWG is permitted after members agree and the chairperson concurs that volume and importance of outstanding safety issues does not warrant automatic participation of all members.

b. Establishes SSWG for existing operational Air Force systems, to augment the normal day-to-day system safety considerations of engineering personnel and the Material Safety Task Group. SSWGs include, as a minimum, engineering personnel, system technicians, and a representative from the staff safety office.

c. Has final authority to direct the formation of the SSWG from a full SSG for an operational system for which it has accepted engineering responsibility. Either an SSG or an SSWG will be active at all times unless waived by AFISC/SE, based on the system's status and activity.

14. Nonnuclear Munitions Safety Board (NNMSB). The NNMSB acts as the SSG for all nonnuclear munitions, including air-launched missiles (AFR 127-16).

15. Nuclear Weapons System Safety Group (NWSSG). The NWSSG is established by AFR 122-2 to review the safety aspects of the design of each nuclear weapon system and the procedures for its employment. This review ensures that both the design and procedures meet DOD nuclear safety standards and provide maximum safety consistent with operational requirements.

a. To avoid bias and self-inspection, the NWSSG as a body neither becomes involved in the normal development process, nor acts as the SSG specified in paragraph 11.

b. For nuclear weapons systems, the SSG supports the NWSSG by making sure that all nuclear safety studies and analyses required for NWSSG review are available by the dates set by AFR 122-2.

BY ORDER OF THE SECRETARY OF THE AIR FORCE

OFFICIAL

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SUMMARY OF CHANGES

This revision implements new direction given in DODD 5000.36. It removes the regulation from the 127 Safety series and places it in the 800-Acquisition series. Major changes include: formal documentation of management decisions to accept the risk associated with identified hazards (para 9d); addressing safety risks in the "for comment" decision coordinating papers (para 6a); applying system safety to the construction phase of facilities (para 9b, and 8a); applying system safety to off-the-shelf procurement items (para 10e(3)); and identifying and maintaining safety critical items listing (paras 9c(b) and 10c(2)).