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Operations

SPACE LAUNCH VEHICLE RETURN TO
FLIGHT

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This instruction implements AFD 10-12, *Space*. It establishes safety and mission assurance return to flight (RTF) policy for Air Force Space Command (AFSPC) and Air Force Materiel Command (AFMC). It does not apply to Intercontinental Ballistic Missile (ICBM) Force Development Evaluation (FDE) missions. This instruction is not intended and should not be constructed to create any rights or benefits, substantive or procedural, enforceable at law by a party against the United States, the Air Force, its officers or any person. It should not be construed to create any substantive or procedural basis on which to challenge any AF action or inaction, except as set forth in paragraph 5., **Grievances**, of this instruction. Maintain and dispose of records created as a result of prescribed processes in accordance with AFMAN 37-139, *Records Disposition Schedule*. Refer recommended changes and conflicts between this and other publications, using Air Force (AF) Form 847, **Recommendation for Change of Publication**, through channels to HQ AF/XOSR, 1480 Air Force Pentagon, Washington, DC 20330-1480. Any organization may supplement this instruction. Major commands (MAJCOM), field operating agencies (FOA), and direct reporting units (DRU) send one copy of their printed supplement to HQ AF/XOSR; other organizations send one copy of each printed supplement to their next higher headquarters.

1. General. This instruction does not apply to the following: Safety and accident investigations for Air Force pre-launch processing and launch mishaps. These investigations are conducted in accordance with established AF instructions: AFI 91-204, *Safety Investigations and Reports*; and AFI 51-503, *Aircraft, Missile, Nuclear, and Space Accident Investigations*. Air Force systems experiencing minor launch anomalies not affecting mission success or pre-launch anomalies are also not covered by this instruction. These are addressed in accordance with AFD 63-12/AFI 63-1201, *Assurance of Operational Safety, Suitability and Effectiveness*. The certification processes in this instruction do not replace or override, but are conducted in addition to those certification processes required during a nominal mission profile.

2. Scope. This instruction applies to all (government and commercial) unmanned space launch vehicle systems (current and future) that have a launch mishap at an AFSPC space launch range, or have commonality to another system that has a mishap. There are two RTF certification processes: safety assurance and mission assurance. Specifically, this instruction outlines the safety and mission assurance RTF processes and criteria for resuming launch operations. The Space Wing Commander (SW/CC) is the designated authority for certifying safety RTF. The Space and Missile Systems Center Commander (SMC/CC) is the designated authority for certifying mission assurance RTF for USAF missions and USAF managed payload and launch vehicles in support of non-USAF customers. Following any launch mishap, if the mishap is launch system-related, applicable safety RTF criteria must be addressed before the system in question is allowed to launch from an AFSPC space launch range. Additionally, if the mishap is Range Safety-related or if Range Safety procedures failed to adequately protect the public or government personnel during a launch, the safety RTF criteria must be addressed before any launch can occur from an AFSPC space launch range. Mission assurance RTF criteria must be addressed prior to the next USAF-supported mission utilizing the launch vehicle, payload, subsystem, component, aerospace ground equipment or procedure having contributed to a launch mishap. If the mission following a launch mishap on the system in question is a non-USAF supported mission, the appropriate launch agency/commercial contractor will use its own RTF certification process for mission assurance issues. However, the SW/CC must be convinced no later than the mission Launch Readiness Review that any mission assurance issues which could affect safety, security or resource protection of range assets required to ensure DoD access to space, have been resolved.

3. Processes. The RTF processes are used to certify the readiness of space launch vehicle and payload systems to resume flight and to certify the readiness of Range Safety systems and procedures to support flight following a launch mishap. The RTF processes are conducted independently of other mishap investigations and certification processes (see paragraph 1. and 6.). However, recommendations from these investigations/certification processes may influence the RTF decision. This section addresses the processes used for safety and mission assurance RTF certification and approval. Responsible agencies provide analysis of the launch system, range safety system, support infrastructure, payloads, and any processes related to the mission. These agencies may include the launch vehicle and/or payload contractor(s), SMC, licensed commercial launch and site operators, wing agencies, or others as defined by the SW/CC and/or SMC/CC. Other interested agencies not directly responsible for addressing certification criteria may wish to participate providing input to the process, as necessary. These agencies may include National Reconnaissance Office (NRO), National Aeronautics and Space Administration (NASA), and others as appropriate.

3.1. Safety RTF Certification Process. Safety certification demonstrates that range safety systems (if activated) functioned properly, and validates any previously conducted hazard/risk assessments. Responsible agencies will actively participate in the safety RTF process by providing the SW/CC with an analysis, an action plan and written certification that safety RTF criteria have been met. The SW/CC will approve and forward the safety RTF certification as soon as it is complete, but no later than the Flight Readiness Review (FRR) for the first flight following a launch mishap for the affected launch system, through 14 AF/CC to AFSPC/CC or designated representative. If a launch mishap involved range safety systems or procedures common to other launch programs (government or commercial), the SW/CC will approve and forward the safety RTF certification as soon as it is complete, but not later than the FRR for the first flight following a launch mishap. If safety RTF certification is not complete by the scheduled FRR, the FRR and possibly the launch will be rescheduled to a later date.

3.2. Mission Assurance RTF Certification Process. Mission assurance certification demonstrates that appropriate corrective actions have been taken to ensure mission success. Responsible agencies will actively participate in the mission assurance RTF process by providing the SMC/CC and SW/CC with an analysis, an action plan and written certification that mission assurance RTF criteria have been met. For USAF-supported missions, the SMC/CC will approve mission assurance RTF certification as soon as it is complete, but no later than the FRR for the first flight following a launch mishap for the affected launch system. If mission assurance RTF certification is not complete by the scheduled FRR, the FRR and possibly the launch will be rescheduled to a later date.

4. Criteria. Safety and mission assurance RTF certification will determine the readiness to resume flight operations for a space launch vehicle system based on the following criteria.

4.1. Safety Criteria. The SW/CC applies safety RTF criteria to ensure public safety and protection of government and third party resources. Safety criteria are based on ensuring that range safety system operation is not affected by the mishap, risk analyses are still valid, and that all other considerations which could affect launch risk are addressed and mitigated. As a minimum, certification must address the following criteria:

4.1.1. Verify that the Flight Termination System (FTS) or any other system used to ensure public safety functioned properly (if activated) and that any failures in range safety system operation have been corrected.

4.1.2. Verify that the range safety systems did not contribute to or cause the mishap, or that failures in these systems have been corrected to eliminate such contributions.

4.1.3. Ensure that hazard/risk assessments were adequate for the failure modes experienced during the operation and they were adjusted based on relevant failure evidence or corrective action changes. In addition, verify that hazard/risk assessments have been appropriately adjusted based on failure evidence or based on corrective action changes.

4.1.4. Verify the conduct of range operations did not contribute to or cause the mishap, correct as necessary.

4.1.5. Ensure that appropriate measures have been taken to control the most likely failure cause(s) and to mitigate mishap consequences so as not to expose non-launch agency property/resources or any personnel to an unacceptable risk.

4.2. Mission Assurance Criteria. The SMC/CC is responsible for certifying that mission assurance criteria are met for USAF-supported missions. As a minimum, certification must address the following criteria:

4.2.1. Ensure all failure-related issues involving pre-launch processing are resolved.

4.2.2. Ensure all failure-related issues involving launch vehicle and/or payload performance go/no-go criteria are resolved.

4.2.3. Ensure all failure-related issues involving launch vehicle and/or payload hardware production, integration and test, vehicle inspection/checkout, or contractor processes/procedures are resolved.

4.2.4. Ensure all failure-related issues involving launch vehicle and/or payload design flaws are resolved.

5. Grievances. A Safety RTF Certification grievance process exists to allow agencies to air concerns and questions regarding their launch systems. Grievances shall be submitted to the SW/CC. The Air Force shall respond to grievance or notify the agency on the status of the grievance within 15 days. Grievances not resolved by the SW/CC will be submitted to 14 AF/CC for adjudication and final resolution.

6. Interfacing Publications. This instruction interfaces with AFPD 10-12, *Space*, AFPD 63-12, *Assurance of Operational Safety, Suitability and Effectiveness*, and AFI 63-1201, *Assurance of Operational Safety, Suitability and Effectiveness*; AFMD 4, *Air Force Material Command (AFMC)*; AFMD 5, *Air Force Space Command*; AFI 51-503, *Aircraft, Missile, Nuclear, and Space Accident Investigations*; AFI 91-204, *Safety Investigations and Reports*.

ROBERT H. FOGLESONG, Lt General, USAF
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Attachment 1**GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION*****References***

AFPD 10-12, *Space*, 1 February 1996

Abbreviations and Acronyms

AFI—Air Force Instruction

AFMC—Air Force Materiel Command

AFPD—Air Force Policy Directive

AFSPC—Air Force Space Command

DoD—Department of Defense

FRR—Flight Readiness Review

NASA—National Aeronautics and Space Administration

NRO—National Reconnaissance Office

RTF—Return to Flight

SMC—Space and Missile Systems Center

Terms

Launch Mishap—In accordance with AFI 91-204 and AFI 51-503, Mishaps are defined as any Air Force launch-related incident which results in damage to government or non-government property, illness or injury to or the death of government or non-government personnel, or failure of a USAF-managed launch system to deliver a payload to its intended orbit. This includes but is not limited to catastrophic destruction of the launch vehicle, failures involving the upper stage delivery system, or an anomaly or degradation of a component or components resulting in mission failure.

Launch System—Includes the launch vehicle, payload, aerospace ground equipment and associated procedures.

Mission Assurance—“Mission Assurance” overall is a shared responsibility between all agencies involved in the generation and execution of the launch mission. In the context of this AFI, mission assurance relates to providing confidence in the launch vehicle, payload, aerospace ground equipment or associated procedures to which a failure, malfunction or error may have led to a launch mishap.

Safety Assurance—“Safety Assurance” overall is a shared responsibility between all agencies involved in the generation and execution of the launch mission. In the context of this AFI, safety assurance relates to providing confidence in the range safety equipment, hazard/risk assessments or associated procedures to which a failure, malfunction or error may have led to a launch mishap.