BY ORDER OF THE COMMANDER
AIR FORCE TEST CENTER

AIR FORCE TEST CENTER
INSTRUCTION 91-202

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Safety

AIR FORCE TEST CENTER TEST SAFETY REVIEW POLICY

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This publication implements Air Force Instruction (AFI) 91-202 Air Force Materiel Command (AFMC) Supplement, *The US Air Force Mishap Prevention Program.* This publication provides further policy and guidance to the test safety chapter of the AFMC Supplement, Chapter 16. It directs the application of system safety principles to the planning and conduct of all test projects involving Air Force Test Center (AFTC) resources or under the responsibility of the AFTC (reference **paragraph 1.6**). It also provides guidance for the application of system safety principles to AFTC training programs, logistics testing, and publications. Organizations within AFTC will supplement this instruction to provide a detailed local test safety review process. All direct Supplements must be routed to the Office of Primary Responsibility (OPR) of this publication for review and approval prior to certification and approval by the 412 or 96 Test Wings (TWs) or Arnold Engineering Development Complex (AEDC) Commander. Attachment 1 lists abbreviations and acronyms used in this instruction. Refer recommended changes and questions about this publication to the OPR using the AF Form 847, *Recommendation for Change of Publication*; route AF Forms 847 from the field through the appropriate functional chain of command. The authority to waive wing/unit level requirements in this publication is Tier 3. See DAFI 33-360, *Publications and Forms Management*, Table 1.1 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 Publication OPR for non-tiered compliance items. This Instruction requires the collection and/or maintenance of information protected by the Privacy Act of 1974 authorized by Title 10 United States Code (USC), Section 9013, Secretary of the Air Force, Title 29 United States Code (USC), Section 668, Program of Federal Agencies; Executive Order 12196, Occupational Safety and Health Programs

for Federal Employees; Part 1960, Title 29, Code of Federal Regulations (CFR), Basic Program Elements for Federal Employee Occupational Safety and Health Programs and Related Matters; Title 5 USC § 7902, Safety Program, and DoD Directive (DoDD) 5134.01, Under Secretary of Defense for Acquisition, Technology and Logistics (USD(AT&L)). All records created, collected and stored under the guidance of this instruction are subject to the provisions of the Freedom of Information Act, as authorized by Title 5 USC § 552, Public Information; Agency Rules, Opinions, Orders, Records, and Proceedings, and IAW DoDM 5400.07_AFMAN 33-302, Freedom of Information Act Program. The System of Records Notice 036 AF PC Q, Personnel Data System (PDS); F024 AF IL C Motor Vehicle Operator's Records, and F032 AF ILE, Enterprise Environmental, Safety and Occupational Health-Management Information System (EESOH-MIS) are available at: https://dpcld.defense.gov/privacy/SORNS.aspx**https://dpcld.defense.gov/privacy/SORNS.aspx** . Ensure that all records created as a result of processes prescribed in this publication are maintained in accordance with (IAW) AFI 33-322, *Records Management and Information Governance Program*, and disposed of IAW Air Force Records Disposition Schedule (RDS) located in the Air Force Records Information Management System (AFRIMS). The use of the name or mark of any specific manufacturer, commercial product, commodity, or service in this publication does not imply endorsement by the Air Force.

SUMMARY OF CHANGES

This revision incorporates AFTC Guidance Memorandum, AFTCI91-202_AFTCGM2021-01, dated 10 September 2021 and other changes including those from the latest AFMC Supplement to AFI 91-202. The major changes to this instruction include: removal of the Baseline Hazard Analysis and Baseline Safety Report, re-assignment of some responsibilities from the Wing/Complex Test Safety Office to either an independent Test Safety Officer or SRB Chair who may or may not be a member of the Wing/Complex Safety Office, enabling a post-SRB test package a direct route to the TEA, discouraging anticipated TEA attendance in an SRB meeting, permitting minor safety plan changes to occur without requiring re-approval from the TEA, ensuring risk acceptance is made explicitly by the TEA, more details to the creation and approval of test cards, clarification on who can assume the TEA role, modifications to the risk assessment matrix, mishap probability and severity definitions, and increasing the scope of the NEGLIGIBLE risk category. The AFTC Forms 5000 and 5001 were also updated due to these changes.

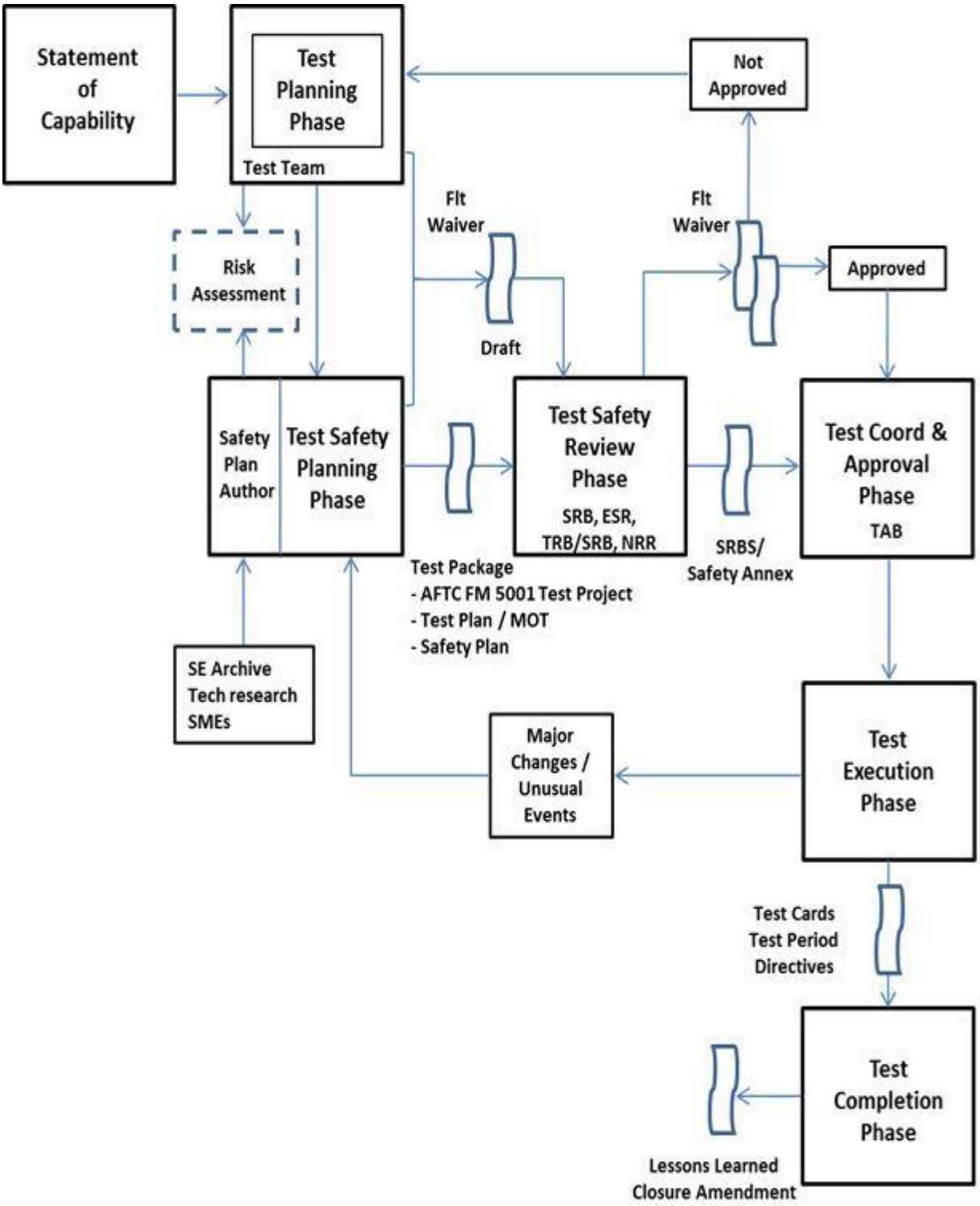
Chapter 1

INTRODUCTION

1.1. General. This instruction establishes a framework and basic requirements for AFTC test safety programs. This instruction further establishes basic vocabulary and definitions to be used universally throughout AFTC. Within the framework of this instruction, wings or their equivalent are expected to develop processes to fulfill the requirements of this instruction.

1.2. Test Safety Review Process. A Test Safety Review Process typically comprises the following functions or phases: Planning (**Chapter 3**), Risk Assessment (**Chapter 4**), Review (**Chapter 5**), Coordination and Approval (**Chapter 6**), Execution (**Chapter 7**), Revisions (**Chapter 8**), Feedback, and Test Completion and Termination. This instruction provides overall policy and guidance for test safety activity to ensure standardization of AFTC organizations while adhering to Air Force Instructions and Air Force Materiel Command Supplements. Organizations within AFTC will supplement this instruction to provide further test safety process details that uniquely apply to their specific test safety requirements. **Figure 1.1** AFTCI 91-202 Process Flow shows the phases and the typical products from each phase.

Figure 1.1. AFTCI 91-202 Process Flow.



1.2.1. As part of the review process, the units will ensure that the appropriate safety plan authors, reviewers and approvers have signed the safety planning documents during the safety review process. This can be done via a locally generated form, workflow process or other electronic review. For the Test Safety Planning Phase, these include the signatures of the safety plan author, Test Safety Officer (TSO), project operator (e.g., project pilot) or project test engineer, and test unit commander/director (or the commander/director's delegate who must be a test unit senior-level leader such as the deputy commander/director, chief engineer, director of projects or director of operations) indicating the test unit's judgment that the safety plan is ready for the Test Safety Review Phase.

1.2.2. Additionally, during the Test Safety Review Phase the locally developed process will include a method for capturing the Safety Review Board (SRB) members' signatures, to include the SRB Chair, independent operations reviewer, technical experts and any additional safety reviewers (see **paragraph 2.3**). These signatures are required before the Coordination and Approval Phase is accomplished. The SRB Chair may elect to fulfill this requirement by coordinating the final safety plan with all other SRB members for their agreement with its content and thus the SRB Chair's signature represents all SRB members. As the final step in the test safety process, the approval signature must be obtained. Approval level is specified in **Table 6.1**.

1.3. Safety Review Process Goals. The goal of any test safety review process is to prevent mishaps during test activities. This process should identify test unique hazards and establish both procedures and corrective actions to eliminate or control the hazards. The process will allow independent reviewers to evaluate the hazards identified by the test team, assess proposed mitigations and corrective actions, and affirm or modify the test team's proposed overall risk level. Once the independent review board has agreed upon and proposed an overall risk level, the safety plan is reviewed and approved by leadership at a level appropriate for the assessed risk. Risk management must be integrated and documented into all stages of Test and Evaluation (T&E) activities to identify test unique hazards, control measures and acceptance/rejection of the residual risk by an appropriate Test Execution Authority (TEA). The safety plan records due diligence in risk management, acceptance and communicates (provides a written copy of) hazards and mitigating measures to test personnel.

1.4. Risk Management.

1.4.1. Risk Management (RM) is the systematic application of management, engineering principles, criteria and tools to optimize all aspects of safety within the constraints of mission/activity effectiveness, time, and cost throughout all mission/activity phases. RM is the main tool used to prevent mishaps and is the essence of any test safety review process within AFTC. While each test may be unique, the test safety review process for each test will follow a predictable, consistent process. The policy outlined in this instruction and the processes defined in local supplements are tailored to manage risk unique to test activity. Detailed processes for risk management can be found in DAFPAM 90-803, *Risk Management (RM) Guidelines and Tools.*

1.4.2. At the discretion of subordinate units, the policy defined in this instruction and local supplement may be used to complete and approve an RM review of non-test activities.

1.5. Safety Mindset. While test safety processes should be intentionally thorough, no process is perfect. Everyone involved in test must maintain a safety mindset. A safety mindset does not assume that a test is safe simply because the test has been reviewed and approved; rather, it is continually on the lookout for previously unrecognized hazards during test planning and execution. Once recognized, appropriate actions must be taken to prevent those hazards from becoming mishaps.

1.6. Scope. This instruction applies to the following and any questions or disputes as to whether or not an activity is in-scope will be directed to the local Wing/Complex Safety Office who will make the final determination:

1.6.1. Any ground or flight test activity (see 'test' definition in Terms) utilizing AFTC assets. A test can be a ground or flight activity to gather specific information, answer a customer's question, or provide information not wholly covered by an approved instruction/training manual. AFTC assets include:

1.6.1.1. Resources owned or possessed by AFTC (personnel, aircraft, equipment, facilities, etc.).

1.6.1.2. Ranges or airspace owned or restricted for use by AFTC units.

1.6.2. Any activity where the AFTC commander or subordinate commander has responsibility for the safety of the general public such as the Major Range and Test Facility Base Commander IAW DoDI 3200.18.

1.6.3. Any activity utilizing AFTC assets that presents hazards not covered by US Military-approved procedures or management directives.

1.6.4. Any AFTC unit assigned or acting in the capacity of an Executing Test Organization (ETO) even when AFTC assets are not at risk.

1.7. Waivers to This Instruction. The AFTC Commander is the waiver authority for this instruction. Guidance in the test safety chapter in AFI 91-202, AFMC Supplement would still apply unless waived separately. The AFTC Chief of Safety (AFTC/SE) may approve minor variations from this instruction provided that the intent of the test safety process and this instruction are adequately met. Any variations or waivers to this instruction that have been approved by AFTC will be on file with the Wing/Complex Test Safety Office. Waiver requests must be coordinated through the appropriate wing safety office prior to submission to AFTC/SE. For minor variations, AFTC/SE will reply with an email with concur or non-concur and a tracking number. Waivers to local supplements will be handled in accordance with (IAW) the established instructions in the supplement.

1.8. Authority. Compliance with AFTC Test Safety Review Policy does not provide authority to violate Air Force, AFMC, or AFTC instructions or directives or flight manual guidance.

1.8.1. When a test activity must deviate from an AFI or other command directive, units will comply with the applicable waivers/deviations process outlined in the applicable document. A copy of the waiver will be filed with the safety office and/or test unit. If the waiver authority is within the local Wing/Complex chain of command, the waiver may be obtained during the approval cycle and documented as a coordination comment within the safety plan.

1.8.2. When a test activity must deviate from a technical order (T.O.) or flight manual, units will follow current command guidance (AFI 11-215, *Flight Manuals Program* and AFI 11-215_AFMCSUP, *Flight Manuals Program*) or program office guidance for uninstalled test items. If a waiver is required, a copy of the draft waiver will be included in the safety plan for discussion by the SRB. Test teams will note the deviation in the test plan and incorporate safety planning as required during the risk assessment process. The approved waiver must be included in the test package.

Chapter 2

SAFETY RESPONSIBILITIES

2.1. Test Safety Management Responsibilities.

2.1.1. Responsibilities of personnel/organizations involved in managing the test safety process are as follows:

2.1.2. The AFTC Commander will:

2.1.2.1. Be the approval authority for this instruction.

2.1.2.2. Be the waiver authority for this instruction.

2.1.3. AFTC/SE will:

2.1.3.1. Establish test safety review policy for all AFTC organizations.

2.1.3.2. Review local supplements to this instruction.

2.1.3.3. Approve minor variations from this instruction that meet the intent of the test safety process and this instruction.

2.1.4. AFTC Test Safety Office will:

2.1.4.1. Conduct an annual test safety process review with all AFTC organizations to review and refine test safety best practices.

2.1.4.2. Assess compliance of AFTC organizations with this instruction and appropriate Management Internal Control Toolset (MICT) Communicators during site visits, staff assisted visits (SAVs) and virtually through MICT.

2.1.4.3. Approve locally developed test safety process training and locally developed supplements to this AFTCI.

2.1.4.4. Notify HQ AFMC/SE and AFMC/A3 of HIGH risk tests when approved by the TEA.

2.1.5. Local Wing/Complex Safety Office will: Approve minor variations from the supplements to this instruction, provided that the intent of the test safety process and this instruction are adequately met.

2.1.6. Local Wing/Complex Test Safety Office (or SE delegate if none exists) will:

2.1.6.1. Develop a local test safety review process as a supplement to this instruction.

2.1.6.2. Maintain the integrity of locally developed test safety review process to ensure independent government review of safety planning documentation is being accomplished for leadership approval decisions.

2.1.6.3. Develop and maintain test safety training programs. Provide initial test safety review process training for Wing/Complex/Unit personnel (including contractor personnel as appropriate) who are involved in test safety planning, review, coordination and/or approval, to include independent safety reviewers/subject matter experts as described in Section 2.3. Annual training will be provided for safety plan authors. Training products will be updated when this instruction, or supplements to this instruction, is revised.

2.1.6.4. Incorporate lessons learned and best practices into appropriate training programs and provide for discussion during AFTC's annual test safety process review.

2.1.6.5. Provide guidance and assistance to safety plan authors on test safety planning.

2.1.6.6. Designate or act as the SRB chairperson.

2.1.6.7. Ensure an archive of approved safety plans and associated documentation is current, maintained in a searchable archive or electronic folder and available to test teams across the enterprise.

2.1.6.8. Maintain a lessons-learned archive that is available across the enterprise in a searchable format. It should include any safety lessons learned, effectiveness of hazard controls or minimizing procedures, unexpected hazards, value added from the safety review process, and suggestions for improving the safety review process. The data can be captured at the completion of the program or at program reviews as a joint effort between the test team and the test safety office.

2.1.6.9. Develop and maintain a cadre of TSOs to support the test safety process. The TSOs may be part of the test unit or in the test safety office as determined by the local Wing/Complex Safety Office. If part of the test unit, they will be designated in writing by the test unit.

2.1.6.10. Inform the AFTC Test Safety Office on HIGH risk tests when approved by the TEA, preferably within 24 hours after approval, and always prior to the test event. If non-AFMC assets are involved, ensure the non-AFMC asset owners are notified prior to test execution. Notification method will be established in local supplements.

2.1.7. Local Test Safety Officers (TSOs) will:

2.1.7.1. Assist test teams with identification of test unique hazards and appropriate mitigation measure and preparation of all safety-related documentation, including safety plan amendments, from Safety Planning through the Approval Phases.

2.1.7.2. Sign the AFTC Form 5001, *Test Project Safety Review*, or equivalent, which shows that the safety-related documentation complies with content and format standards contained in this instruction and supplements to this instruction.

2.1.7.3. Complete the appropriate Wing/Complex test safety training course.

2.1.7.4. Advise test team and safety plan author on appropriate independent reviewers and subject matter experts available for test and safety plan development.

2.1.7.5. Be independent of the test project being assisted to be deemed an independent TSO. Independence from a test project is described in the definition of the term Independent Review.

2.2. Test Unit Safety Planning Responsibilities.

2.2.1. Responsibilities of personnel within a test unit (e.g., a squadron or Combined Test Force) during the Test Safety Planning and Review Phases are as follows:

2.2.2. Squadron Commanders (Test Unit Commander, Director or equivalent) will:

2.2.2.1. Review and provide coordination for all test and safety plans within their organization where they are not the ETO.

2.2.2.2. Ensure all unit personnel, themselves included, involved in any part of the test safety process are familiar and comply with this instruction and local supplements and receive test safety training.

2.2.2.3. Support the AFTC test safety process, which may include operations and/or technical personnel assigned to their test unit participating in independent review of other test projects or activities.

2.2.2.4. Provide TSOs, as applicable per Wing/Complex test safety policy.

2.2.2.5. Maintain a current list of test safety officers with training and experience applicable for test unit projects.

2.2.3. Safety plan authors will:

2.2.3.1. Complete the locally developed test safety training course offered by the Wing/Complex Test Safety Office.

2.2.3.2. Maintain currency by completing continuation training annually.

2.2.3.3. Develop safety plans in accordance with **Chapter 3** of this instruction and local supplements.

2.2.3.4. Review the applicable T-2 modification documents such as the AFTC Form 6239, *T-2 Modification Airworthiness Compliance*, and use these to address hazards that should be included in the test safety plan. Attendance at the Design Review Board (DRB)/Configuration Control Board (CCB) is highly recommended for upfront and early insight into the modifications and airworthiness assessments.

2.2.3.5. Ensure safety plans clearly and adequately provide enough information to support an approval decision. This includes specifying what residual safety risk the AFTC TEA will be asked to accept.

2.2.3.5.1. If an AFTC unit is assigned or acting in the capacity of an ETO, then the residual safety risk will be for the entire test unless otherwise agreed to by the relevant parties (e.g., Program Office and the test unit) and specified in the safety plan. At a minimum, the residual safety risk to be accepted by the AFTC TEA will be for those assets under paragraphs **1.6.1 and 1.6.2** and for other test assets when under the control of the AFTC unit.

2.2.3.5.2. If an AFTC unit is assigned or acting in the capacity of a Participating Test Organization (PTO) such as in experimentation or demonstration test projects, then the residual safety risk to be accepted by the AFTC TEA will only be for those assets under paragraphs **1.6.1 and 1.6.2** and for other test assets when under the control of the AFTC unit. If the residual safety risk to be accepted by the AFTC TEA is for more than the aforementioned assets then it must be agreed to by the relevant parties (e.g., Program Office and the test unit) and specified in the safety plan.

2.2.3.6. Identify a proposed project risk and include the rationale for the proposed risk level to the Safety Review Board members in support of the safety reviews described in section 5.2.

2.2.3.7. Review lessons learned and Test Hazard Analyses (THAs) from similar and/or applicable tests to determine if there are any applicable hazards to consider in the safety plan.

2.2.3.8. Nominate the team of independent safety reviewers to the SRB Chair, if requested, for approval. The SRB Chair can also require other independent safety reviewers.

2.2.3.9. Obtain the Safety Release and technical data as appropriate. Per AFI 91-202, the Program Manager is required to provide the Safety Release to the testers, and the AFMC Supplement states the Test Director has the responsibility for contacting the Program Office to obtain that information.

2.2.4. Test Team will:

2.2.4.1. Determine if test methods, conditions, and resources in test methodology balance safety and data needs.

2.2.4.2. Ensure all appropriate test techniques were considered. Choose the lowest risk technique which efficiently meets test/data objectives.

2.2.4.3. Ensure appropriate test unique hazards related to test methods and system(s) operation are identified and sufficiently controlled (eliminated, mitigated, or residual risk believed to be acceptable).

2.2.4.4. Ensure tests are being conducted per US Military-approved flight manual(s), technical orders, test facility procedures, and/or operational guidance/instructions (e.g., Air Force Instructions, Air Force Materiel Command Instructions, and Air Force Test Center Instructions), or equivalent AF-approved documentation (e.g., contractor-provided procedures).

2.2.4.5. Ensure flight manual waivers are submitted and approved per AFI 11-215, or per program office guidance for uninstalled test items.

2.2.4.6. Report changes to the Test Directive/Method of Test (MOT)/Test Plan to an independent TSO per local instruction.

2.2.4.7. Perform a review of the safety plans for their test projects every three years IAW **paragraph 8.4**.

2.3. Independent Safety Reviewer Responsibilities.

2.3.1. Independent Safety Reviewers (ISRs) include the technical experts, operations reviewers and the SRB Chair who together form the Safety Review Board. The ISRs should be from outside the test unit, which is especially important for tests proposed by the test team to be MEDIUM or HIGH Risk, but they can be from within the test unit. In both cases, the ISRs must neither have a vested interest in the successful accomplishment of the test objectives nor be directly responsible for the development of the safety plan. The ISRs must be independent of the test project (e.g., not a project engineer or project operator for the test), not have been involved (or had limited involvement) in preparing the test plan (MOT) or safety plan, and not the TEA. The ISRs should have appropriate qualifications. They should be senior in test experience or have formal Test Pilot School training, have applicable knowledge and sufficient expertise in the test activity to be reviewed. To the maximum extent possible, independent safety reviewers should be the same individuals that served as independent

reviewers for the technical review (if applicable). All independent reviewers must have accomplished the initial test safety review process training. Independent reviewers will review and provide recommendations on all THAs and General Minimizing Procedures (GMPs) as part of the safety review process. They must each sign the AFTC Form 5001, or equivalent, unless the SRB Chair signs for all (see **paragraph 1.2.2**). Individual reviewer responsibilities are as follows:

2.3.2. SRB Chair will:

2.3.2.1. Ensure appropriate test unique hazards are identified and sufficiently controlled (eliminated, mitigated, or residual risk believed to be acceptable).

2.3.2.2. Ensure general and special mitigation measures are clear and unambiguous.

2.3.2.3. Ensure the safety assessment is clearly and concisely articulated to approval authorities.

2.3.2.4. Determine the proper composition of the Safety Review Board and approve the SRB members IAW qualification guidelines set forth in local supplements to this instruction ensuring operations, facilities, maintenance, etc., reviewers have appropriate expertise relevant to the type of testing being reviewed.

2.3.2.5. Not be under the control or influence of the organization responsible for operations and execution of the test and have direct lines of communication with the commander.

2.3.2.6. Be a government employee.

2.3.2.7. Be a full-time safety staff or formally designated and approved by the Wing/Complex Chief of Safety.

2.3.2.8. Determine if another safety review composed of a different set of ISRs is required when the SRB includes ISRs from within the test unit and the SRB risk assessment is higher than the test team’s proposed risk level.

2.3.2.9. Ensure due diligence has been performed by all ISRs in the review of all test safety documents.

2.3.3. Technical Reviewer will:

2.3.3.1. Ensure safety hazards are identified and appropriately controlled (eliminated, mitigated, or residual risk believed to be acceptable).

2.3.3.2. Have applicable knowledge and sufficient expertise in the test activity to be reviewed.

2.3.4. Operations Reviewer will:

2.3.4.1. Be experienced in the types of tests being conducted. Depending on the nature and anticipated risk level of the test effort, the reviewer may need to have experience in the type of system under test (SUT) such as aircraft (i.e., fighter, bomber, cargo) or ground test facility (i.e., wind tunnel, sled track, propulsion stand, climatic lab). Exceptions can be approved by the SRB Chair who is the decision authority on the necessary qualifications for the Operations Reviewer.

2.3.4.2. Ensure tests are executable, all test techniques were considered, and lowest risk technique which efficiently meets test/data objectives was selected.

2.3.4.3. Ensure hazards related to operating the system are identified and appropriately controlled (eliminated, mitigated, or residual risk believed to be acceptable).

2.3.5. Facility Reviewer (if required) will: Ensure hazards related to operating ground test facilities are identified and appropriately controlled.

2.3.6. Maintenance Reviewer (if required) will: Ensure test conduct and execution does not deviate from SUT maintenance procedures or technical manuals.

2.3.7. Range Safety/Range Operations Engineer (if required) will: Analyze proposed test plans and attend SRB meetings relating to range activities as deemed necessary by the SRB Chair.

2.3.8. Flight Safety representative (if required) will: Establish procedures to coordinate on all planned or contractual flight tests.

2.3.9. Weapons Safety representative (if required) will: Review weapon safety analyses, operating instructions, and attend SRB meetings relating to aircraft store/weapons system and range activities where new or modified weapon testing or explosives are involved.

2.3.10. In any SRB, additional expertise from other sources may and should be called upon when required. Optional reviewers, as deemed necessary by the SRB Chair, may include, but are not limited to:

2.3.10.1. Test Engineer

2.3.10.2. System Safety Engineer

2.3.10.3. Occupational Safety Representative

2.3.10.4. Explosive Ordnance Disposal Representative

2.3.10.5. Airspace Representative

2.3.10.6. Logistics Representative

2.3.10.7. Munitions Representative

2.3.10.8. Fire Department Representative

2.3.10.9. Bioenvironmental Engineer

2.3.10.10. Medical Representative

2.3.10.11. Environmental Management Office Representative

2.3.10.12. Range O&M Representative

2.3.10.13. Laser or Directed Energy Safety Representative

2.3.10.14. Flight Termination System Analyst

2.3.10.15. Airfield Management Representative

Chapter 3

TEST SAFETY PLANNING PHASE

3.1. Test and Safety Planning. Safety planning and test planning are integral and iterative processes, and as such, both should be interwoven to ensure the test methods incorporate safety controls where possible. Well planned tests that consider and incorporate risk control measures to eliminate or mitigate test unique hazards are inherently safer than test plans without this safety emphasis. This chapter covers considerations and guidance during the Test Safety Planning and Review Phases.

3.2. Safety Considerations during Test Planning.

3.2.1. Test Approach or Build-up. During test plan development, the test team will carefully consider the test approach or build-up. The way the test approaches a hazardous or unknown condition must be clearly defined. If predictive analysis does not exist, or has questionable validity, the test methodology may require a more refined buildup approach to offset the risk. Criteria to continue, or more importantly when to stop, can provide good risk control by providing a clearly defined roadmap into the test team's decision making. This decision-making process is extremely important and should be documented.

3.2.2. Test Plan Size and Complexity. The test team must consider the size and complexity of the test plan and assess whether a review of a large, complex safety plan is more or less advantageous than several smaller reviews. If feasible, teams may conduct test safety planning for large, complex test plans in smaller, less complex safety plans matched to progressive phases of the test project.

3.2.3. Integration. If the planned testing utilizes more than one test plan, method of test, test information sheet (TIS), or procedure, it is incumbent upon the team to provide a clear test progression description. Without a clear path, the ability to identify hazards appropriately and develop a sensible risk assessment is difficult. The test team should be aware of this basic issue to avoid significant and unplanned schedule delays caused by action items or cancelled safety review boards.

3.3. Safety Planning Objectives. The objective of the Safety Planning Phase is to identify and assess hazards and develop controls or mitigation measures to reduce the risk to an acceptable level.

3.3.1. Hazard Identification. The first step in safety planning is identification and evaluation of existing and potential credible hazards. A hazard is any condition that has the potential of causing a mishap. Some hazards will be inherent in operating the system and others will be induced by the test itself. For test safety planning, the goal is to identify and mitigate test unique hazards.

3.3.1.1. Identify Test Unique Hazards. The team will identify unique hazards associated with each type of test or activity. A hazard associated with the normal operation of the aircraft, vehicle, SUT, or facility is not a test unique hazard. A hazard ordinarily encountered in a typical activity is also not a test unique hazard (e.g., sunburn while working outside). But some test activities may elevate the risk associated with normal operational hazards. For example, midair collision with non-participating aircraft and bird strikes are not generally considered test unique hazards. However should the very nature of the test increase the exposure to these hazards above that of normal operations, they should be addressed as test unique hazards. Hazards associated with the initial testing of a new system should also be addressed as test unique hazards since normal operations for this system have not been established. Sources for identifying test unique hazards include:

3.3.1.1.1. Archived test and safety plans, to include lessons learned and THAs, across the enterprise for consideration of similar tests.

3.3.1.1.2. Personnel or test teams with experience in similar test activities or testing.

3.3.1.1.3. Technical libraries, internet, etc. to research technical aspects.

3.3.1.1.4. System safety hazard analyses of the test article and test facility.

3.3.1.1.5. Applicable safety reviews from other organizations such as the Program Office, Nonnuclear Munitions Safety Board, Directed Energy Safety Board, 711 Human Performance Wing Independent Review Board or the contractor.

3.3.1.1.6. Aircraft modification documents.

3.3.2. Eliminate or Control Hazards. Once the causes of each hazard have been identified, minimizing procedures or controls are used to reduce risk by reducing severity or probability or both. The following order of precedence should be applied to eliminate or control any hazards identified during the safety planning.

3.3.2.1. Design the test to eliminate the probability of the hazard occurring. This could include a decision to not perform the test if the risk is deemed to be unacceptably high. A redesign of the system to eliminate the hazard is another option.

3.3.2.2. Change the test methodology to reduce the probability, severity, or exposure to the hazard (building up to the test condition can be a strong control method).

3.3.2.3. Incorporate safety devices (e.g., spin chute or additional power sources).

3.3.2.4. Provide caution and warning devices to detect an unsafe condition or trend or install instrumentation and data displays with active monitoring.

3.3.2.5. Develop procedures and training when it is impractical to change the design or test methodology.

3.4. Test Package Documentation.

3.4.1. The "test package" shall be an all-encompassing package of documents consisting of a test plan, safety plan, and any other appendices or documentation that support the test planning. All safety planning will be documented in the safety plan including minimizing procedures, THAs, and safety buildup that may be in the test planning documents. Additional guidance on the test planning process and documentation can be found in local Wing/Complex test planning instructions.

3.4.2. The safety plan should follow documentation guidance from the test safety chapter of AFI 91-202, *The US Air Force Mishap Prevention Program*, AFMC Supplement. The safety plan, at a minimum, is comprised of THAs, GMPs, the Safety Review Board Summary, mishap accountability, and waivers/deviations from AFIs, T.O.s and flight manuals. Format and structure of the safety plan may be further defined in local supplements to this instruction. In the event testing requires the preplanned damage/destruction of test assets, the instructions specified in the test safety chapter of AFI 91-202, AFMC Supplement should be followed.

3.4.2.1. In the safety documentation, hazards should adequately describe the risk situation including the unsafe act or condition and its effects. Test unique hazards will be documented on a *Test Hazard Analysis* Form (AFTC Form 5000), or an equivalent format, that captures the information required in AFI 91-202, AFMC Supplement. Typically, each THA captures a single test unique hazard. If there are multiple hazards in the form, then the mishap severity and probability associated with each hazard shall be determined separately. The THA will include the following:

3.4.2.1.1. Mishap severity and probability as discussed in detail in **Chapter 4**. It is often helpful to assess the risk (probability and severity) prior to applying mitigations as well as after mitigations are in place.

3.4.2.1.2. Causes are anything that could lead to the presence of the hazard. The causes can include inherent hazardous characteristics, design inadequacies, hardware failures, environmental effects, software deficiencies or operator errors. This is the cause of the hazard, not the mishap. There may be more than one cause for each hazard.

3.4.2.1.3. Effect is the outcome if the hazard is not controlled. The effect is what the THA is trying to prevent and is directly related to the mishap severity level. Effects are often descriptors that tie into the mishap severity, such as loss of life/aircraft/facility, severe injury/damage, minor injury/damage, superficial injury or less than minor damage.

3.4.2.1.4. Controls or Minimizing Procedures (see section 3.4.2.6 for guidance) should be an action or procedure and tied to a specific cause, causes, or effect it is trying to control. These controls or minimizing procedures attempt to break the chain of events linking the causes to the hazard (i.e., to reduce the probability of the hazard from occurring).

3.4.2.1.5. Corrective Actions or Emergency Procedures (see section 3.4.2.6 for guidance) are the list of actions taken to prevent or mitigate a mishap (the effect) if the hazard occurs. These corrective actions attempt to break the chain of events linking the hazard to the mishap.

3.4.2.1.6. Comments are optional information that helps support the THA risk analysis but are not directive in nature and do not contribute to breaking the mishap chain.

3.4.2.1.7. While hazard identification should have been accomplished leading up to the Safety Review Phase, emphasis should be placed on identifying items of special interest for THA/SRB consideration including, but not limited to:

3.4.2.1.7.1. New systems or system variants: aircraft, stores, instrumentation, test equipment.

3.4.2.1.7.2. Unique and/or unprecedented systems not previously used in the test environment: aircraft, stores, instrumentation, test equipment.

3.4.2.2. GMPs (see section 3.4.2.6 for guidance) are stand-alone phrases/statements and are used to address SUT restrictions, test build-up, critical parameter monitoring, go/no-go criteria, weather or environmental criteria, and flight test chase requirements among other items of test safety concern.

3.4.2.3. Safety Review Board Summary (SRBS). The SRBS documents the results of the SRB meeting and is used to help the TEA make an informed decision. Final approval of the SRBS resides with the SRB Chair. As a minimum, the SRBS will contain:

3.4.2.3.1. Date of SRB meeting.

3.4.2.3.2. SRB attendees.

3.4.2.3.3. SRB action items and responses.

3.4.2.3.4. Overall risk assessment with justification.

3.4.2.3.5. Any test/training activity contingent on any waivers (i.e. chase waiver, deviations from AFTCI 91-202 and/or local supplements) or flight manual waivers per AFI 11-215 requires discussion at the SRB and will be included in any hazard risk assessment and documented in the SRBS. Any waiver not approved by the TEA, or appropriate approval authority, after the SRB will require a reassessment by the SRB.

3.4.2.3.6. Any significant discussions and disagreements. If a disagreement could not be resolved and the SRB Chair had to make the final determination, it will be documented in the SRBS. Anyone that has an opposing view should provide a coordination comment to inform the TEA.

3.4.2.4. Mishap Accountability. Detailed information on mishap accountability and investigating responsibility must be provided by the test team in the safety plan when deviating from DAFI 91-204, or if multiple MAJCOMs are involved, or if non-Air Force assets are involved, to include pre- mishap planning. A memorandum of agreement is the preferred method when multiple agencies are involved. For tests that include non-AFTC resources, the AFTC assets that are at risk for the test should be explicitly identified.

3.4.2.5. Other items that should be included are:

3.4.2.5.1. Test or project identifier.

3.4.2.5.2. Special considerations (e.g., flight restrictions).

3.4.2.5.3. References to include review of previous similar test projects and lessons learned.

3.4.2.5.4. When applicable, other essential range safety criteria such as approved test areas, test items, danger areas, safety instrumentation requirements, safety footprint development methodology, etc.

3.4.2.5.5. Coordination comments and responses.

3.4.2.6. Controls, Minimizing Procedures, Corrective Actions, Emergency Procedures, and General Minimizing Procedures should be actionable, well-defined, test-unique statements and must be followed. These are indicated by 'must,' 'will' or 'shall' statements. Actions are specified for test execution participants (e.g., control room personnel, ground personnel, aircrew/operators, test facility operators, etc.) and are generally not system design attributes that were not intended for test safety (e.g., designing a flight control system with triple-redundancy should not be included but having an independent, redundant Flight Termination System should be). They can be targeted to a particular phase of a program or type of test. And, they should be specific such as stating who will perform an action, when, and how often.

3.4.2.6.1. Compliance with regulations, flight manuals, or documented standard practices is always expected; these are not test-unique and generally should not be written as GMPs or in the THAs. They should only be included if the test team or the SRB feels they add value.

3.4.3. Statement of Capability (SOC). The following wording must be included in any SOC that is transmitted to a customer when the safety review process is required:

3.4.3.1. "AFTC Safety Review: The proposed test/activity must be reviewed using the procedures contained in AFTCI 91-202, *AFTC Test Safety Review Policy* and any local supplements to this instruction. To support this review, safety planning must begin early in the program."

Chapter 4

RISK ASSESSMENT

4.1. General. Risk is defined as a combination of mishap severity and mishap probability. The overall risk level is the degree of risk assumed by leadership in allowing the proposed test to be accomplished in the manner described and under the conditions specified. Test teams will propose a risk assessment; independent reviewers will evaluate test unique hazards identified by the test team, assess proposed mitigations and corrective actions, and affirm or modify the test team's proposed overall risk level. Once the independent reviewers have agreed upon a risk level, they will document via the SRBS the overall risk level and recommendation to the TEA on whether or not to execute the test based on the SRB results. Test teams use system safety techniques, prior experience, legacy system research, lessons learned and overall engineering judgment to identify test unique hazards and assess risk by evaluating the credible outcome (mishap severity) of each hazard together with the associated probability of occurrence. The mishap severity and probability is then plotted on a Risk Assessment Matrix to determine the hazard's overall risk level. Although the goal is to minimize risk through good test and safety planning/review processes, the test may result in residual risk that must be directly accepted by the TEA in accordance with Section 6.1.

4.2. Determine Mishap Severity. The mishap severity category is a qualitative assessment of the most reasonable credible mishap consequence that could occur with all mitigations in place. For activities at AFTC organizations, the mishap severity categories are shown in **Table 4.1** The assessment should incorporate engineering judgment and/or past experience with similar tests or systems and is often assessed with no mitigations and then reassessed with all minimizing procedures and corrective actions in place. The severity is assigned based on the system level consequence of total direct mishap cost and severity of injury/occupational illness. Direct mishap cost is the sum of all costs of damage and destroyed assets including, when appropriate, non-government property and environmental clean-up costs. Descriptive definitions should be used as the primary criteria for assessing mishap severity. The quantitative values are to supplement the descriptive definitions by judging damages based on direct mishap cost. Quantitative values for mishap severity listed in **Table 4.1** may be adjusted to match current guidance specified in AFI 91-202 AFMC Supplement.

Table 4.1. Mishap Severity Definitions.

Mishap Severity	Level	Descriptive[1]	Quantitative[3]	Mishap Class
Catastrophic	**1**	**Loss of life (or permanent total disability), DoD aircraft[2], facility, or expensive system.**	**≥ $2.5M**	**A**
Critical	**2**	**Severe injury (permanent partial disability), hospitalization of three or more personnel, or permanent damage. Severe aircraft, equipment or property damage.**	**≥ $600K but < $2.5M**	**B**
Marginal	**3**	**Minor injury, medical treatment requiring lost work days, but no permanent injury. Minor damage.**	**≥ $60K but < $600K**	**C**
Negligible	**4**	**Superficial but recordable injury, works partial days, has restricted duties. Incidental, less than minor damage.**	**< $60K**	**D/E**

NOTES:

1. Environmental impact is assessed independent of the test risk and is documented on an AF Form 813 per AFI 32-7061 or 32 CFR Part 989.3 (d).

2. Loss of Groups 1, 2 and/or 3 UAVs will not be Catastrophic unless the direct mishap cost exceeds the quantitative value. In this case, the loss of UAV(s) will be treated as damage for mishap severity determination (Reference DoDI 6055.07).

3. Use values listed in AFI 91-202 AFMC Supplement for definitive guidance.

4.3. Determine Mishap Probability. After test unique hazards have been identified and mitigation measures have been assessed and documented, the safety reviewers will subjectively assess the mishap probability. The mishap probability level should qualitatively and/or quantitatively measure the likelihood of the mishap occurring due to personnel error, environmental conditions, design inadequacies, procedural deficiencies, or system/subsystem component failure or malfunction. The assessment should incorporate engineering judgment and past experience with similar tests or systems with all minimizing procedures and corrective actions in place. If available, the test team and safety reviewers should consider the system safety analysis results from the contractor or system program office in order to understand areas of known concern. For operations where there is a well-developed database or sophisticated modeling/simulation, probabilities may be expressed quantitatively as 1 x 10-4, 3.8 x 10-6, etc.

However, for developmental testing, the ability to compute numeric failure probability values with confidence is difficult because these activities involve new, complex, and often unproven systems. Therefore, **Table 4.2** also contains descriptive probability definitions (along with some example descriptive statements) that should be used as a standard to consistently assess mishap probability for all AFTC test activities.

Table 4.2. Mishap Probability Definitions.

Mishap Probability Level[2]	Descriptive[1]	Probability of a Mishap during the Period of Test Risk Acceptance
A	**A real likelihood to occur during the period of test risk acceptance (e.g., test exceeds design limits or mishap occurred during similar testing, etc.)**	**$> 10^{-1}$ (greater than 10%)**
B	**Unlikely to occur during the period of test risk acceptance but not unexpected if it occurs (e.g., test at design limits or mishap almost occurred during similar testing)**	**$< 10^{-1}$ but $> 10^{-2}$ (less than 10% but greater than 1%)**
C	**Unlikely to occur during the period of test risk acceptance and is deemed unexpected if it occurs**	**$< 10^{-2}$ but $> 10^{-3}$ (less than 1% but greater than 0.1%)**
D	**Highly unlikely to occur during the period of test risk acceptance (e.g., test activity approaching design limits and done before with no problems encountered)**	**$< 10^{-3}$ but $> 10^{-6}$ (less than 0.1% but greater than one-in-a-million)**
E	**So unlikely to occur that it may be assumed it will not happen during the period of test risk acceptance (e.g. test activity within design limits and covered under normal operational procedures)**	**$< 10^{-6}$ (less than one-in-a-million)**

1 – Descriptive probability definitions should be aligned with the quantitative probability values. For example, a real likelihood assessment is analogous to the belief that there is a greater than 10% chance of a mishap occurring.

2 – AFI 91-202 AFMCSUP associates mishap probability Level A with the term Frequent, Level B with Probable, Level C with Occasional, Level D with Remote, and Level E with Improbable.

4.4. Risk Assessment Matrix. The risk assessment matrix, shown in **Figure 4.1**, is a tool for assessing mishap risk of test unique hazards as documented in safety planning documents. The risk categories are discretely divided into four shaded regions to distinguish between NEGLIGIBLE (green hatched, #14-15 and 17-20), LOW (green, #10-13 and 16), MEDIUM (yellow, #6-9), and HIGH (red, #1-5) risk levels. The correlation of approval authorities with the assigned overall risk level is discussed in **Chapter 6**. Despite the discrete distinction between each risk level, safety reviewers are reminded of the subjective nature of their assessment as each member incorporates engineering judgment and/or past experience with similar tests or systems into their risk level assessment. The use of the matrix defined in **Figure 4.1** and locally developed Test Safety Review Processes defined in supplements to this instruction are in accordance with AFI 91-202, *The US Air Force Mishap Prevention Program*, AFMC Supplement.

Figure 4.1. Risk Assessment Matrix.

		Mishap Severity Category			
		Catastrophic–1 (Class A)	**Critical–2** (Class B)	**Marginal–3** (Class C)	**Negligible–4** (Class D/E)
Probability of Mishap Occurring During the Test	**Level A**	1	3	7	13
	Level B	2 **HIGH**	5	9	16
	Level C	4	6 **MEDIUM**	11 **LOW**	18
	Level D	8	10	14 **NEGLIGIBLE**	19
	Level E	12	15	17	20

4.5. NEGLIGIBLE Risk. The NEGLIGIBLE risk assessment reflects a subset of LOW risk applicable to activities that either are or are equivalent to normal or routine operations, and to activities that have risk levels comparable to those operations. The first AFTC Test Safety Review Policy published in 2014 defined NEGLIGIBLE risk category as hazards where the severity and probability assessments fall in the Negligible Severity column and Levels C through E Probability rows on the Risk Assessment Matrix. Since risk is a combination of severity and probability, a quantitative measure of risk (referred to here as 'equivalent cost risk') can be defined as the product of the direct mishap cost and mishap probability. Using the previously established NEGLIGIBLE risk category, the maximum equivalent cost risk in this category is 600 (the product of 60,000 and 0.01) which is for the Negligible/Level C block in the matrix. Starting from that basis, the NEGLIGIBLE risk category is further expanded to include the Marginal/Level D, Marginal/Level E and Critical/Level E blocks in the matrix all of which have equivalent cost risk values equal to or less than 600. Due to the subjective nature of any risk assessment, an overall assessment greater than NEGLIGIBLE for these blocks could still be appropriate.

4.5.1. An example of a test that can be deemed NEGLIGIBLE risk is a test that meets all of the following criteria:

4.5.1.1. Testing will adhere to normal operating procedures and existing risk control measures as defined in either a US Military-approved flight manual(s), technical orders, test facility procedures, and/or operational guidance/instructions (e.g., Air Force Instructions, Air Force Materiel Command Instructions, and Air Force Test Center Instructions), or equivalent AF-approved documentation (e.g., contractor-provided procedures). If adhering to non-US Military-approved documentation, then the TEA must be informed of the maturity of these operating procedures and risk control measures prior to the test approval decision.

4.5.1.2. GMPs are allowed only to the extent that they clarify or further restrict already existing guidance. And, the test team or reviewers did not identify test unique hazards that warrant a THA document.

4.5.1.3. Routine and existing aircrew/operator training, qualification, and proficiency are sufficient to perform the test activity, test or maneuver.

4.5.1.4. Test procedures do not involve the use of abnormal or emergency procedures, checklists or configurations.

4.5.1.5. For flight test, the SUT has no airworthiness impact such that a failure or malfunction of the SUT would cause the use of abnormal or emergency procedures to safely recover the aircraft.

4.6. Determine Overall Risk Assessment. An overall risk level assessment is accomplished after all test unique hazards to the test have been identified and mitigations are clearly defined and documented in accordance with Section 3.4. Plot the combination of mishap severity and probability on the Risk Assessment Matrix for each hazard. Once all the individual hazards are plotted, the test team will discuss the safety aspects of the plan and propose an overall project risk level. Project risk will be no lower than the highest assessed risk from the THAs. A detailed explanation of THAs is discussed in Section 3.4, Test Package Documentation.

4.6.1. THA Risk Assessment. The test team may assess the pre- and post-mitigation mishap severity category and probability level by plotting both on the Risk Assessment Matrix (**Figure 4.1**). This provides a comparison between initial and residual risk levels to evaluate the adequacy of safety measures and best available solution. Test teams and safety reviewers should note that although risk mitigation in the safety plan may not change the assessed severity and probability levels, it will still reduce the actual risk (e.g., potential damage to equipment would be reduced from $2 million to $1 million or the mishap probability would be reduced from 1/10,000 to 1/100,000). The residual risk level determined by the test team for each THA acts as a proposal for the independent safety reviewers to affirm or adjust as necessary.

4.6.2. Overall Risk Assessment. The test team will propose an overall risk level for the test as determined by procedures discussed in this section. During the Safety Review Phase (outlined in **Chapter 5**), the independent safety reviewers will have a general discussion of the test, identified hazards, and associated mitigations to generate opinions on the residual risk. The discussions should be candid and result in a general agreement by the SRB, although disagreements may occur. Safety reviewers will weigh the control measures in place (mitigation steps), their experience with the types of tests, and the SUT to assess the overall residual risk. The cumulative risk may (and frequently does) exceed the assessed risks for all THAs individually. However, the overall risk cannot be lower than the risk associated with any individual THA. The safety reviewers must also consider the complexity of the test, the potential for safety-related "unknown unknowns", and their own experience with similar test activities. By using the Risk Assessment Matrix (**Figure 4.1**) and referencing the overall risk level descriptions, shown in **Table 4.3**, each safety reviewer should assess overall risk and provide justification for their assessment. The overall risk assessment must be documented in the safety plan.

Table 4.3. Overall Risk Level Assessments.

Assessment	Description and Implication
HIGH Risk[1]	Tests or activities that present a significant risk to personnel, equipment, and/or property after all precautionary measures have been taken.
MEDIUM Risk[1]	Tests or activities that present a greater risk to personnel, equipment, and/or property than normal after all precautionary measures have been taken.
LOW Risk	Test or activities that present a little/no greater risk than normal operations (such as operating the system using approved procedures) after all precautionary measures have been taken. Routine supervision is appropriate.
NEGLIGIBLE Risk	Activities that either are or are equivalent to normal or routine operations.
1 – Although 'unacceptable risk' is not a category, the SRB can recommend to the TEA that an elevated risk test, or portions of it, should not be performed. The TEA will determine if the risk cannot be tolerated and is therefore unacceptable.	

4.6.2.1. In some situations, sufficient information may not be available to complete a risk assessment. The Wing/Complex Test Safety Office will determine a course of action to develop resolution and may reconvene the safety reviewers to perform the assessment at a later date.

4.6.2.2. If appropriate, the risk may be assessed separately for AFTC and non-AFTC assets, for different phases of the test projects, or for individual test events. The overall risk for the test project is still based on the highest level of risk assessed on any of the tests, but the project can have split risk assessments. For example, an overall HIGH risk may be assigned for a test project which includes flight envelope expansion, but a subset of that testing may be assessed as MEDIUM or even LOW. If this is the case, the test points in each risk category will be clearly identified in the safety plan.

4.6.3. In cases where there is disagreement between the independent reviewers such as on a THA risk level or the overall risk level, the SRB Chair will attempt to bring all reviewers to a consensus. If the SRB cannot come to a consensus, the SRB Chair will make the final determination and document the lack of consensus in the SRBS. A reviewer that disagrees or non-concurs should provide a coordination comment to inform the TEA.

4.7. Elevated Risk Activities. Certain tests conducted at AFTC organizations have demonstrated a higher than normal risk due to the inherent hazards involved. However, if the analysis of test activities clearly indicates that the predicted performance (flying qualities, pilot induced oscillation susceptibility, flutter margin, loads margin, etc.) is well within acceptable levels, the test point need not be considered elevated risk. This may be especially true if the analysis model has been validated through other simulation or test activity.

Chapter 5

TEST SAFETY REVIEW PHASE

5.1. Safety Review Preparation. In preparation for an independent safety review, test teams should perform the following:

5.1.1. Propose the type of safety review (examples in **Paragraph 5.2.2**) after consulting with a TSO.

5.1.2. Evaluate the probability and severity category for each THA (Chapter 4). Provide to the safety reviewers the proposed overall risk level and any test points or test phases which may have a lower risk than the overall risk level (if they exist). Include the rationale for the varying risk levels. The proposed risk level(s) will be considered during the independent safety review.

5.1.3. Develop a list of safety reviewers following guidance in Section 2.3

5.2. Safety Review. The purpose of the Safety Review Phase is to allow an independent team to formally review the test unit's safety plan to ensure that all test unique hazards have been identified and sufficiently mitigated, affirm or modify the residual risk, determine the overall risk level of the test and recommend to the TEA whether or not to execute the test. The documentation from this phase should reflect a suitable level of clarity and maturity for the TEA to make an informed decision on whether to proceed with test execution.

5.2.1. Objectives:

5.2.1.1. Ensure appropriate test unique hazards associated with the test activity are identified.

5.2.1.2. Ensure the proposed risk control measures sufficiently mitigate (minimize or eliminate) the hazards caused by the test/activity to an acceptable level.

5.2.1.3. Assess and recommend an appropriate residual risk level for the test/activity.

5.2.1.4. Ensure the safety plan clearly and adequately provides enough information to support an approval decision by the TEA.

5.2.2. Types of Independent Safety Reviews. Below are four types of independent safety reviews that may be used to complete the Safety Review Phase. The Wing/Complex Test Safety office may advocate additional types of reviews as defined in local supplements to this instruction. The test team will review relevant documentation and propose a review type to the SRB Chair, who will make the final determination. The four types of independent safety reviews are:

5.2.2.1. Formal Safety Review Board (SRB)**.** This is a meeting attended by independent safety reviewers and project personnel, and is chaired by a designated Wing/Complex Test Safety office representative. The anticipated TEA should not attend the formal SRB as attendance may unduly influence risk management, risk assessment or undermine the SRB Chair. Although attendance is not expressly prohibited, it should be limited to extraordinary circumstances where expedited understanding of complex safety concerns is required. The anticipated TEA would attend only as a non-participant and a non-voting member. The decision to conduct a Formal SRB vs an Electronic Safety Review (ESR) or Combined Technical Review Board (TRB)/SRB is based primarily on the test plan size,

complexity, maturity of test item/methodology, and expected risk level and is determined by the SRB Chair. To the maximum extent possible, independent safety reviewers chosen for the SRB should be the same individuals that served as independent reviewers for the technical review. This is to ensure continuity of information regarding test methodology is preserved throughout the review and approval process and should result in a more insightful and thorough SRB.

5.2.2.2. Combined TRB/SRB**.** For those tests that are easily understood, less complex, or lower in risk, the test team may request a combined TRB/SRB in lieu of separate technical and safety reviews to minimize impact to resources and shorten the timeline. Teams should contact the SRB Chair for final determination on this course of action. Additional coordination with regard to the technical review portion may be specified at the Wing/Complex level. Teams will ensure that the test plan is sufficiently mature for safety review prior to the combined TRB/SRB. The instructions concerning the anticipated TEA's attendance in a formal SRB (see **paragraph 5.2.2.1**) also apply to the combined TRB/SRB.

5.2.2.3. Electronic Safety Review (ESR)**.** The ESR is a formal safety review of test packages by the SRB that occurs without a meeting. The test package is typically distributed electronically and reviewed in parallel by the safety reviewers. An ESR is appropriate when test activities are readily understood by reviewers, tend to be less complex, and are lower in risk.

5.2.2.4. NEGLIGIBLE Risk Review (NRR)**.** An NRR is a streamlined safety review process applicable to a subset of LOW risk tests as indicated on **Figure 4.1**, Risk Assessment Matrix. Test activities that either are or are equivalent to normal or routine operations (e.g., incidental to another routine flight activity or test) are excellent candidates for an NRR process since the risk is effectively the same as the operational risk.

5.2.2.4.1. Qualification of a test project for an NRR should be proposed by the test team to an independent TSO. The independent TSO will choose at least one other independent reviewer to review the proposed activity. If the independent TSO and all other independent reviewers unanimously assess the overall risk to be NEGLIGIBLE, then the test project qualifies.

5.2.2.4.2. Each Wing/Complex may define a NEGLIGIBLE risk review and approval process in a local supplement to this instruction. If defined locally, the NRR process will comply with NRR qualification guidance in this Chapter and the approval coordination path defined in **Table 6.1**.

Chapter 6

TEST SAFETY APPROVAL PHASE

6.1. Approval Authorities and Notification Levels. All activities conducted in accordance with **paragraph 1.6** require approval before beginning execution. The Approval Phase provides appropriate leadership the opportunity to make an informed risk acceptance and test approval decision based on the safety review and risk assessment completed in the Safety Review Phase. The TEA for these activities is based on the overall risk level as outlined in **Table 6.1** Approval is defined as permission to conduct or participate in the test project or activity granted by the appropriate TEA. The TEA may require a Test Approval Brief (TAB) to assist in making an informed decision. Coordinating the post-SRB test package with subordinate units before delivering it to the TEA is not required. This is intended to avoid staffing redundancy but is not intended to reduce opportunities for the subordinate units to review the package and provide inputs. Signature of the TEA on AFTC Form 5001, or equivalent, is required prior to test execution to indicate acceptance of the risk and approval to begin activities under the conditions set forth in the test package. Approval by negation (i.e., without the TEA actually providing the approval via a signature or some other means) is not authorized. An approved test package does not authorize deviation from Air Force, AFMC, or AFTC instructions or directives.

Table 6.1. Approval Process Coordination Path.

Organization Level	LOW Risk (NEGLIGIBLE Risk)	MEDIUM Risk	HIGH Risk
Safety Office	Note 4	Note 4	Note 4
Squadron CC (or equivalent)	Approve[1, 3]	Note 4	Note 4
Group CC (or equivalent)	Info[5]	Approve[1, 3]	Note 4
Wing/Complex CC	Not Required	Info	Coord[3]
AFTC/SE	Not Required	Not Required	Coord
AFTC/CC	Not Required	Not Required	Approve[2]
HQ AFMC/SE and A3	Not Required	Not Required	Info

NOTES:

1. Delegation of test approval is authorized to the TEA's deputy commander or deputy director when the TEA is unavailable. If a unit does not have a deputy commander or deputy director, then it can be the Commander/Director's designated representative who per AFI 51-509 paragraph 7.2.4.2, "acts, at the direction of the commander, for the commander in the commander's name, just as is routinely done when the commander is present." An example may be a Sq/DO or Director of Projects. This delegation will not be further delegated (e.g., Sq/ADO). The Commander/ Director's deputy or designated representative will be trained in the AFTC test safety review process. If this person is also not available, then the TEA role will be assumed by the next higher leadership level.

2. HIGH risk approval may be delegated in writing to the Test Wing/Complex commander. In the absence of the Test Wing/Complex commander, the vice commander can approve the testing; however, this cannot be further delegated. If delegated to a Test Wing/Complex commander, the AFTC/SE and AFTC/CC will be coordinated for 'Info' only.

3. A commander may elevate the TEA responsibility to the next level at their discretion.

4. Coordination is not required unless required by local instruction. Subordinate commanders or their representatives are expected to provide their inputs to the TEA either before or during the TAB, if one is held.

5. Not required for NEGLIGIBLE risk.

6.1.1. The TEA will be in the ETO's chain of command. If multiple AFTC Wings/Complex are involved, the Wing/Complex with the designated ETO may transfer the TEA role to the other Wing/Complex if the Wing/Complex commanders of both organizations agree. Control of most of the assets at risk is not a criterion for TEA designation.

6.2. LOW Risk Activities. The TEA for all LOW risk (including NEGLIGIBLE risk) test events is the responsible Squadron Commander (CC) or equivalent.

6.3. Elevated Risk Activities. Elevated risk activities are those that result in a residual risk level of MEDIUM or HIGH.

6.3.1. MEDIUM Risk Test Approval**.** The TEA for all MEDIUM risk test events is the Group CC or equivalent.

6.3.2. HIGH Risk Test Approval. The TEA for all HIGH risk test events is the AFTC/CC. Final approval to execute HIGH risk test may be delegated in writing to the Test Wing/Complex Commanders.

6.4. Test Approval Brief. The TEA may require a TAB to assist in making an informed decision. A TAB should be an executive level meeting that provides a test project overview and highlights test unique hazards, mitigation measures, discussion points during the independent review (e.g., Formal SRB, ESR, Combined TRB/SRB), and any contention or disagreement by the independent board and the test team. If a TAB is held and if slides are used, the slides will be archived with the test package documentation.

6.5. Acceptance of Safety Planning across AFTC.

6.5.1. An AFTC test project which has been approved through an AFTC Wing/Complex's technical and safety review processes may be executed by a different, supporting, AFTC test wing/complex.

6.5.2. The originating test wing/complex will notify the supporting wing/complex when the technical and safety review processes are complete and the test project is approved for execution by the originating test wing/complex TEA. The originating test wing/complex will provide the supporting wing/complex with test and safety planning documentation required under the originating test wing/complex processes. The supporting wing/complex responsible independent TSO will review this documentation and may accept it as written, or may require additional safety review following their wing/complex supplement to this instruction. Differences will be resolved by equivalent TEAs from each wing/complex. The supporting wing/complex may then execute any assigned portion of a test project which has been approved to execute under the originating test wing/complex processes. Although approval from the originating test wing/complex TEA is sufficient to begin testing, it does not preclude the supporting wing/complex from requiring local approval as well. Note that the local Range Operating Authority may require a local test safety review and approval as specified in the local wing-level supplement to AFMAN 13-212V1, *Range Planning and Operations.*

6.5.2.1. If changes are made to the test package at the supporting wing/complex, such as additional GMPs due to range, complex or facility differences, the originating test wing/complex will be notified via a memorandum. The memo will include, as a minimum, the project title, additions to the package and rationale for the additions. If safety plan amendments are required for test or safety planning reasons, or an unexpected test event, the supporting wing/complex will provide the originating wing's Test Safety Office a copy of the amendment.

6.5.3. Test execution materials (e.g., test cards or mission decks) may be developed by either the originating or supporting test wing. The organization creating the mission materials will adhere to local guidance for formatting, content and approval. Mission materials will be approved by the ETO in accordance with their local procedures.

6.6. Acceptance of Safety Planning from Non-AFTC Organizations.

6.6.1. Safety plans created and reviewed by other government safety organizations may be accepted by the AFTC TEA. Acceptance requires the participation of AFTC Wing/Complex Test Safety Office personnel in that review process to ensure adequate SRB rigor and hazard management for AFTC assets. A safety review IAW this policy may still be required at the discretion of the Wing/Complex Test Safety Office.

6.6.2. Safety plans created and reviewed by non-government organizations will be reviewed and approved IAW this instruction. The safety plan will be supplemented as required in order to meet the requirements specified in this instruction.

Chapter 7

TEST EXECUTION PHASE

7.1. General. Risk management must be integrated and documented into all stages of T&E activities to identify test hazards, mitigating measures and acceptance/rejection of the residual risk by an appropriate TEA. The safety plan records due diligence in risk management and acceptance, and also communicates (e.g., provides a written copy of) hazards and mitigating measures to test personnel. The procedures, restrictions, and mitigations documented in the safety plan must be observed while conducting the test in order to maintain the accepted level of risk. Safety plan requirements take precedence over those specified in the test plan. The test package is a contract between the test team and the TEA.

7.2. Test Card/Daily Test Directive Preparation and Approval. This section applies when an AFTC unit is the ETO or acting in the capacity of the ETO. The procedures in this section ensure the Test Cards properly reflect the test and safety plans. When an AFTC unit is a PTO, AFTC test card review and approval in accordance with this section can be required if deemed appropriate by the participating AFTC unit commander/director.

7.2.1. Test Cards/Daily Test Directives/other similar test execution documents (all referred to in this section simply as Test Cards) are documents describing the test activity procedures in a step-by-step or checklist format. These documents are used by test teams to successfully complete test activities. They may be reused for multiple test projects but should not be overly general in documentation. Inherently, they should be a synopsis of operation, test and/or manufacturing technical data immediately available to reference for the test team in executing test activities safely, effectively, and efficiently.

7.2.2. During Test Card preparation, the test team will review applicable GMPs and THAs to ensure the procedures comply with safety limits, procedural constraints or approved test plan requirements.

7.2.2.1. The Test Card preparer will be responsible for ensuring all steps are in compliance with Flight Manual or similar operational manual guidance and current MAJCOM and AF level waivers.

7.2.2.2. Test Cards will be coordinated with the lead project operator (flight crew member, ground test tunnel operator, etc.) and the lead project test engineer. The lead project operator and lead project test engineer will ensure the Test Cards are in accordance with the method of test/test plan and verify compliance with the applicable manual and waivers. For a multidisciplinary test, the lead project test engineer referred to in this paragraph may be replaced with the appropriate project test engineer(s).

7.2.3. Test Cards must be approved prior to use during testing.

7.2.3.1. All ground test and flight test events will be conducted from approved Test Cards.

7.2.3.2. The Test Card approval authority will be informed of the safety risks and any applicable deviations or waivers, and will have access to the test and safety plans. Test Cards will be approved no lower than one organizational level below the TEA who approved the test (including the allowances in the notes of **Table 6.1**). For LOW risk tests where the TEA is at the squadron level, this will be at the Squadron Director of Operations or equivalent level (Assistant Directors of Operations may also be authorized by Wing Guidance).

7.2.4. The order or sequence of the Test Cards may have a direct effect on the safety of a given test mission. Approved Test Cards, or "test decks", may be reordered or re-sequenced without re-approval if there is no impact to the required buildup order or test safety. Test teams must ensure that test approach and build-ups, as defined or intended in the test and safety plans, are adhered to in all cases, and they should carefully analyze test point sequencing to avoid hidden pitfalls. Resequencing of test cards that would result in a violation of a safety build-up as prescribed in the safety plan requires a safety review and amendment to the safety plan.

7.2.4.1. Approved Test Cards may be altered due to the prevailing test environment so long as the safety plan is followed (e.g., a daily test directive or run matrix for a ground test facility may be modified by the test team to match the test environment but cannot deviate into areas that exceed the TEA-approved safety boundaries, or the test altitude for a flight test point may be moderately increased or decreased for weather reasons).

7.3. Test/Mission Execution Briefing. During the test/mission execution brief, the test team will address the procedures and restrictions specified in the safety plan. Test unique hazards applicable to the scheduled testing, risk minimizing procedures or controls, and go/no-go criteria must be briefed at the test/mission execution briefing. These can be captured in GMPs or THAs.

7.4. Unexpected Test Event.

7.4.1. Unexpected test events are those that affect the continued safe execution of the test including but not limited to:

7.4.1.1. Unexpected or unplanned damage to the SUT or support equipment.

7.4.1.2. Exceeding safety of test limits.

7.4.1.3. Unfavorable departure from predicted simulation/analysis.

7.4.1.4. Unanticipated frequency of occurrence of a hazard.

7.4.1.5. Failure of planned mitigations that allowed a hazard to occur.

7.4.1.6. Hazard occurrence without cause(s) fully identified or understood.

7.4.2. If an unexpected test event occurs (actual or suspected), the test team will put the test on hold and consult with an independent TSO for confirmation of an unexpected test event. If confirmed, the independent TSO will provide notification of the event through the appropriate chain of command. Test points associated with the unexpected test event will be placed on hold, but if the test team and the independent TSO concur, other unrelated test points can continue. The SRB Chair may also elect to reconvene the SRB to review and revalidate that all associated risks have been mitigated/addressed before the associated testing can continue.

7.4.3. Once a recovery plan of action is determined, the unexpected test event will be documented with a safety plan amendment (a memorandum format could be used) which will describe the occurrence of the event, summarize the cause(s) as they are understood by either analysis or hypothesis, and identify the test team's intended path for the resumption of testing. Testing of the suspended test points may be resumed upon approval of the appropriate change documentation as described in **Chapter 8**. An unexpected test event amendment does not constitute a mishap investigation, if one is required by DAFI 91-204.

7.5. Hazard Occurrence but Not an Unexpected Test Event. If a hazard occurs that is not considered an unexpected test event, it will be reported to the Wing/Complex test safety office as soon as practical (e.g., after post-test debrief). This information should be collected by the Wing/Complex test safety office and could be of use to future test teams in their safety planning.

Chapter 8

CHANGES AND TIME LIMITS

8.1. Changes. It is not unusual for project changes to arise after receiving test approval. Unexpected results, overly restrictive controls in THAs or GMPs, hazards not previously identified or adequately controlled, and proposed changes in risk level all constitute reasonable grounds for changing the safety plan. All project changes will re-accomplish the following test safety review process phases: Safety Planning, Safety Review, and Approval. However, the scope of each phase may differ significantly from that of an original safety plan, depending on the changes and documentation method used.

8.2. Major Changes. Any potential change in risk level (higher or lower), major test plan change, major safety plan change, and unexpected test events are considered major changes that affect test conduct or safety planning. Major changes require additional safety planning, independent safety review, and TEA approval before continued testing with these changes incorporated. The definition of major test plan change (e.g., scope changes or expansion) will be outlined in local supplements. A major safety plan change is any change to the content of the safety plan that the SRB Chair or the independent TSO determines to be outside the scope of the previously approved safety plan (e.g., test conditions beyond those previously approved, changing the minimizing procedures, changing corrective actions, identification of a new hazard, etc.). For the Review Phase, the minimum SRB composition will be an SRB Chair, an Operations Reviewer, and other reviewers from section 2.3 determined by the SRB Chair as required reviewers due to the changes. Individuals in the SRB should be the same as those from the original package, if available. Approval of the changes will be IAW **Table 6.1** Signature of the TEA on AFTC Form 5001 or equivalent (e.g., locally developed electronic or hard copy document that captures the appropriate signatures) is required to indicate approval of the change. Use of a memorandum instead of the AFTC Form 5001 to capture the appropriate signatures is acceptable.

8.2.1. Risk Level Change. During the course of testing, information may be obtained that potentially warrants a change in risk level. This could be an increase in the risk based on unexpected results or a decrease in risk level due to increased system maturity.

8.2.1.1. The approval authority for an increase in risk level will be based on the "new" risk level IAW **Chapter 6** (i.e. an upward change to HIGH risk requires AFTC/CC approval if not already delegated).

8.2.1.2. The approval authority for a decrease in risk level will be based on the "original" risk level IAW **Chapter 6** (i.e. a downward change from HIGH risk requires AFTC/CC approval if not already delegated).

8.2.1.3. Changes to testing approved with split risk levels. For changes to test packages with split risk levels (see **paragraph 4.6.2.2**), the approval authority for the changes will be based on the portion of the test package that is being changed.

8.2.1.3.1. For example, a test package has been approved as HIGH risk for test points over 800 KCAS and MEDIUM risk for all other test points. A change is submitted that only affects test points below 800 KCAS. The approval authority for the change corresponds to the MEDIUM risk TEA as IAW **Table 6.1**.

8.2.2. Unexpected Test Event. Once suspended for safety, only the TEA (or higher) can authorize resumption of testing.

8.3. Minor and Administrative Changes. Some changes to the approved test package may be classified as minor or administrative only.

8.3.1. An administrative change to the test package clarifies information contained in the package and does not affect test conduct or safety plan execution. The definition of minor test plan change (e.g., changing flight conditions of test points as long as they remain close to existing points and within the envelope of test points approved in the original plan; adding test points within the envelope of test points and technical scope approved in the original plan; and deleting test points if preliminary results validated by a technical expert show they are unnecessary and are not part of a safety build-up) will be defined locally. Procedures for documenting and approving administrative changes and minor test plan changes with no changes to the safety plan will be defined locally as well.

8.3.2. Minor safety plan changes are those changes that are within the scope of the previously approved safety plan (e.g., substitution of a strain gauge safety-of-test parameter with a functionally equivalent parameter, adding an intermediate build-up test point as an additional safety precaution, re-wording of a minimizing procedure to improve clarity, etc.). The SRB Chair or independent TSO will review the change and determine if the change qualifies as a minor safety plan change and agree that there is no change in the risk level. Concurrence from other ISRs may also be required at the discretion of the SRB Chair or the independent TSO. The minor safety plan change and concurrences will be documented in the test package. The squadron commander (or equivalent) will be the approval authority for minor safety plan changes. However, a new approval is not required if the TEA has permitted future minor safety plan changes and this pre-approval is documented in the approved test package.

8.4. Time Limit. As part of the RM process, safety plans will be reviewed at least every three years to ensure identified hazards and mitigation measures are appropriate and to incorporate any lessons learned. USAF Test Pilot School standard curriculum event safety plans will be reviewed at least every four years. During this review, test teams will identify any new risks and mitigation measures; highlight key issues experienced since approval or the last review; and purge non-applicable guidance from the plan. If the team's review concludes that no changes are required to the test package whatsoever, then an independent review is not required and completion of the review will be documented on an AFTC Form 5001, or equivalent. If the team's review concludes changes are required, then these will be reviewed and approved IAW sections 8.2 or 8.3, as appropriate, with the exception that an AFTC Form 5001, or equivalent, will be used to capture the appropriate signatures.

8.5. Closure Amendments/Lessons Learned. A safety plan closure amendment or close-out notification email provided by the test team will be used to notify the Wing/Complex test safety office that the existing safety plan is no longer in use. The Wing/Complex test safety office should approve the closure amendment. A well-written closure amendment could close the loop on a test package by re-assessing the GMPs and THAs. In addition, it could help future researchers benefit from the lessons learned during testing and obtain pertinent information that the test team would have liked to know at the beginning of the test project. Although a closure amendment can be used to documented lessons learned over the course of the test project, lessons learned should be documented in the test package and submitted to the Wing/Complex test safety office as they arise. Lessons learned can also be captured when the three year time limit has been reached.

EVAN C. DERTIEN
Major General, USAF
Commander

Attachment 1

GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION

References

AFI 11-215, *Flight Manuals Program*, 25 March 2019

AFI 11-215_AFMCSUP, *Flight Manuals Program*, 1 August 2022

AFI 33-322, *Records Management and Information Governance Program*, 27 July 2021

AFI 91-202_AFGM2022-01, *The US Air Force Mishap Prevention Program*, 11 April 2022

AFI 91-202_AFMCSUP, *The US Air Force Mishap Prevention Program,* 30 March 2022

AFMAN 13-212V1, *Range Planning and Operations, 21 June 2018*

AFTCI 62-602, *Airworthiness*, 21 August 2020

DAFI 90-160, *Publications and Forms Management*, 13April 2022

DAFI 91-204_AFMCSUP, *Safety Investigations and Reports,* 5 January 2022

DAFPAM 90-803, *Risk Management (RM) Guidelines and Tools*, 22 March 2022

DODI 5000.89_DAFI 99-103, *Capabilities-Based Test and Evaluation*, 8 December 2021

MIL-STD-882E, *Standard Practice for System Safety*, 11 May 2012

AFI 32-1015, *Integrated Installation Planning*, 30 July 2019

Prescribed Forms

AFTC 5000, *Test Hazard Analysis*

AFTC 5001, *Test Project Safety Review*

Adopted Forms

AF 813, *Request for Environmental Impact Analysis*

AF 847, *Recommendation for Change of Publication*

AFTC 6239, *T-2 Modification Airworthiness Compliance*

Abbreviations and Acronyms

AEDC—Arnold Engineering Development Complex

AFI—Air Force Instruction

AFMAN—Air Force Manual

AFMC—Air Force Materiel Command

AFRIMS—Air Force Records Information Management System

AFTC—Air Force Test Center

CCB—Configuration Control Board

DRB—Design Review Board

DT&E—Developmental Test and Evaluation

ESR—Electronic Safety Review

ETO—Executing Test Organization

GMP—General Minimizing Procedure

IAW—In Accordance With

ISR—Independent Safety Reviewer

LDTO—Lead Developmental Test and Evaluation Organization

MOT—Method of Test

NRR—Negligible Risk Review

PTO—Participating Test Organization

RDS—Records Disposition Schedule

RM—Risk Management

SE—Safety Office

SOC—Statement of Capability

SRB—Safety Review Board

SRBS—Safety Review Board Summary

SUT—System Under Test

T&E—Test and Evaluation

T.O.—Technical Order

TAB—Test Approval Brief

TEA—Test Execution Authority

THA—Test Hazard Analysis

TIS—Test Information Sheet

TRB—Technical Review Board

TSO—Test Safety Officer

TW—Test Wing

Terms

Acceptable Risk—That part of identified risk which is allowed by the managing activity to persist without further engineering or management action.

Control/Safety Measure—An action taken to eliminate or reduce a potential hazard to a more acceptable risk level.

Executing Test Organization (ETO)—Test organization, usually at the squadron level, charged with accomplishing developmental test under supervision of the LDTO. The system under test may or may not be a resource of the test organization/unit.

General Minimizing Procedure (GMP) —Statements that direct a specific action or procedure that mitigates general test execution risk; these generally include the words "will" or "shall". GMPs are used to address system under test restrictions, test build-up, critical parameter monitoring, go-no-go criteria, weather or environmental criteria, and flight test chase requirements among other items of test safety concern.

Hazard—Any real or potential condition that can cause injury, illness, or death to personnel; damage to or loss of a system, equipment or property; or damage to the environment. It is the threat of harm and is a precursor state to a mishap.

Identified Risk—That risk which has been determined through various analysis techniques.

Independent Review—A review by an individual or group that does not have a vested interest in the successful accomplishment of the test objectives and was not directly responsible for the development of the test package.

Initial risk—The first assessment of the potential risk of an identified hazard. Initial risk establishes a fixed baseline for the hazard.

Lead Developmental Test and Evaluation Organization (LDTO) —The LDTO functions as the lead integrator for a program's DT&E activities. It is separate from the program office, but supports the Program Manager and Integrated Test Team in a provider-customer relationship with regard to scope, type and conduct of required DT&E. The LDTO plans, manages, and/or conducts government DT&E. The LDTO may designate a sub-organization, such as an ETO or PTO, to conduct the test with LDTO oversight. The LDTO accomplishes independent technical and safety reviews. When directed by the program office Chief Developmental Tester (known as Test Manager for some programs), the LDTO assists the Chief Developmental Tester / Test Manager with oversight of other developmental tests. The LDTO is selected from the list of qualified candidates published by AFMC.

Mishap—An unplanned event or series of events resulting in death, injury, occupational illness, or damage to or loss of equipment or property, or damage to the environment, and meets Class A, B, C or D reporting criteria IAW DAFI 91-204.

Mishap Accountability—The identification of an "owning unit or units" (see DAFI 91-204 for definition) of the mishap assets and/or personnel and the unit assuming investigative responsibility (Convening Authority) if other than the owning unit or if multiple owning units are involved. Mishap accountability must be established IAW DAFI 91-204 prior to conducting tests.

Mitigation Measure—Action required to eliminate the hazard or when a hazard cannot be eliminated, reduce the associated risk by lessening the severity of the resulting mishap or lowering the likelihood that a mishap will occur. (MIL-STD-882). These are also referred to as a countermeasure or a control/safety measure and can be captured as a GMP.

Participating Test Organization (PTO)—Any test organization required to act in a supporting role to the ETO or LDTO by providing specific T&E data or resources.

Probability—An expression of the likelihood of occurrence of a mishap.

Residual Risk—The remaining mishap risk that exists after all mitigation measures have been implemented or exhausted, in accordance with the system safety design order of precedence.

Risk—A combination of the severity of the mishap and the probability that the mishap will occur.

Risk Level—An expression of the danger posed by a hazard in terms of the severity of outcome and the probability of occurrence. Risk level is assigned to a hazard or to a combination of hazards. As such, risk levels are assigned to both a test event and the test as a whole.

Risk Management (RM)—The systematic process of identifying threats/hazards/problems, assessing risk, analyzing risk control options and measures, making control decisions, implementing control decisions, accepting residual risks, and supervising/reviewing the activity for effectiveness.

Safety Plan—Safety documentation that details the specific safety criteria and parameters to allow safe conduct of a test. The safety plan can identify targets, munitions, aircraft, and other equipment to be used; defines danger areas; identifies the potential hazards associated with the test; and establishes the specific safety requirements necessary to conduct the test, such as special handling, flight termination systems, surveillance requirements, communication requirements, etc.

Safety Plan Author—The individual(s), typically a member of the test team, charged with writing the safety plan and serves as the focal point for its development.

Safety Review Board—An independent panel of subject knowledgeable individuals that review the test and associated safety plan to ensure test unique hazards are identified; then eliminated, minimized or controlled to an acceptable level; and to establish the overall risk level. As a minimum, the safety reviewer panel will be composed of a technical and operations representative who will review the test package. Technical representatives are chosen based on their experience and expertise in the engineering discipline(s) associated with the test activity to be reviewed. Operations representatives are chosen based on their test and operations experience in similar test activities. An SRB Chair will be appointed as one of the safety reviewers. Other independent reviewers can include range safety, maintenance, logistics, etc. as appropriate for the test.

Severity—The magnitude of potential consequences of a mishap to include: death, injury, occupational illness, damage to or loss of equipment or property, damage to the environment, or monetary loss. Damage to the environment will be assessed through the appropriate channels and documented on an AF Form 813.

System Safety—The application of engineering and management principles, criteria, and techniques to achieve acceptable risk within the constraints of operational effectiveness and suitability, time, and cost throughout all phases of the system life-cycle. (MIL-STD-882)

Test—the act of generating empirical data during the research, development or sustainment of systems, and the creation of information through analysis that is useful to technical personnel and decision makers for reducing design and acquisition risks.

Test Director—An individual responsible for coordinating, leading and executing a test, and reporting the results according to a specific test plan. This individual may have a different title such as Test Manager, Test Planner or Test Engineer.

Test Execution Authority (TEA)—The government individual responsible for accepting the SRB and Technical Review Board results and approving the test to proceed with any residual risk.

Test Hazard Analysis (THA)—A document that identifies test unique hazards, causes and effects, and establishes controls which are used to determine risk level. For AFTC test projects, test hazard analysis will be documented on an AFTC Form 5000 or equivalent.

Test Package—As a minimum, the test package includes the test plan, safety plan and any other appendices or documentation that supports the test planning.

Test Plan—The test plan describes the system under test, defines the test objectives and outlines the test methodology in sufficient detail to demonstrate technical adequacy and execute a technically effective test project.

Test Safety—The application of engineering and management principles, criteria, and techniques to optimize all aspects of safety within the constraints of operational effectiveness, time and cost throughout the defined test cycle.

Test Safety Office—The safety office responsible for oversight and support of the LDTO. This responsibility may reside in the test organization's safety office or the Center/Installation safety office.

Test Safety Officer—An individual working in the Wing/Complex Test Safety Office or in a test unit that is responsible for helping test projects follow the AFTC Test Safety Review Policy.

Test Team—A group of individuals usually all members of a single test unit who plan, execute and report on a particular test project. This group is typically composed of a project operator, one or more project test engineers, and a project manager.

Test Unique Hazards—Hazards that are a result of the specific test being accomplished and not present in the normal operational hazards associated with the system or environment. These hazards include those inherent to the article being tested as well as those hazards associated with the initial testing of any new system.

Unacceptable Risk—That risk which cannot be tolerated by the managing activity. It is a subset of identified risk. Unacceptable risk is either eliminated or controlled.

Vested Interest—Having a personal stake or involvement in the test such that the person’s finances, professional standing, or reputation are expected to be directly affected.

Waiver—Approval from the appropriate authority to deviate from both the intent and the letter of the requirement.