

**BY ORDER OF THE COMMANDER
AIR FORCE RESEARCH LABORATORY
(AFRL)**

**AIR FORCE RESEARCH LABORATORY
INSTRUCTION 61-103**

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Scientific/Research and Development

**AFRL RESEARCH TEST
MANAGEMENT**

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This instruction implements Air Force Policy Directive (AFPD) 61-1, *Management of Science and Technology*, Air Force Instruction (AFI) 99-103, *Capabilities Based Test and Evaluation*, Air Force Materiel Command Instruction (AFMCI) 99-103, *Test Management*, Air Force Research Lab Manual (AFRLMAN) 99-103, *AFRL Flight Test and Evaluation*, and AFI 91-202 AFMC Sup 1, *The US Air Force Mishap Prevention Program*. It establishes policy for how AFRL conducts research test management. It describes how AFRL uses accepted scientific practices to plan, conduct, and report research test activities, including contracted activities where AFRL retains mishap accountability. This instruction applies to all AFRL personnel involved with the planning, management, or execution of research test activities. This publication may be supplemented at any level, but all direct supplements must be routed to the OPR of this publication for coordination prior to certification and approval. Refer recommended changes and questions about this publication to the Office of Primary Responsibility (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. Ensure that all records created as a result of processes prescribed in this publication are maintained in accordance with (IAW) Air Force Manual (AFMAN) 33-363, *Management of Records*, and disposed of IAW Air Force Records Information Management System (AFRIMS) Records Disposition Schedule (RDS).

SUMMARY OF CHANGES

This publication updates roles and responsibilities to reflect current AFRL organization with the standup of the AFRL Operations Directorate (AFRL/DO) and the Engineering and Technical Management Directorate (AFRL/EN). Changes include clarification of responsibilities for detachment chiefs of safety (paragraph 2.4), updated roles for chief engineers (paragraph 2.6) and introduction of the AFRL Delegated Technical Authority (DTA) to perform independent airworthiness assessments and issue Military Flight Releases (MFRs)/Civil Letters.

1. Purpose and Scope.

1.1. Purpose. The purpose of this instruction is to establish roles and responsibilities, standardize policy, and define basic processes for the conduct of research test activities by AFRL. In this instruction, the term “test” shall include laboratory tests, experiments, and demonstrations. The intent of this instruction is to ensure AFRL effectively manages technical and safety risks during the conduct of test activities. This instruction refines requirements found in many separate Department of Defense (DoD), AF, and AFMC governing directives. While this instruction defines basic policy, processes, and procedures common to all AFRL research test activities, each technology directorate (TD) must define specifics for each type of test activity (flight, munitions, directed energy, space, human use, animal use, propulsion, sensors, materials, software/cyber, etc). Note: AFRL Operations (AFRL/DO) is responsible for the flight test and evaluation processes; 711th Human Performance Wing (711 HPW) is responsible for research test activities involving humans. These offices will establish and maintain the associated volumes accompanying this instruction. Flight test programs and test activities involving humans in all AFRL TDs shall follow the processes in the respective test volumes.

1.2. Scope. This guidance applies to all AFRL test activities, including experiments and demonstrations that involve AFRL assets (full or part ownership) or AFRL personnel (government civilian, military, and government support contractors), or where AFRL either holds Mishap Investigation Responsibility, or some level of liability. Efforts executed under an approved AFRL safety permit should adhere to AFI 91-202 AFRL Sup 1 (see paragraph 3.1). This guidance also applies to all tests executed by organizations under contract to AFRL where AFRL holds either mishap investigative responsibility or some level of liability. NOTE: Mishap Investigation Responsibility has replaced the previous term, mishap accountability. This policy does not apply to activities wholly contained within contractor facilities that do not directly involve AFRL personnel during the course of research, manufacturing or fabrication prior to delivery to the government or to activities such as modeling and simulation (M&S), calibration, maintenance, simple component verification, component machining, machine shop operations, and well-established measurement procedures. To eliminate duplication of effort, technical and safety reviews conducted by other organizations partnered with AFRL, possessing mature, well defined, and documented review processes may be considered and accepted at the discretion of the AFRL Test Approval Authority (TAA) (see paragraph 2.8.2) with Center Test Authority concurrence. Once the safety review process has determined the risk level, the actual TAA can be identified.

1.3. Waivers.

1.3.1. Unless otherwise directed in this AFI, waiver authority for the contents of this document is HQ AFRL/CC.

1.3.2. Coordinate waiver requests with local TD test leads for coordination/staffing to AFRL Operations (AFRL/DO) and AFRL Safety (AFRL/SE).

1.3.3. For waiver requests to higher level instructions (AFMC, HAF, SAF, DoD, etc.), coordinate with local TD test leads for staffing through AFRL/DO and AFRL/SE to the appropriate OPR, as necessary.

2. Roles and Responsibilities.

2.1. AFRL Commander (AFRL/CC) will:

2.1.1. Appoint in writing a center test authority (CTA), normally a member of AFRL/DO.

2.1.2. Serve as the AFRL TAA for high risk tests.

2.1.3. Serve as the approval authority for execution of high risk test cards if applicable.

2.2. AFRL Center Test Authority (CTA) will:

2.2.1. Establish procedures for implementing AFRL's Research Test Management process consistent with the DoD 5000-series regulations, AFI 99-103, AFMCI 99-103, and this instruction. The goal of the CTA is to provide a single face to the Directorate Test Lead for test program assistance and to AFRL leadership for issues concerning research test policy and procedures.

2.2.2. Advocate for AFRL research test training and human resource development.

2.2.3. Represent AFRL on test issues to HQ AFMC and other centers, USAF Test and Evaluation (USAF/TE), Major Commands (MAJCOMs), and other external agencies.

2.2.4. Assist/advise program managers (PMs), scientists, and engineers in the development and review of test and related program documentation to include test strategies, concepts, plans, reports, and execution.

2.2.5. Participate in technical review boards (TRBs), safety review boards (SRBs), and test readiness reviews (TRRs) as required. Ensure independent technical and safety risk assessments. Ensure appropriate participation and level of coordination/approval for all AFRL led test activities.

2.2.6. Oversee the Lead Developmental Test Organization (LDTO) designation process for AFMC-approved LDTOs, IAW HQ AFMC/A3 guidance. When LDTOs or other U.S. government test organizations conduct equivalent reviews (i.e. technical, safety, engineering/airworthiness, and TRRs, etc), the results of these reviews may be approved substitutes for AFRL boards. A memorandum of understanding (MOU) or a memorandum of agreement (MOA) should be used in advance to document the LDTO (or other similar responsible test organization) and the Participating Test Organization(s) (PTO(s)), and their specific roles and responsibilities.

2.2.7. Support PMs, scientists, and engineers in the development of test teams and Integrated Test Teams (ITTs) as required.

2.2.8. Maintain insight into all test programs being conducted at, by, or for AFRL to include test planning documentation, resources, execution, and lessons learned.

2.2.9. Assist AFRL/EN and the AFRL Delegated Technical Authority (DTA) on the integration of an independent airworthiness assessment policy into the flight test and evaluation process.

2.2.10. As required, provide AFRL HQ-level oversight of test resource management procedures (use, re-use, and disposal), test capability development activities, and test support agreement establishment.

2.2.11. Provide oversight of AFRL compliance with test policies and procedures.

2.2.12. Coordinate with other AFRL functionals for specific test guidance developed by the TDs. Coordinate and review associated volumes to this instruction containing specific test policies, processes, and procedures developed by the TDs.

2.2.13. Inform HQ AFMC/A3 and HQ AFMC/SE of high-risk test events prior to execution.

2.2.14. Conduct inspections of AFRL test policy/processes IAW AFRL Commander's Inspection Program (CCIP) and AFRL Inspector General guidance.

2.3. AFRL Delegated Technical Authority (DTA) will, for tests involving flight:

2.3.1. Collaborate with AFRL/DO and AFRL/SE to convene and conduct a program planning meeting with the PM to determine the course of action needed to complete comprehensive test planning, an independent airworthiness assessment, and issue an MFR/Civil Letter.

2.3.2. Conduct an independent airworthiness assessment of the program airworthiness determination through a review of supporting data and/or documentation.

2.3.3. Ensure an airworthiness approval such as a Military Flight Release (MFR), Civil Air Operation (CAO) Letter, Interim Flight Release (IFC), or other government agency equivalent flight release document, as appropriate, is issued on all aircraft entering into an AFRL flight test program. The airworthiness approval should follow Test Approval Authority (TAA) approval of the test plan and acceptance of residual risks assigned.

2.3.4. Develop and publish guidance that will assist PMs and engineers through the flight release process.

2.4. AFRL Chief of Safety (AFRL/SE) will:

2.4.1. Identify and approve SRB chair candidates who are not members of an AFRL detachment safety office staff.

2.4.2. Develop, publish, and manage the high-risk safety approval process.

2.4.3. Coordinate on high risk safety review packages prior to presentation to AFRL/CC.

2.4.4. Develop and maintain the AFRL safety review policy contained in this instruction.

2.4.5. Review and approve safety policy and procedures developed by AFRL detachment safety offices.

2.4.6. Coordinate review of AFRL safety policy with HQ AFMC/SE.

2.4.7. Review and approve training materials developed by AFRL detachment safety offices for personnel involved with the test safety review process.

2.4.8. In addition to standard mishap reporting procedures, AFRL/SE will notify the Air Force Test Center Chief of Safety (AFTC/SE) of any mishap involving manned flight activity. AFRL/SE will also notify DTA or AF Technical Airworthiness Authority for affected aircraft where an MFR was issued.

2.4.9. Accept partnered organizations' TRB and SRB equivalent reviews in concert with AFRL Det/Site SE and the CTA to eliminate duplication of effort.

2.5. AFRL Detachment Chiefs of Safety will:

2.5.1. In cooperation with TD test leads, develop specific test safety review and approval processes and procedures tailored to their unique test activities and operating environments. The detachment commander, TD director, AFRL CTA, and AFRL/SE will approve these local processes and procedures.

2.5.2. Inform and coordinate with AFRL/SE on approval of high risk test packages for AFRL/CC approval prior to execution.

2.5.3. Assist the TD test lead, PMs, scientists, and engineers with safety portion of test plan development.

2.5.4. Act as or designate in writing the SRB chairperson and in consultation with the SRB chairperson determine the Test participation/members of the SRB. AFRL/SE approval is required if the designated SRB chairperson is not a member of the AFRL detachment safety office staff.

2.5.5. Develop training materials and train personnel involved with the test safety review process.

2.5.6. Where applicable, coordinate with other host base or range safety offices to ensure awareness of AFRL test activities. AFRL/DO can assist as required.

2.5.7. Inform AFRL/SE of all test mishaps as defined in paragraph 3.6.3.2.

2.5.8. Execute a test safety lessons learned process by documenting results and submitting to AFRL/SE.

2.5.9. Accept partnered organizations' TRB and SRB equivalent reviews in concert with AFRL/SE and the CTA to eliminate duplication of effort.

2.6. AFRL TD Directors and the 711 HPW/CC will:

2.6.1. Ensure compliance with the research test processes as defined in this instruction and associated volumes and AFI 91-202, *The US Air Force Mishap Prevention Program* and associated AFMC and AFRL Supplements.

2.6.2. Appoint, in writing, a TD test lead, within their organization to coordinate with the CTA and other test leads, oversee TD research test policy, and assist TD research test activities as necessary.

2.6.3. In conjunction with the AFRL CTA, ensure local processes and procedures are established and coordinated with Detachment Chiefs of Safety, Chief Engineer, Chief Scientist to include: the need for formal TRBs and SRBs, the participation on these boards (to include the chairperson), the streamlined review process when formal boards are determined not necessary, and the local test approval process.

2.6.4. Ensure all PMs conducting test activities follow the procedures published in the appropriate test volume of this instruction.

2.6.4.1. PMs planning to conduct flight tests must contact the TD Chief Engineer as early as practical to ensure airworthiness requirements are incorporated into the impending contract language, appropriate processes are defined, documentation identified and procedures followed to accomplish the program airworthiness determination and obtain a MFR/Civil Letter as required before flight test begins.

2.6.5. Act as or designate in writing IAW AFI 91-202, AFRL Sup 1 the AFRL TAA for medium and low risk test cards/events as applicable. See "*Flight Test and Evaluation*" volume for specific levels of TAA approval for flight tests.

2.6.6. Act as the AFRL approval authority for Lead Test Organization (LTO), Lead Developmental Test Organization (LDTO) or Participating Test Organization (PTO) designation IAW AFI 99-103 and associated guidance.

2.6.7. Provide adequate resources to support the technical review, safety review, and airworthiness determination (as applicable) processes.

2.7. TD/Wing Chief Engineer (CE) will in accordance with AFRLI 61-104, S&E Systems Engineering and Technical Management:

2.7.1. Ensure the PM and supporting scientists and engineers (S&Es) apply systems engineering and program management fundamentals to test planning and execution. This includes, but is not limited to, ensuring requirements are validated and verified, test plans are developed, technical and operational risks are identified and mitigated and residual risks are accepted by the AFRL TAA at the appropriate level.

2.7.2. Ensure through TD policy that all aircraft and/or air systems programs requiring flight test have completed an airworthiness determination.

2.7.2.1. Ensure programs employ the correct disciplines and resources necessary for programs to achieve their technical objectives safely and in accordance with this instruction.

2.7.3. For programs conducting flight research, ensure the test plan describes the system and subsystem requirements and methods of compliance to validate and verify the aircraft is safe-to-fly and is airworthy.

2.7.4. Ensure the test plan defines methods to develop and control the configuration of the test article.

2.7.5. Chair the TRB. Coordinate TRB chair assignments with Chief Scientist. The TD Chief Engineer can also delegate TRB chairmanship to an individual that is independent from the program but also possess technical expertise to review the program.

2.7.6. Serve as an advisor to the test and safety process.

2.7.7. Participate in safety review boards when requested by the SRB chair for TD activities projected to be potential medium risk or higher.

2.7.8. Chair formal Test Readiness Reviews for all unique system/prototype developments that pursue transition or demonstration: extended user evaluations; operational assessments; Joint Concept Technology Demonstrations (JCTD); or Advanced Technology Demonstrations (ATD).

2.7.9. Provide subject matter expertise, guidance, and assistance to all AFRL personnel engaged in test activities associated with a TD's research specialty.

2.7.10. Develop technical review processes with the test lead to ensure that each TD's test activity has a test plan reviewed for technical adequacy and assigned a technical risk level.

2.8. Test Approval Authority (TAA) will:

2.8.1. Review and approve the proposed test plan, review the risks and mitigating efforts identified during the Safety Review Board (SRB), and accept the residual risk associated with the SRB-recommended test execution risk level. The TAA risk acceptance official is a senior AFRL manager and its position is dependent on the recommended test execution risk level as defined in AFI 91-202 AFRL Supplement:

2.8.1.1. High risk: AFRL Commander.

2.8.1.2. Medium risk: TD Director/711 HPW Commander (or Deputy/Associate). For non-flight activity, may be delegated to the Division Chief (minimum O-6 or civilian equivalent).

2.8.1.3. Low risk: TD Director/711 HPW Commander (or Deputy/Associate). For flight activity, may be delegated to the Division Chief (minimum O-6 or civilian equivalent); for non-flight activity, may be delegated to the Branch Chief.

2.8.2. Approve partnered organizations' TRB and SRB equivalent reviews as accepted by AFRL Det/Site SE, AFRL/SE, and the CTA.

2.8.3. For flight tests, accept contractor Small Unmanned Aircraft Systems (SUAS) operator qualification, experience, and currency through test plan approval. AFRL/DO will assist with appropriate input.

2.8.4. Approve test cards for flight and flight-associated ground test events (where aircraft moves under its own power, such as taxi).

2.8.5. Participate on decisions to suspend ground or flight tests due to safety and/or mishap concerns. Participate on decisions to return to ground or flight testing.

2.9. TD Test Lead will:

- 2.9.1. Manage TD's independent technical review process. Perform independent technical review of TD test plans and nominate test activities needing formal TRB review.
- 2.9.2. Act as the TD director's focal point for all test processes and procedures.
- 2.9.3. In conjunction with the detachment safety office, develop, publish, and keep current policy, process, and procedures tailored to their unique test activities and operating environment.
- 2.9.4. Assist PMs, scientists, and engineers with test plan development, including test safety planning.
- 2.9.5. Assist TD Chief Engineers, PMs, scientists, and engineers with coordination and execution of test plan technical, safety, and readiness reviews as required.
- 2.9.6. Assist PMs, scientists, and engineers with the identification and scheduling of test ranges and resources.
- 2.9.7. Assist AFRL ITT or PM in selecting and obtaining assignment of LDTO, LTO, or PTO when required.
- 2.9.8. Maintain a database of TD test activity and lessons learned as determined by the TD, conduct an annual survey to identify new and continuing test programs, and report this to the AFRL CTA. AFRL flight tests will be reported to AFRL/DO.
- 2.9.9. Collaborate with TD Chief Engineer to develop directorate specific test planning process policy if necessary.

2.10. Program Managers, Scientists, and Engineers will:

- 2.10.1. Ensure systems engineering fundamentals (reference AFRLI 61-104) are applied to requirement validation and verification involving development of a formal test plan. The test plan shall include, but not be limited to, performance requirements and methods of compliance (i.e., inspection, analysis, demonstration or test) for the article to be tested. Ensure traceability between requirement and test methodology.
- 2.10.2. Ensure, as appropriate, airworthiness requirements are incorporated into impending contract language, appropriate processes are defined, documentation identified, and procedures followed to accomplish the program airworthiness determination necessary to obtain a MFR/Civil Letter as required before flight test begins. An MFR/Civil Letter issued by the AFRL DTA, AF TAA, another Armed Service Department (reference DODD 5030.61) or NASA is required before test execution approval is granted by the Flight Operations Authority (FOA) of a flight test.
- 2.10.3. Ensure test activity is conducted in accordance with documented procedures in a test plan that has been through a technical review, engineering (or airworthiness) assessment, and safety review, then approved by the appropriate AFRL TAA.
- 2.10.4. Conduct test readiness review as needed IAW local TD guidance.
- 2.10.5. Consult with their TD test lead and refer to the applicable volumes for specific test guidance/processes.

2.10.6. Plan, conduct, manage, and document assigned test programs IAW this instruction and the appropriate accompanying volumes. Contact the appropriate TD test lead and safety organization early in the planning process to ensure all test process requirements are addressed.

2.10.7. Ensure mishap investigative responsibilities and mishap response procedures are established and documented in the test plan. Report all mishaps to the appropriate AFRL detachment safety office IAW locally developed procedures.

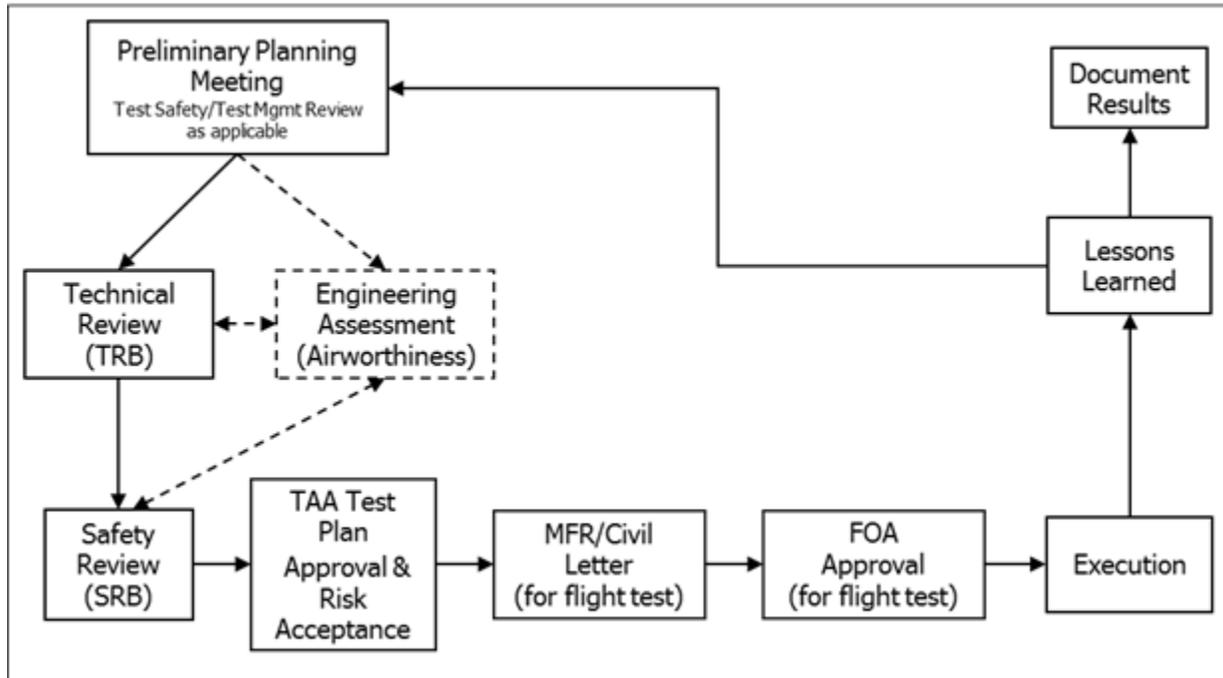
2.10.8. Ensure, as appropriate, contracts include requirements for the contractor to: provide an acceptable test plan that will be reviewed and approved through the AFRL test safety review process; support the government TRB, airworthiness assessment, and SRB process; support any mishap investigations.

2.10.9. Ensure all team members conducting test activities follow the procedures published in the appropriate test volume of this instruction. For flight tests, follow the procedures in the *“Flight Test and Evaluation”* volume. If there is any doubt regarding whether a program or test is flight related, contact AFRL/DO for clarification. PMs assigned programs conducting test activities involving humans must contact the research test office in AFRL Human Effectiveness Plans Branch (711 HPW/XPT) and follow the procedures published in the *“Test Activities Involving Humans”* volume 2 of this instruction.

3. Test Process.

3.1. Overall Test Process. As indicated in Figure 3.1., all AFRL research test activities will follow the top-level process of: planning, technical review, safety review, test approval, execution, lessons learned, and documentation.

3.1.1. Certain test activities may require an engineering assessment before the Safety Review Board (SRB). For flight activities, an independent airworthiness assessment is completed by AFRL/EN and must be reviewed as part of the SRB. For specifics on flight test or human testing, see the appropriate sub-volumes to this instruction.

Figure 3.1. Research Test Management Process

3.1.2. Each of these steps as described below can be tailored by the TD to the level appropriate for the activity, e.g., for all efforts executed under an approved AFRL safety permit IAW AFI 91-202 AFRL Sup 1, approval and review processes can be delegated to the Branch level, whereas a flight test may require a full TRB/SRB and test documentation. Research test management begins with proper test planning that ensures adequate rigor has been applied prior to approval to conduct a test. The test plan describes the concept behind the test; investigational issues and objectives; and how objectives will be analyzed and measured to arrive at a conclusion. Test planning and successful execution provides decision makers the ability to qualitatively and quantitatively determine if technologies have valid capabilities that merit continued design, development, or transition to operations.

3.1.3. AFRL/CC will be the AFRL TAA for any activity with a high residual safety risk. Each TD director will determine how to delegate TAA responsibilities within the TD for low and medium risk activities IAW AFI 91-202 AFRL Sup. Use the risk assessment matrix identified in AFI 91-202 AFRL Sup to determine residual risk levels.

3.1.4. Risk Level. To help manage a test and its risk, the safety review establishes a risk level for each individual hazard as well as the test as a whole based on severity vs. probability. The risk management process and severity vs. probability definitions are more thoroughly covered in MIL-STD-882, Standard Practice for System Safety. However, the MIL-STD-882 risk acceptance model and approval levels are aimed at fleet-wide, acquisition lifecycle risks, not single test events as experienced in the lab. For test events, AFRL recognizes three risk and approval levels low, medium, and high.

3.1.5. To eliminate duplication of effort, TRB and SRB reviews conducted by other organizations partnered with AFRL, possessing mature, well-defined, and documented

review procedures may be reciprocal and accepted at the discretion of the appropriate AFRL TAA, AFRL Det/Site SE, AFRL/SE, and the CTA.

3.1.6. For flight test, an MFR/Civil Letter, IFC, or other equivalent flight release document will be issued for all aircraft.

3.2. Test Documentation. Test documentation should be developed to adequately cover both technical and safety reviews, as well as all planning described below. The PM is responsible for documenting lessons learned and reporting these to the appropriate TRB chairman, SRB chairman, AFRL TAA, and CTA as required. The PM is responsible for documenting test results and for accomplishing any unique documentation required by associated volumes.

3.3. Test Planning. Determine the necessary resources, support requirements, and supporting test organizations. For specific processes and procedures of unique test activities such as flight test, human use, etc., refer to the associated volumes.

3.3.1. Test Plan. This document details the entire test and how it will be accomplished. Typically, the plan includes test objectives, test parameters, success criteria, test procedures, data collection process, and build-up conditions and description and results of any ground tests accomplished incrementally before test begins. All AFRL test plans will contain sufficient detail and documentation to allow TRB and SRB reviews to evaluate technical effectiveness, quantify residual risk, and enable the AFRL TAA to approve the test plan and accept residual risk. For programs with flight test activities, the test plan may be the primary source of data and documentation to accomplish the independent airworthiness assessment needed for an MFR/Civil Letter. Tests will be conducted according to the approved test plan. Changes/revisions to the test plan will require additional reviews as determined by the TRB or SRB chairman and may require a new MFR/Civil Letter as determined by the AFRL DTA. Previous results and changes will be documented via the test plan amendment process as described in paragraph 3.6.2.

3.3.2. System Safety Program. AFI 91-202 and AFMC and AFRL Supplements establish policy and procedures for managing a system safety review process. The safety review must be documented IAW AFI 91-202 AFRL Sup. Refer to AFI 91-202 AFRL Sup for Safety Review and Permission process.

3.3.3. Test Plan Approval Process. Once the test plan is written, the approval process consists of three basic steps. All steps must be accomplished for a test plan to be approved. These steps are:

3.3.3.1. Execution of a TRB review.

3.3.3.2. Execution of an SRB review.

3.3.3.3. Coordination and signature by the AFRL TAA.

3.3.3.4. Additional coordination and approvals are required for flight or human tests. See the *“Flight Test and Evaluation”* volume or *“AFRL Test Activity Involving Human Participants”* volume 2 for additional guidance.

3.3.4. Test Plan Reviews. All test plans require a TRB and SRB review. The organization responsible for the reviews differs with different scenarios that are explained below. If unsure which scenario applies to your program, contact your TD test lead for assistance.

- 3.3.4.1. If your test activity either involves AFRL assets/personnel or involves assets/personnel for which AFRL holds either Mishap Investigation Responsibility or liability then AFRL TRB review, SRB review, and test plan approval will be conducted per this instruction and its associated volumes.
- 3.3.4.2. If the test involves activities with a mix of AFRL assets/personnel and other federal government agency assets/personnel, then the AFRL TAA, AFRL/SE, and the detachment chief of safety have the discretion to accept the results of a safety review conducted by another government agency. Note: The AFRL TAA would normally be identified after the SRB recommends the risk level. Therefore, in cases such as this, the anticipated AFRL TAA should be consulted for the decision to accept the alternate safety review. If the other government agency does not conduct a safety review, or in the opinion of the PM, TD chief engineer, TD detachment chief of safety, or AFRL TAA, the review was not acceptable, then AFRL will conduct the safety review as required. The AFRL PM will clearly establish in writing who has mishap investigative responsibility (memorandum of agreement [MOA] or contract) and who will conduct these reviews.
- 3.3.4.3. If the test activity is either wholly or partly executed under an AFRL contract, then AFRL TRB and SRB reviews will be conducted prior to official government approval of the AFRL or contractor-developed test plan. AFRL retains mishap investigative responsibility throughout the contract vehicle. The PM is responsible to ensure that the requirements for the contractor to provide an acceptable test plan and to support the government SRB and TRB are included in the contract.
- 3.4. TRB Review Process. The TRB review process is a thorough assessment of the test plan for technical soundness and adequacy. It will verify if the overall method of test is adequate to evaluate the test objectives and verify that the objectives can be met with acceptable technical risk. The TRB review will normally take place before the SRB review. The AFRL PM, scientist, or engineer is responsible for ensuring a TRB is conducted for their test plan, if test meets the requirement for a TRB.

3.4.1. As a minimum, TRB reviews will assess test objectives, measures of performance, test equipment requirements, instrumentation system and techniques, adequacy of the test effort, schedules, and resources. The TRB will also ensure that environmental assessments have been completed and referenced in the test plan. For test activities involving flight test, the TRB will: assess whether the test aircraft, along with any required modifications, is airworthy and safe-to-fly and provide recommendations to the AFRL DTA for airworthiness verification; review, at a minimum, applicable sections of the Flight Test Volume of this instruction; assign action items to the PM for any areas that warrant further attention prior to the SRB.

3.5. SRB Process. The test safety review process prescribed in AFI 91-202, AFMC and AFRL Supplements, will be used for all tests associated with research and technology development/demonstration activities. The purpose of the test safety review process is to minimize risks to an acceptable level, identify residual mishap risk as well as preventing injury to personnel and damage to property.

3.5.1. The process includes two parts, the SRB review conducted by the safety review board and the test approval. The review process will identify hazards and associated

risks and provide a means to determine the residual risk after the proper selection of control measures. Through the safety review process, the risk will be accepted at the appropriate level and mishap reporting and investigation responsibilities will be defined. The safety review must be documented IAW AFI 91-202, AFRL Sup.

3.5.2. The SRB is an independent group of knowledgeable individuals convened to review the test plan, ensure test hazards are identified, eliminated, or minimized, and recommend the overall risk level to the TAA.

3.5.3. Risk Assessment Matrix. The associated hazard probabilities and hazard severity categories as depicted in Attachment 7 of AFI 91-202 AFRL Sup will be used by the SRB chairman to assign one of three risk levels.

3.5.3.1. Hazard Probability. The SRB members subjectively assess the hazard probability. Minimizing procedures are taken into consideration during the assessment.

3.5.3.2. Hazard Severity Category. This is a qualitative measure of the hazard's effect. Severity is assessed with all minimizing procedures and corrective actions in place.

3.5.3.3. Low risk. Tests or activities which present no greater risk than normal operations after appropriate controls have been applied.

3.5.3.4. Medium risk. Tests or activities which present a greater risk to personnel, equipment, or property than normal operations even after the appropriate controls have been applied.

3.5.3.5. High risk. Tests or activities which present a significant risk to personnel, equipment, or property even after all precautionary measures have been taken.

3.5.3.6. During the SRB, board members will use these guidelines, expert opinions, engineering analysis, and common sense to assign risk levels to each identified hazard, and individual test events.

3.6. Test Execution.

3.6.1. The PM is responsible for developing the test plan and ensuring the following:

3.6.1.1. All action items identified during the TRB and SRB review are incorporated into the final version of the test plan.

3.6.1.2. Test Readiness Review (TRR). A TRR shall confirm that test procedures comply with test plans and descriptions, demonstrate adequacy to accomplish test requirements, and have a high probability to achieve requirement verification. The TRR will be held, and is normally conducted by the PM before the commencement of testing for new-starts and system upgrades, test milestones (e.g. first flights), or after an extended break in test activity. The TRR should be appropriately tailored for the test activity and will ensure all preparations for initiating a test have been completed and known anomalies have not compromised the execution of the test. All reasonable efforts to minimize risk must be made and verified to the TAA. The TRR will ensure all key participants are familiar with the hazards, associated risks, minimizing

procedures or controls, emergency or corrective actions procedures, and go/no-go criteria before executing any test event.

3.6.1.3. Flight Operations Authority (FOA) Approval. AFRL activity designated as flight tests require FOA approval prior to test execution. This phase of approval ensures the tests are conducted in accordance with Federal Aviation Regulations and/or applicable Air Force Instructions 10- or 11- series instructions and MAJCOM supplements. Refer to AFRL Flight Test and Evaluation volume or contact AFRL/DO for further guidance.

3.6.1.4. In the event of a mishap, testing will be suspended and mishap procedures will be initiated. Once suspended for a safety mishap, only the SRB chairman or TAA (or higher) can authorize resumption of test activities. The TAA will determine if a supplemental SRB is required to resolve the unsafe condition.

3.6.1.4.1. If a mishap occurs that changes the scope of the test or the design of the system under test that was previously evaluated by the TRB, then the PM must engage in a new review with the TRB chairman to ensure technical risks are adequately addressed. The PM must document corrective actions and mitigating measures if required by the TAA or SRB chairman. For flight test activities, contact AFRL/EN for determination if a new MFR/Civil Letter is necessary.

3.6.2. Test Plan Changes/Revisions. The PM will ensure that all testing is conducted according to the approved test plan. Test plan changes/revisions may be required due to unexpected test results, overly restrictive controls, test program initiated changes, or hazards not previously identified or adequately controlled and will require additional reviews. Minor changes may use applicable AFRL Forms to amend a test plan at the discretion of the TRB and SRB chairmen.

3.6.2.1. PMs will contact the appropriate AFRL detachment safety office or SRB chairman, the appropriate AFRL TAA, and TD test lead if changes to the test plans are required after approval has been granted. The AFRL SRB chairperson or detachment chief of safety will evaluate the safety impacts of the proposed change and determine required action. Actions may vary from no action, to test and safety plan amendments, to re-accomplishing the safety review. TD Directors will ensure their directorate establishes internal amendment procedures to accommodate test plan changes IAW AFRL/DO policies. For flight test activities, a change to the test plan may necessitate a new MFR/Civil Letter. The AFRL Delegated Technical Authority (DTA) will determine if a new MFR/Civil Letter is needed.

3.6.3. Mishap Reporting. The detachment chief of safety or SRB chairperson will ensure that the PM is aware and the test plan contains mishap reporting procedures and applicable timelines IAW AFI 91-204 AFMC Sup, *Safety Investigations and Reports*. The PM will ensure that all test personnel clearly understand their mishap-response roles and responsibilities prior to the start of test.

3.6.3.1. In the event of a mishap, members of the test team will initiate mishap response procedures as defined in the test plan. After the initial response is complete and the situation has stabilized, test team members will initiate mishap-notification

procedures according to the test plan and complete an AFRL Test Safety Mishap Worksheet. AFRL/SE must be notified within 8 hours of a mishap.

3.6.3.2. The definition of a mishap is, “unplanned events or range operations resulting in loss/damage to DoD or private property, injury, departure from range boundaries, or public endangerment.” Mishaps will be reported per AFI 91-204 AFMC Sup.

3.6.3.3. Exceptions to mishap reporting apply only if destruction/damage to a test asset was documented in the test plan as an expected and documented outcome of the test, it occurred within the planned timeframe and for anticipated reasons, and test objectives were met. See AFI 91-204 AFMC Sup.

3.6.4. Project Completion or Termination.

3.6.4.1. The PM will notify the appropriate AFRL Detachment Safety Office, SRB Chairman, TRB Chairman, and Directorate Test Lead when the test is complete or test activity has been terminated or completed. Upon project completion, the PM shall ensure the test is properly documented IAW the Test Plan. This includes whatever report format is necessary, archival or distribution of raw and/or processed data, test lessons learned, and post event briefings. As required, PMs will provide the AFRL detachment safety office with 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.

3.6.4.2. AFRL detachment safety offices will review and recertify the safety portions of active test plans at least once a year.

THOMAS J. MASIELLO, Major General, USAF
Commander

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

AFI 91-202 *The US Air Force Mishap Prevention Program*, 5 August 2011
AFI 91-202 AFMC Sup1, *The US Air Force Mishap Prevention Program*, 11 November 2005
AFI 91-202 AFRL Sup 1, *The US Air Force Mishap Prevention Program*, 11 December 2011
AFI 91-204 AFMC Sup 1, *Safety Investigations and Reports*, 18 August 2011
AFI 99-103, *Capabilities Based Test and Evaluation*, 26 February 2008
AFMCI 99-103, *Test Management*, 22 November 2004
AFPD 61-1, *Management of Science and Technology*, 18 August 2011
AFRLI 61-104, *S&E Systems Engineering and Technical Management*, 16 October 2013
AFRLI 61-108, *Science and Technology Program Management*, 19 November 2013
AFRLMAN 99-103, *AFRL Test and Evaluation*, 21 May 2007

Prescribed Forms

None

Abbreviations and Acronyms

CE —Chief Engineer
CTA —Center Test Authority
DTA —Delegated Technical Authority
IAW —In Accordance With
ITT —Integrated Test Team
LDTO —Lead Developmental Test Organization
LTO —Lead Test Organization
M&S —Modeling and Simulation
MAJCOM —Major Commands
MFR —Military Flight Release
MOA —Memorandum of Agreement
MOU —Memorandum of Understanding
PM —Program Manager
PR —Purchase Request
PTO — Participating Test Organizations
SRB — Safety Review Board

S&Es – Scientists and Engineers—TAA – Test Approval Authority

TD —Technology Directorate

T&E —Test and Evaluation

TRB —Technical Review Board

TRR —Test Readiness Review