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

RESEARCH TEST REVIEW, APPROVAL, AND OVERSIGHT

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This instruction and its sub-volumes implement Air Force Policy Directive (AFPD) 61-1, *Management of Science and Technology*, DoDI 5000.89_DAFI 99-103, Air Force Materiel Command (AFMC) Supplement, *Capability-Based Test and Evaluation,* and DAFI 91-202, *The US Air Force Mishap Prevention Program*, and its supplements. It establishes policy for how AFRL reviews, approves, and oversees research test activities. It describes how AFRL uses accepted scientific practices to plan, conduct, and report research test activities, including contracted efforts that involve AFRL equities. This instruction applies to all AFRL personnel involved with the planning, management, or execution of research test activities unless specifically exempted or excepted. Ensure 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 Information Management System (AFRIMS) Records Disposition Schedule (RDS). Refer recommended changes and questions about this publication to the office of primary responsibility (OPR) using the DAF Form 847, *Recommendation for Change of Publication*; route DAF Forms 847 from the field through the appropriate functional chain of command. This publication may be supplemented at any level, but all direct supplements must be routed to the Office of Primary Responsibility (OPR) of this publication for coordination prior to certification and approval. Request for waivers must be processed through command channels to the publication OPR for consideration, usually through the Technology Directorate (TD) Test Lead.

SUMMARY OF CHANGES

This publication has been thoroughly revised and should be reviewed in its entirety.

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. The intent of this instruction is to ensure AFRL effectively manages technical, safety, and other risks during the conduct of test activities. This instruction refines requirements found in many separate Department of Defense (DoD), Air Force, and AFMC governing directives. While this instruction defines basic policy, processes, and procedures common to all AFRL research test activities, each TD or Wing must develop internal means to manage each type of test activity (flight, munitions, directed energy, space, human performance, propulsion, sensors, materials, cyber, etc.). Note: The AFRL Operations Directorate (AFRL/DO) is responsible for process, policy and oversight of flight test and space test, while the 711th Human Performance Wing (711 HPW) is responsible for ensuring compliance with human subject research protections. These offices will establish and maintain the associated volumes accompanying this instruction. Flight test programs (Volume 1), test activities involving human subjects (Volume 2), and space test programs (Volume 3) in all AFRL TDs shall follow the processes described in the respective test volumes.

1.2. Scope. In this instruction, the term "test" shall include laboratory and field tests, experiments, and demonstrations. This guidance applies to all AFRL test activities that involve AFRL equities, including but not limited to: AFRL assets (full or partial ownership), AFRL personnel (government civilian, military, and support contractors), technical accountability, tests executed by organizations under contract to AFRL where AFRL holds mishap investigative responsibility, or has more than a minimal risk of liability.

1.2.1. Laboratory testing is testing which occurs indoors within a laboratory in a controlled setting. This includes (but is not limited to) chemistry laboratories, laser tests, and clean rooms.

1.2.1.1. Efforts executed in AFRL facilities under an approved safety permit (AFRL Form 5, *Laboratory Safety Permit Form*, or suitable equivalent) are prime candidates for tailoring of this instruction's tenets as discussed in **Paragraph 3.1**. A technical review shall be conducted when an AFRL Form 5 is originally sought and thereafter revalidated when the form is renewed to ensure the facility will operate as intended to meet the technical objectives of activities conducted within it as discussed in **Paragraph 2.6.2.1**. The AFRL Form 5 process is described in DAFI 91-202 AFRL Supplement.

1.2.1.2. Laboratory activities that consist only of modeling and simulation (M&S), calibration, maintenance, component-level verification, component machining, machine shop operations, or well-established instrument/equipment measurement procedures are not considered testing and do not require any additional AFRLI 61-103 considerations.

1.2.2. Field testing is any testing that occurs outdoors or does not fall into the laboratory test category. This includes (but is not limited to) any research that involves flying in the National Airspace (NAS), explosives testing, rocket engines, performing research on ranges, etc. Field research is further categorized into one of three categories: ground test, flight test, or space test.

1.2.2.1. For the purposes of this instruction, "ground test" refers to any field test that is non-flight and non-space testing.

1.2.2.2. For the purposes of this instruction, "flight test" refers to any field test activity involving a vehicle that moves through the air making use of the physics of controlled or maneuvering aerial transport, including ground activities with an intent for flight. It includes balloon flights but does not include activities where the flight path is solely ballistic in nature. Flight tests include circumstances where research accomplished is being conducted in conjunction with flight but does not materially affect the actual mechanics of flight (e.g., the system under test [SUT] is a payload). Flight tests also include circumstances where a ground-based SUT requires utilization of airborne assets to accomplish the test.

1.2.2.2.1. Some flight activities are designed to be conducted in enclosures, as tethered operations, or in other environments where the extent of flight is constrained in some physical manner. Such designs can raise the question whether the envisioned activity should be governed under flight, ground, or laboratory review and approval processes. In cases where the Mission Organization believes ground or laboratory activity approval processes are most appropriate, they should propose their rationale to AFRL/DO for an authoritative determination.

1.2.2.3. For the purposes of this instruction, "space test" refers to any field test activity that takes place in space, characterized as orbital and lunar trajectory space flights, including beyond geosynchronous orbit (objects departing the influence of Earth’s gravity).

1.2.3. To eliminate duplication of effort, the technical, safety, and other required reviews/supporting artifacts conducted by other organizations partnered with AFRL who possess mature, well-defined, and documented review processes (e.g., approved AFMC Lead Developmental Test Organizations [LDTO] or other Major Command [MAJCOM] Operational Test Organizations, NASA, other Non-USAF DoD Test Organizations, etc.) may be considered and accepted at the discretion of the AFRL process owner's review lead (e.g. Safety, Technical, Airworthiness), Test Execution Authority (TEA), and Center Senior Functional for Test & Evaluation (T&E CSF).

1.2.4. Safety and airworthiness risk level assessment and terminology is IAW DAFI 91-202 as supplemented and DAFI 62-601, USAF Airworthiness, respectively.

1.3. Out of Scope. This instruction does not apply to activities that meet one of the following circumstances. Test teams should nominate activities they believe fall under the circumstances described in this paragraph to AFRL/DO for a scope determination:

1.3.1. Those that are wholly contained within contractor facilities or at locations they are fully responsible for; are conducted according to standard industry practices that are regulated and produce products or services that are interchangeable with other goods or services of the same type; and that do not directly involve AFRL personnel during the performance of the contracted work prior to delivery to the government of the product (e.g., a test fixture or data package).

1.3.2. Those performed under a grant or similar cooperative agreement.

1.3.3. Those that consist of supporting another government organization's operations where there is no direct AFRL interest in the activity, technical objectives/requirements, or risk to AFRL equities. Examples of tests that may fall under this determination include (non-exhaustive):

1.3.3.1. Loaning of AFRL equipment, where full loss of the equipment is an acceptable outcome.

1.3.3.2. Providing informal subject matter expertise.

1.3.3.3. Assisting with administrative processes that do not invoke AFRL authorities (e.g. coordinating range scheduling).

1.3.4. Participating in another organization's operations via duly authorized aircrew attachment, organizational agreement, or inter-fly agreement.

1.4. Waivers.

1.4.1. Unless otherwise directed in this AFRLI or its sub-volumes, waiver authority for the contents of these documents is the AFRL Deputy Commander (AFRL/CD).

1.4.2. Coordinate waiver requests with TD Test Leads for coordination/staffing through AFRL/DO and other agencies when appropriate (e.g. AFRL/SE, AFRL/EN, etc.).

1.4.3. For waiver requests to higher level instructions and supplements (AFMC Instruction [AFMCI], DAFI, DoD Instruction [DoDI], etc.), coordinate with TD Test Leads for staffing through AFRL/DO and other agencies when appropriate (e.g. AFRL/SE, AFRL/EN, etc.) to the appropriate OPR, as necessary.

2. Roles and Responsibilities.

2.1. AFRL/CC will:

2.1.1. In accordance with paragraph 2.23.a of AFMC Supplement to DODI5000.89 DAFI 99-103, *Capabilities Based Test and Evaluation*, and paragraph 5.1 of AFMCI 36-2645, *Senior Functional Roles and Responsibilities*, appoint a Center Senior Functional (CSF) for T&E (a.k.a., T&E CSF). Unless specifically designated in writing to another individual, the AFRL T&E CSF is the Director of Operations with the Deputy Director of Operations serving as the T&E CSF alternate. The AFRL T&E CSF also serves as head of the AFRL Center Test Authority (CTA) Office.

2.1.2. Serve as the TEA for HIGH residual safety risk tests. For HIGH residual safety risk ground tests, TEA approval signifies both residual safety risk acceptance and approval to proceed into test execution. For flight and space tests, additional approvals are required as discussed in AFRLI 61-103 Vols 1 and 3.

2.1.3. IAW Program Executive Officer responsibilities as exercised through the role of Technology Executive Officer (TEO), designate LDTOs or delegate designation authority to the TD Directors for their test programs. Within AFRL, delegation of LDTO designation authority is the default condition unless rescinded by the TEO.

2.2. AFRL CTA Office (DO) will:

2.2.1. Serve as owner for the AFRL Research Test Review and Approval process to include policies which define it and actions necessary to ensure compliance with it through all phases of a test from planning through execution. Establish procedures for implementing AFRL's Research Test Review, Approval, and Oversight process consistent with the DoD 5000-series regulations, DAFI 99-103 AFMC Supplement, and this instruction.

2.2.2. Maintain test rigor across the AFRL T&E test portfolio via policy and oversight.

2.2.3. Assist AFRL leadership in developing and implementing guidance and processes for sufficient and independent technical and safety reviews.

2.2.4. Provide a single face to the TD Test Lead for test program assistance and to AFRL leadership for issues concerning research test policy and procedures.

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

2.2.6. Represent AFRL on test issues to HQ AFMC and other centers, Headquarters Air Force Test and Evaluation (HAF/TE), MAJCOMs, and other external agencies.

2.2.7. Oversee the LDTO designation process IAW HQ AFMC/A3/6 guidance.

2.2.7.1. CTA office (DO) will track Participating Test Organization(s) (PTO) and their specific roles and responsibilities in an AFRL test.

2.2.8. At the request of the AFRL/CC, assess any test program being conducted at, by, or for AFRL to include test planning, resources, execution, and lessons learned.

2.2.9. Coordinate with AFRL Engineering and Technical Management Directorate (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. Coordinate with AFRL Cybersecurity Management (AFRL/IZC) and the AFRL Authorizing Official (AO) on the integration of AFRL CyberSecurity Program management policy and the AFRL cyber–Risk Management Framework (RMF) into the test and evaluation process.

2.2.11. Coordinate with AFRL Safety (AFRL/SE) on the integration of independent safety reviews into the test and evaluation process.

2.2.12. Coordinate with AFRL Strategic Partnering (AFRL/SP) on the integration of the AFRLI 16-110, *AFRL International Program* and AFRLI 25-201, *AFRL Formulation and Oversight of Domestic Alliances* into AFRL test and evaluation process.

2.2.13. As required, provide AFRL HQ-level oversight of test resource management activities, test capability development activities, and test support agreement establishment.

2.2.14. Oversee AFRL compliance with test policies and procedures. Support conduct of inspections of AFRL test policy/process compliance IAW the AFRL Commander's Inspection Program (CCIP) and AFRL Inspector General (AFRL/IG) guidance.

2.2.15. Coordinate with AFRL functional directorates for specific test guidance as it affects or impinges upon their scope of responsibilities. Review and coordinate on supplements to this instruction containing locally applicable test policies, processes, and procedures developed by the TDs.

2.2.16. Inform HQ AFMC/A3/6 of HIGH residual safety risk test events prior to execution.

2.3. AFRL Chief of Safety (COS) (AFRL/SE) will, consistent with the guidance contained in DAFI 91-202 AFMC and AFRL Supplements:

2.3.1. Ensure consistency of safety policy contained in this instruction with other safety-related AFRLIs, AFRL supplements, and higher headquarters instructions/directives.

2.3.2. Identify and approve safety review chair candidates who are not members of an AFRL site/detachment safety office staff.

2.3.3. Coordinate on HIGH residual safety risk test review packages prior to presentation to AFRL/CC for TEA approval.

2.3.4. Review and approve or ensure approval by Center Test Safety Manager of all training materials developed by AFRL site/detachment safety offices for personnel involved with test safety review processes.

2.3.5. Ensure, through SRB Chairs, Notification to the DTA or AF Technical Airworthiness Authority of any significant information developed through safety processes affecting an aerospace vehicle flight release issued to support an AFRL flight activity.

2.3.6. Assist, when requested by CTA or as required and appropriate, to accept partnered organizations' equivalent safety reviews in concert with AFRL site/detachment/HQ COSs and CTA office (DO) to avoid duplication of effort.

2.4. AFRL Site/Detachment COSs will:

2.4.1. In cooperation with TD Test Leads, develop specific safety review and approval processes as required that are tailored to their unique test activities and operating environments. The TD commanders/directors and AFRL CTA office (DO) will coordinate on, while AFRL/SE will approve, these local processes.

2.4.2. Inform and coordinate with AFRL/SE on preparation of HIGH residual safety risk test packages as applicable for AFRL/CC approval prior to execution.

2.4.3. Develop training materials and train personnel involved with the test safety review process on its relation to and integration with other non-safety processes.

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

2.4.5. In coordination with the CTA, determine the acceptability of safety review processes of other government organizations and, through safety review leads, accept partnered organizations' equivalent safety reviews in concert with the TEA and CTA office (DO) to avoid duplication of effort.

2.5. AFRL TD Commanders/Directors will:

2.5.1. Ensure compliance with the research test processes as defined in this instruction and relevant volumes.

2.5.2. Appoint, in writing, a TD Test Lead, within their organization to coordinate with the CTA office (DO) and other test leads, oversee TD research test policy/procedures, and assist TD research test teams as necessary.

2.5.2.1. When TDs have significant test missions at multiple, geographically separated sites, TD commander/director may appoint co-leads responsible for individual sites.

2.5.3. In conjunction with the AFRL CTA office (DO), ensure local processes are established and coordinated with TD Chief Engineers and Site/Detachment COSs to provide for: formal technical and safety review forums, participation in these forums, streamlined reviews when formal boards are determined not necessary, and test approval coordination.

2.5.4. Ensure all PMs and Scientists & Engineers (S&Es) conducting test activities follow the procedures published in this instruction and its relevant volumes.

2.5.5. As delegated by AFRL/CC, approve nominated programs within their TDs for LDTO designation IAW HQ AFMC/A3/6 guidance. Approve domestic alliances with other organizations IAW with AFRLI 25-201, *Formulation and Oversight of Domestic Alliances*.

2.5.5.1. Authority to approve domestic alliances with other organizations or LDTO designations may be further delegated in writing.

2.5.6. Provide adequate resources to support the following processes: technical review, safety review, cyber RMF, and airworthiness determination (as applicable).

2.6. TD Chief Engineers will, consistent with the guidance contained in AFRLI 61-108, *Management and Control of Technology Development for AFRL*:

2.6.1. Ensure PMs and supporting S&Es apply systems engineering and program management fundamentals to test planning and execution. This includes, but is not limited to, ensuring requirements are properly resourced, conceptualized, sound test plans are developed, technical risks are identified and mitigated, residual risks are accepted at the appropriate level, and tests commence only with TEA approval (and Flight Approval Authority [FOA] or Satellite Control Authority [SCA] approval as well in the case of flight or space tests).

2.6.2. Chair Technical Reviews Boards (TRB), as defined in the DoDI5000.89_DAFI 99-103AFMCSUP, or delegate such duties as necessary to individuals that are programmatically independent yet possess the relevant technical expertise to review assigned programs.

2.6.2.1. For Laboratory tests when a TRB is not required, conduct a non-board technical review or appoint individuals that are programmatically independent yet possess the relevant technical expertise to review assigned programs as the technical review lead.

2.6.3. Develop technical review processes with the TD Test Lead(s) to ensure that each test activity and/or laboratory has a test plan reviewed for technical soundness, sufficiency of resources, and assessment of the technical risk level.

2.6.3.1. Efforts executed in AFRL facilities under an approved safety permit (AFRL Form 5, *Laboratory Safety Permit Form*, or suitable equivalent) require a technical review. However, a Technical Review Board is not necessarily required.

2.6.3.1.1. TD Chief Engineers should scope local laboratory Technical Review Policies, as appropriate. At the minimum laboratory technical review processes should be conducted when an AFRL Form 5 is originally sought and thereafter revalidated when the form is renewed to ensure the facility will operate as intended to meet the technical objectives of activities conducted within it.

2.6.3.1.2. Field Activities require a Technical Review Board that will, at a minimum, meet the over-arching policies found in Section 3 of this volume.

2.6.4. Ensure programs employ the correct disciplines and resources necessary for them to achieve their technical objectives safely and IAW this instruction. Ensure through TD policy and processes that all aircraft and/or air system programs requiring flight test have completed required compliance items such as airworthiness, cyber RMF methodology, environmental assessments and Proper Use Memorandums.

2.6.5. Chair formal test readiness reviews for all R&D 1 programs (ref. AFRLI 61-108). The TD Chief Engineer may elect to delegate the position of chair.

2.7. TEA will, as a senior AFRL manager in the program chain of command determined as a function of the residual safety risk level, as defined in this instruction and as assessed during the safety review process found in the DAFI 91-202 and Supplements:

2.7.1. Review test plans and safety packages as revised and finalized following technical and safety reviews and mandate changes, they deem necessary to the test plan or risk levels recommended by the TRB and SRB.

2.7.2. Accept residual safety and technical risks as appropriate.

2.7.3. Provide input to decisions to suspend ground or flight tests due to technical or safety concerns. Support process to recommence ground or flight testing following a suspension IAW **para 3.6.3**.

2.8. TD Test Leads will:

2.8.1. Act as the TD commander/director's focal point for all test policies and processes.

2.8.2. Develop, publish, and keep policies current and processes tailored to the TD's unique test activities and operating environment in conjunction with the local AFRL site/detachment safety office and TD Chief Engineer.

2.8.3. Assist PMs and S&Es with test plan development, including test safety planning.

2.8.4. Assist TD Chief Engineers, PMs, and S&Es with coordination and execution of test plan technical, safety, and readiness reviews as required.

2.8.5. Assist PMs and S&Es with the identification and scheduling of test ranges and resources.

2.8.6. Assist PMs and test teams with selecting and obtaining assignments of Lead Test Organization (LTO), LDTO, and/or PTO when required.

2.8.7. Ensure that ground and space test activities are tracked with unique identifiers.

2.8.8. Assist PMs and S&Es with the proper storage and retention of test documentation created as a result of this publication, IAW AFI 33-322, *Records Management and Information Governance Program* and AFRLI 61-201, *AFRL Research and Development (R&D) Work Unit Records and Scientific and Technical (S&T) Reporting* requirements.

2.9. PMs and S&Es will:

2.9.1. Ensure systems engineering fundamentals (reference AFRLI 61-108) are applied to the development of test plans IAW AFRLI 61-108 and TD supplements as applicable. Test plans will ensure traceability between program requirement(s)/ objective(s) and detailed test methodology.

2.9.2. Ensure, as appropriate, that support to AFRL processes for test planning and execution, airworthiness determination, cyber RMF methodology, and safety review is incorporated into acquisition or assistance actions (e.g., contract language).

2.9.3. Ensure all action items identified during the technical and safety reviews are addressed in the final version of the test plan and associated test package documentation.

2.9.4. Ensure test activities are conducted IAW documented procedures in test plans that have been through technical reviews, airworthiness assessments (if applicable), cyber RMF methodology, safety reviews, environmental assessments and approved by the appropriate AFRL TEA and, for flight or space tests, approved by FOA or SCA, respectively.

2.9.5. Conduct test readiness reviews as chair as applicable and necessary except as noted in **Paragraph 2.6.5**.

2.9.6. Ensure all team members conducting test activities follow the procedures published in the appropriate test volumes of this instruction. For flight activities, follow the procedures in AFRLI 61-103, Volume 1, *AFRL Flight Test and Evaluation*. If there is any doubt regarding whether a program or test is flight-related, consult with the TD Test Lead and/or AFRL/DO. AFRL/DO retains final authority to determine whether a test constitutes a flight activity for purposes of applying Volume 1. PMs assigned to programs conducting test activities involving human participants or subjects, as defined in the AFRLI 61-103, Volume 2, *AFRL Test Activity Involving Human Participants*, must follow the procedures published therein. For space activities, follow the procedures in AFRLI 61-103, Volume 3, *AFRL Space Test and Operations*.

2.9.7. Ensure program decisions regarding disposition of test resources obtained through or used on contracts are communicated to the Contracting Officer.

2.9.8. For testing involving international partners, ensure that necessary Project Agreements/Project Arrangements have been approved IAW AFRLI 16-110, *AFRL International Program* requirements.

2.9.9. Ensure adequate documentation is developed to support all required reviews, determinations, and assessments. Lessons learned are documented and reported to the appropriate technical review lead, safety review lead, AFRL TEA, and CTA office (DO) as appropriate.

2.9.10. Ensure proper storage and retention of test documentation, to include test results and reports, created as a result of this publication, IAW AFMAN 33-363, *Management of Records* and AFRLI 61-201, *AFRL Research and Development (R&D) Work Unit Records and Scientific and Technical (S&T) Reporting* requirements

2.10. AFRL FOA will:

2.10.1. Ensure AFRL test management processes are complete for flight test activities.

2.10.2. In addition to that of TEA/RAA, provide final approval for flight test activities see AFRLI 61-103 Volume 1, to proceed into execution.

2.11. AFRL Satellite Control Authority will:

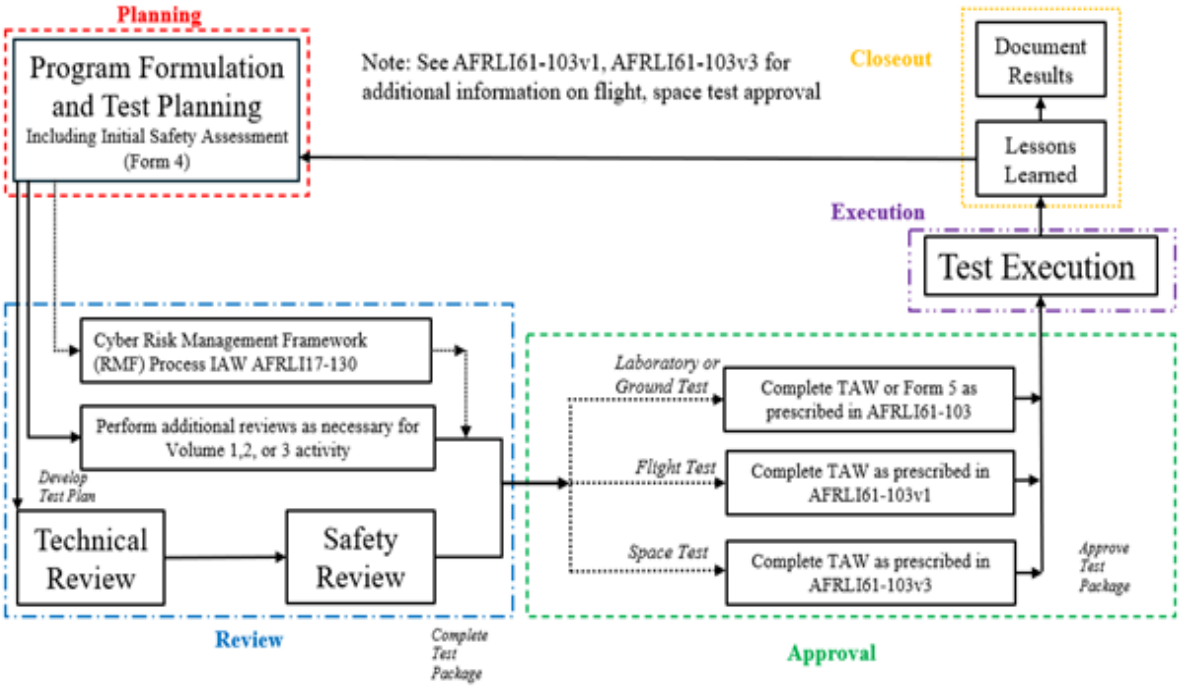
2.11.1. As delegated by AFRL/CC, ensure AFRL test management processes are complete for Space Test and Operations.

2.11.2. As delegated by AFRL/CC, provide final approval (in addition to that of the TEA) for Space Test and Operations, see AFRLI 61-103 Volume 3, to proceed into execution.

3. Test Process.

3.1. Overall Test Process. All AFRL research test activities will follow the top-level process of planning, review, approval, execution, and closeout (see **Figure 1**.). The test team can tailor each of the steps as described below to the level appropriate for the activity. Research test management begins with proper test planning that ensures sufficient 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 measured and analyzed 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. Test activities whose objectives and procedures do not change with time (i.e., there are no amendments to the test package), do not require periodic repetition of the review and approval steps of the process unless directed by the TEA or FOA. However, if long down times and/or high test team member turnover are experienced between test events, consideration should be given to composition of a new test package which is taken through the test planning, review, and approval steps of the process.

Figure 1. AFRL Test Process.



3.2. Test Documentation. The PM is responsible for developing documentation to adequately support all required reviews, determinations, and assessments. The PM documents lessons learned and reports these to the appropriate technical review lead, safety review lead, AFRL TEA, and CTA office (DO) as appropriate. The PM shall ensure test results are recorded and documentation completed as required by Research and Development (R&D) case file guidance found in AFRLI 61-201, *AFRL Research and Development (R&D) Work Unit Records and Scientific and Technical (S&T) Reporting*. For templates and example versions of required documentation contact AFRL/DO for link to current version of the AFRL Flight Activity Process Guide.

3.2.1. For testing involving international partners, documentation requirements also include all necessary Project Agreements/Project Arrangements IAW AFRLI 16-110, *AFRL International Program*.

3.3. Test Planning. Test teams must identify and arrange the necessary resources, support processes, and partner organizations to successfully achieve research test objectives. For information on flight test planning considerations and process details beyond that presented in this instruction, see AFRLI 61-103 Volume 1 or contact AFRL/DO for link to current version of the AFRL Flight Activity Process Guide.

3.3.1. Test Planning Meeting (TPM). For field testing, a TPM held as early as possible during the Initial Program Formulation Phase is a best practice. This meeting is organized and chaired by the PM, allowing the PM and test team to introduce the activity to the AFRL organizations and personnel involved in the test review and approval processes (to include ISSMs, SE, the CE [or delegate, such Branch/Division Technical Advisor] and the AFRL TD Test Lead). At the TPM, Functional and process representatives, the PM, and test team

work together to identify and tailor AFRL review and approval process requirements and milestones that will apply to the program. Occasionally, as programs plan for and proceed with their field tests, significant changes in scope (objectives, procedures, participants, venues, etc.) may prompt a follow-on TPM to be convened to address these changes as appropriate. Scheduling a TPM as early as practical allows the PM to leverage AFRL subject matter expertise to properly manage the various risks encountered in field test activities and to balance them with the programmatic risks the PM and the program chain must manage.

3.3.1.1. For flight or space tests, see AFRLI 61-103 Volume 1 or Volume 3, respectively, for specifics on Test Planning Meeting Requirements.

3.3.2. Test Plan. The test plan details the entire test and how it will be accomplished. Test plans should include sufficient detail for reviewers, approvers and the test execution team to thoroughly understand the test's objectives, methodologies and associated risks. Unless it is warranted to mitigate a specific risk, test plans should avoid inhibiting flexibility in execution by including unnecessarily prescriptive language. All AFRL test plans will contain sufficient detail and documentation to allow technical and safety reviewers to evaluate sufficient technical rigor, assess residual risks, and enable the AFRL TEA to accept residual safety risk and (along with FOA as applicable) approve test execution. Tests will be conducted according to the approved test plan. Changes/revisions to the test plan may require additional reviews as determined by the technical and safety review leads and may require a new MFR/Civil Aircraft Operation (CAO) letter as determined by the AFRL DTA. See **paragraph 3.6.2** below for additional details on the test plan amendment process. Typically, the plan includes:

3.3.2.1. Test Item Description

3.3.2.2. Test objectives

3.3.2.3. Test parameters

3.3.2.4. Test procedures

3.3.2.5. Measures of Performance/evaluation criteria

3.3.2.6. Completion criteria

3.3.2.7. Success criteria

3.3.2.8. Data plan

3.3.2.9. Data collection means

3.3.2.10. Build-up conditions

3.3.2.11. Expected results based on analysis, M&S, and/or results of any related tests

3.3.2.12. Test safety limits

3.3.2.13. Identification of test unique hazards and mitigations

3.3.2.14. Unexpected Event reporting procedures

3.3.2.15. Test-specific emergency procedures

3.3.2.16. Configuration management plan

3.3.3. For Laboratory testing, local supplements to this policy may specify alternatives to test plans that allow for Form 5 safety processes and technical review and approvals.

3.4. Safety Package. DAFI 91-202 with AFMC and AFRL Supplements, provides guidance for conducting safety analyses to identify hazards and develop mitigation strategies/procedures. Test planning efforts will ensure adequate consideration of safety issues and record such consideration within test plans or in accompanying safety documents so reviewers can properly assess program safety risks.

3.5. Test Reviews. All test plans require technical and safety reviews before approval to execute can be granted. Other reviews may be required as well depending on the nature of the test activity.

3.5.1. The organization responsible for reviews differs with various scenarios that are explained below. If unsure which scenario applies to a given program, contact the applicable TD Test Lead or AFRL/DO for assistance.

3.5.1.1. AFRL as LTO. When the AFRL program/test team leads a test effort as LTO, AFRL retains TEA – whether the activity is conducted organically, as a contracted effort, or through another organizational agreement. Given the variety of test team arrangements possible with AFRL as LTO (in-house, contracted, heavy reliance on PTO, etc.), refer to DAFI 91-204 and consult with the local site/detachment safety office or AFRL/SE to determine convening authority and mishap investigation responsibilities. As LTO, AFRL generally conducts TRB, SRB, and other required reviews in-house.

3.5.1.1.1. Technical, safety and other AFRL-required reviews conducted by other government organizations partnered with AFRL possessing mature, well-defined, and documented review procedures may be accepted in lieu of AFRL in-house reviews. The decision to utilize a partner organization’s review process instead of AFRL's involves three parts: determination of acceptability, delegation of the review, and the shadow process. The determination that a partner organization’s review processes are well defined and meet AFRL review requirements will be made in advance by cognizant AFRL authorities, as described below. Once the determination has been made that a partner organization’s review processes are acceptable, the Mission Organization will delegate the review to the partner organization. The shadowing of the review processes by AFRL personnel and utilizing the resultant products of the review to gain AFRL test approval is also described below.

3.5.1.1.2. The determination that technical review processes conducted by other government organizations are acceptable is at the discretion of the TD Chief Engineer. For purposes of shadowing, a duly appointed AFRL TRB Chair and the AFRL PM will shadow the technical review to ensure that AFRL requirements are met and utilize its resultant documentation to gain AFRL test approval. At a minimum, minutes documenting the organization’s review will be collected for inclusion in the AFRL Test Package. If no minutes are composed by the other government organization, then the AFRL TRB Chair must document the technical review themselves. The AFRL TRB Chair will sign the AFRL Test Approval Worksheet (TAW).

3.5.1.1.3. The determination that Safety review processes conducted by other government organizations are acceptable is at the discretion of the Site/Detachment COS. The duly appointed AFRL SRB Chair and the AFRL PM will shadow the safety review to ensure that AFRL requirements are met. In addition to shadow requirements found in DAFI 91-202 AFRL Supplement, the AFRL PM or AFRL SRB Chair will:

3.5.1.1.3.1. Collect SRB minutes documenting the organization's review for inclusion in the AFRL Test Package.

3.5.1.1.3.2. Collect THAs (or their equivalent) for inclusion in the AFRL Test Package.

3.5.1.1.4. The determination that other AFRL-required review processes (e.g. airworthiness, cyber) are acceptable will be at the discretion of the AFRL Authority responsible for the review. For purposes of shadowing, the AFRL Authority responsible for the outcome of AFRL's process will appoint an AFRL representative to participate or review the resultant documentation to ensure that AFRL requirements are met and utilize its resultant documentation to gain AFRL approval.

3.5.1.2. Non-AFRL Agency as Test Lead or LDTO. When the AFRL program/test team delegates another government agency to lead a test effort which AFRL is funding or otherwise sponsoring, the test activity may be reviewed and approved through the partner agency's review forums and authorities. In these cases, AFRL does not retain TEA.

3.5.1.2.1. Delegation of Test Lead or LDTO requires AFRL/CTA approval. AFMC retains approval authority for programs anticipated to become Acquisitions Category (ACAT) I, feed technology directly into ACAT I programs, or seek to designate Air Force Test Center (AFTC) as the LDTO. In those cases, staff the request through AFRL/DO to AFMC/A3F approval. In all cases, LDTO designations should be documented on an AFMC LDTO Worksheet.

3.5.1.2.2. When utilizing the non-AFRL Agency as Test Lead or LDTO, the Test Lead/LDTO is generally responsible for all reviews and approvals. Any AFRL involvement or utilization of AFRL reviews will be agreed upon and specified by both parties, in writing, prior to the commencement of the review processes. In all cases when designating a Test Lead or LDTO there will be a clear written understanding of which organization is responsible for each aspect of the test management process.

3.5.1.2.2.1. All agreements will include the requirement for AFRL to receive a copy of the Non-AFRL Agency's approved test package and final test reports. Copies of those packages and reports will be provided to the AFRL CTA by the AFRL PM.

3.5.1.2.3. If the other government agency does not conduct a technical, safety, or any other AFRL-required reviews then AFRL will conduct them. If any review (as applicable to their purview) is not acceptable to the TD Chief Engineer, site/detachment/HQ COS, other AFRL-required authorities, or CTA, then AFRL will conduct that review as required.

3.5.1.2.4. Regardless of the appointment of a non-AFRL Agency as Test Lead or LDTO, AFRL is responsible for the programs it sponsors. The Technical Approval Authority responsible for the sponsored program will ensure, through the AFRL PM, the test is conducted in a manner that meets AFRL oversight requirements found in AFRLI 61-108.

3.5.1.2.4.1. When using another agency as Test Lead or LDTO, AFRL Mission Organization may also elect to observe the partner agency's reviews. Collected test packages may facilitate the AFRL Mission Organization making informed decisions in consideration of AFRL equities prior to the conduct of test activities.

3.5.1.3. In those cases where AFRL program participation in a test activity is only in a supporting role where AFRL has no research objectives, liability exposure is very limited to non-existent, and a non-AFRL organization is serving as test lead (e.g., AFRL loan of equipment for use in an operational exercise), a letter signed by the AFRL program's Division Chief accepting any residual risks can be processed for CTA office (DO) concurrence in lieu of the test review and approval process directed herein.

3.5.2. Technical Review Process. The technical review process is a thorough assessment of the test plan for technical soundness and sufficiency. It will verify that the overall method of test is adequate to evaluate the test objectives and verify the objectives can be met with acceptable technical risk. At a minimum, technical reviews will assess test objectives, measures of performance or evaluation criteria, exit criteria, success criteria, test equipment/instrumentation system requirements, test techniques, adequacy of the test schedule and resources, and disposition of data to ensure ease of transition and/or follow-on programs. Technical reviews will ensure that environmental requirements from the National Environmental Policy Act (NEPA) have been appropriately completed and documented. The TRB will assign a Technical Risk level of LOW, MEDIUM, or HIGH to the test plan upon completion of the TRB process. The technical review will normally take place before or can be combined with the safety review. For recommended criteria to use in Technical Risk Assessments for both flight and ground test, please contact AFRL/DO for link to the AFRL Flight Activity Process Guide on Sharepoint or review attachment A2.1 of this publication.

3.5.3. Safety Review Process. The test safety review process described in DAFI 91-202 AFMC and AFRL Supplements will be used for all test activities. The purpose of the test safety review process is to avoid injury to personnel and unintended damage to property by mitigating safety risks to the appropriate level and to identify the residual safety risks and, as a consequence of the residual safety risk level, be accepted by the appropriate TEA. Safety review members will use the guidelines found in DAFI 91-202 and related guidance, expert opinions, engineering analyses, and common sense to assign and document a residual safety risk level for each test activity.

3.5.3.1. The site/detachment COS or safety review lead will ensure the PM is aware of and the test plan contains unexpected event reporting procedures and applicable timelines. The PM will in turn ensure all test personnel clearly understand their unexpected event and mishap-response roles and responsibilities prior to the start of test.

3.6. Test Approval. For both Laboratory and Field testing, the transition from planning and review into the execution phase of a test activity will not occur until the test package is finalized and the TEA formally accepts the residual safety risk and grants approval. For flight activities, airworthiness assessment and FOA approval are also required. For space test activities, SCA approval is also required.

3.6.1. All Field tests will use the TAW to document test approval. Laboratory test approvals can be documented on the AFRL Form 5 or TAW, IAW DAFI 91-202 AFRL Supplement requirements.

3.6.2. A final test package consists of all necessary documentation (such as test plan, safety information if separate from the test plan, technical review documentation, airworthiness flight release, cyber approval, spectrum release, Proper Use Memorandum, Institutional Review Board [IRB] sanction, etc.) necessary for the TEA (and FOA/SCA as applicable) to have full knowledge of what is being approved for execution. A final test package provides assurance that all relevant risks (technical, safety, airworthiness, cyber, privacy) have been properly vetted and accepted by the cognizant authorities.

3.6.3. Under circumstances where another government organization is responsible for the conduct of the test, the TEA will reside within the responsible organization and will utilize local forms and processes to document TEA approval. However, AFRL Mission Organization oversight is still required.

3.7. Test Execution.

3.7.1. Test Readiness Reviews. A review of readiness to proceed before testing commences is required for R&D 1 programs and are chaired by the TD Chief Engineer or delegate per section 2.6.5. Additionally, TRRs can be used as a best practice employed when circumstances warrant, such as for major program new-starts and system upgrades, significant test milestones (e.g., first flights), tests of elevated complexity, or after an extended break in test activity. Non-required TRRs are normally arranged and chaired by the PM.

3.7.1.1. TRRs confirm that test procedures comply with test plans and descriptions, personnel are prepared to perform them as required, and the resources are or will be in place for their successful execution. Test readiness reviews 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. Test readiness reviews will ensure all key participants, to include the test crews, are familiar with the hazards, associated risks, minimizing procedures or controls, emergency or corrective actions, and go/no-go criteria before executing any test event.

3.7.2. Test Plan Changes/Revisions/Amendments. The lead for test conduct supported by the PM will ensure all testing is conducted IAW the approved test plan. Test plan changes/revisions may be needed due to unanticipated circumstances (such as unexpected test results, overly restrictive controls, test program-initiated changes, configuration changes, or hazards not previously identified or adequately controlled, etc.) which in turn typically require additional reviews and approvals. Test program leads and/or PMs will contact the AFRL technical review lead, site/detachment safety office or safety review lead, and TD test lead as appropriate if changes to test plans are required after approval has been granted. Technical and/or safety review leads or site/detachment COSs will evaluate the technical and safety impacts respectively of proposed changes and determine required action(s) in response. Actions may vary from no action, to test or safety plan amendments, to re-accomplishing reviews as necessary. For flight test activities, a change to the test plan may necessitate a new MFR/CAO Letter. Test teams making changes/revisions to test plans will process applicable AFRL documentation to record and gain approval for amendments at the discretion of the technical and/or safety review leads. If in doubt whether a proposed change requires review and approval, contact AFRL/DO for a determination.

3.7.2.1. Administrative Changes. Clarity/grammar corrections, etc. Changes are made directly to the test package and do not require additional approval unless they are substantive in nature. Test card changes that continue to adhere to the approved test plan do not require the test plan to be amended.

3.7.2.2. In-Scope Amendments. An in-scope amendment is a minor test plan change that modifies test procedures but does not affect technical or safety risks. Technical and/or safety review leads will document their concurrence that technical and safety risks have not changed (this can be as simple as a PDF'ed email). In-Scope amendments may be documented in a memorandum, which takes the place of the TAW. The technical and/or safety review leads, may determine in-scope amendments require additional approvals. All additional approvals will be specified in the memo. The PM will provide the final memo and any associated documentation (e.g. edited test plan) as the amendment test package to approval authorities as an info copy.

3.7.2.3. Out-of-Scope Amendments. An out-of-scope amendment is any test plan change that affects technical or safety risks. New Technical/Safety reviews must occur and may be accomplished outside of reconvening a formal board. Out-of-Scope amendments require a new test package approval via a TAW. The approval authority for out-of-scope amendments is the same as the original test package, even in cases where the safety risk level decreases. An out-of-scope amendment requires TRB Chair, SRB Chair, TEA, DTA, and FOA/SCA signatures (as applicable) on the TAW.

3.7.3. Test Delay/Pause/Suspension. Test activities may be delayed, paused, or suspended and eventually resumed depending on the circumstances involved.

3.7.3.1. Delays. Causes for delay include equipment issues, deteriorating weather conditions, personnel unavailability, and similar benign considerations. Delays are typically called by members of the test team for programmatic reasons or test/training/operations plan compliance, and it is they who make the decision to resume test activities when conditions become favorable or meet requirements.

3.7.3.2. Pauses. Pauses involve more deliberation than delays. Pauses can be called by anyone on the test team or in the programmatic (supervisory), operational, or functional management chains. Potential reasons for calling a pause include: actions not in compliance with the test/training/operations plan; significantly anomalous test results, operating in an unsafe manner, experiencing an unexpected event including those that may qualify as a mishap, etc. Once instituted, a test activity pause (that has not been elevated to a suspension due to being assessed as an unsafe event or mishap) may only be resumed with the concurrence of the TD Test Lead and in coordination with other applicable authorities.

3.7.3.2.1. For flight or space tests, see AFRLI 61-103 Volume 1 or Volume 3, respectively, for specifics on Test Pause procedures.

3.7.3.3. Suspensions. Suspensions are declared by the TEA or TD Test Lead typically after notification of a test pause that is then determined to merit elevation to a suspension; however, a test pause need not be declared prior to putting a suspension into effect. Testing will be suspended in the event of a mishap declared as such by AFRL/SE or the site/detachment safety offices or if the test team encounters a significant hazard or experiences an unsafe event. The TD Test Lead will advise the cognizant safety office(s) to determine if a supplemental safety review is required to resolve the unsafe condition. Suspensions require a return-to-test action which must be processed for approval by TEA and other required authorities on a Form 5 or TAW dependent on type of testing and review leads' assessment. A test plan amendment may also be prescribed as part of the return-to-test process, which will document additional corrective actions and mitigating measures. A return-to-test action does not take the place of a safety mishap investigation as required by DAFI 91-204. Completion of the safety mishap investigation is not necessarily a prerequisite for the return-to-test action.

3.7.3.3.1. For flight or space tests, see AFRLI 61-103 Volume 1 or Volume 3, respectively, for specifics on Suspension procedures.

3.7.4. Unexpected Test Events and Mishaps.

3.7.4.1. An unexpected event is any unexpected occurrence, or series of occurrences, during test that results in (or has the potential to cause) injury or death, damage to systems (excluding normal wear and tear), property damage, significant departure from planned performance, departure from the airspace, or significant deviations from expected technical results/data. Unexpected events may include, but are not limited to the following:

3.7.4.1.1. Unexpected or unplanned damage to the system-under-test or support equipment.

3.7.4.1.2. Exceeding safety or test limits, airspace violations, or significant flight manual deviations.

3.7.4.1.3. Significant departure from predicted simulation/analysis.

3.7.4.1.4. Unanticipated frequency of occurrence of a hazard.

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

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

3.7.4.1.7. Exceptions to Unexpected Event reporting apply only if destruction/damage to/loss of a test asset was reviewed by an SRB and documented in the test plan as a likely or expected outcome of the test, it occurred within the planned timeframe and for anticipated reasons, and test objectives were met.

3.7.4.2. In accordance with DoDI 6055.07, the definition of a mishap is, "an unplanned occurrence, or series of occurrences, that results in damage to Department of Defense (DoD) property; occupational illness to DoD personnel; injury to on- or off-duty DoD military personnel; injury to on-duty DoD civilian personnel; or damage to public or private property, or injury or illness to non-DoD personnel, caused by DoD activities. Mishaps are classified by total direct mishap cost and the severity of injury/occupational illness." Mishaps will be reported IAW DoDI 6055.07 and DAFI 91-204, AFMC Supplement, *Safety Investigations and Reporting*.

3.7.4.2.1. For space test activities, see AFRLI 61-103 Volume 3 for specifics of mishap reporting procedures.

3.7.4.2.2. For flight activities, report mandatory investigation events or hazards that do not meet other mishap criteria IAW DAFMAN 91-223, *Aviation Safety Investigations and Reports*, Chapter 3

3.7.4.3. For Field tests, if an Unexpected Event occurs or is suspected to have occurred, test teams will discontinue the test activity, initiate any necessary safety procedures (e.g. provide medical attention, call local emergency contact numbers), and once the situation has stabilized, the Test Director or other cognizant authority within the test team will notify the AFRL PM and TD Test Lead. For Unexpected Events that are safety related or have safety implications, the notification is made to the PM, applicable AFRL Detachment Safety Office, and the TD Test lead.

3.7.4.3.1. For laboratory testing, if an Unexpected Event occurs or is suspected to have occurred, test teams will discontinue the test activity, initiate any necessary safety procedures (e.g. provide medical attention, call local emergency contact numbers), and once the situation has stabilized, the Test Director or other cognizant authority within the test team will notify the AFRL PM or Activity POC (as listed on the Form 5). For Unexpected Events that are safety related or have safety implications, the notification is made to the PM, Activity POC, and applicable AFRL Detachment Safety Office.

3.7.4.3.2. For flight or space tests, see AFRLI 61-103 Volume 1 or Volume 3, respectively, for specifics on Unexpected Event Reporting procedures.

3.7.4.4. When an Unexpected Event is reported, applicable AFRL Detachment Safety Office will make a formal assessment of whether a Mishap occurred and coordinate with AFRL/SE and the AFRL PM to determine if further mishap response is required IAW DAFI 91-204, Safety Investigations and Reports.

3.7.4.4.1. After a mishap declaration by applicable AFRL Detachment Safety Office, the test will be suspended by the TEA or TD Test Lead. The program/test team will work with applicable AFRL Detachment Safety Office in support of mishap and/or return-to-test investigations to present findings and recommend actions to ensure future mishaps do not occur from the same or similar hazards.

3.7.4.4.1.1. After a mishap declaration, the test suspension can only be removed by a return-to-test action as described in section 3.6.3.3 of this instruction.

3.7.4.4.1.2. In the case of flights tests suspended as a result of a mishap, also refer to AFRLI 61-103 Volume 1 of this instruction.

3.7.4.4.1.3. In the case of space tests suspended as a result of a mishap, also refer to AFRLI 61-103 Volume 3 of this instruction.

3.7.4.4.1.4. In the case of ground tests suspended as a result of a mishap, refer to established safety guidance in DAFI 91-202 and its supplements and DAFI 91-204 AFMC Supplement.

3.7.4.5. For laboratory tests, if a response to an Unexpected Event does not change the test plan, the design of the system under test (SUT), or exceed any limitations set by prior technical and safety review and TEA approval; the test may resume with approval from the AFRL PM and the Activity POC.

3.7.4.6. For field tests, if a response to an Unexpected Event does not change the test plan, the design of the system under test (SUT), or exceed any limitations set by prior technical and safety review and TEA approval; the test may resume with approval from the AFRL PM and the TD Test Lead.

3.7.4.6.1. For flight or space tests, see AFRLI 61-103 Volume 1 or 3, respectively, for specifics on resumption of test activities following an Unexpected Event.

3.7.4.7. If a response to an Unexpected Test Event changes the test plan, the design of the system under test (SUT) or exceeds any limitations set by prior technical and safety review and TEA approval; then the PM must engage in a new Safety and Technical reviews. The PM must document corrective actions and mitigating measures through the test amendment process. For flight test activities, contact AFRL/EZZ for determination if a new airworthiness release is necessary.

3.8. Project Closeout. The PM will notify the AFRL site/detachment safety office or AFRL/SE as appropriate, the technical and safety review leads, and the TD Test Lead when the test is complete, or test activity has been terminated. AFRL/DO will also be notified of termination or completion of flight test activities. Upon project completion, the PM shall ensure the test is properly documented IAW the test plan and R&D case file requirements. This may include a final report in the necessary format, archival or distribution of raw and/or processed data, test lessons learned, and/or post event briefings, as required.

3.8.1. For field testing, PMs will provide AFRL/DO of copies of test reports. PMs will also provide the cognizant AFRL site/detachment safety office or AFRL/SE with safety lessons learned, effectiveness of hazard controls or minimizing procedures, unexpected hazards, as well as value added from and suggestions for improving the safety review process. To this end PMs will input lessons learned in AFRL SE's Lessons Learned reporting system regarding effectiveness of hazard controls or minimizing procedures and unexpected hazards.

JASON E. BARTOLOMEI,
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Attachment 1

GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION

References

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AFRLI 61-201, *AFRL Research and Development (R&D) Work Unit Records and Scientific and Technical (S&T) Reporting*, 09 February 2016 Certified Current, 14 November 2019

AFRLI 61-601, *AFRL Airworthiness,* 5 September 2017 Certified Current, 05 March 2025

Prescribed Forms

None

Adopted Forms

AFMC *Lead Developmental Test and Evaluation Organization (LDTO) Worksheet*

DAF Form 847, *Recommendation for Change of Publication*

Abbreviations and Acronyms

AO—Authorizing Official

ATO—Authority to Operate

AW—Airworthiness

CAO—Civil Air Operation

CCIP—Commander's Inspection Program

COS—Chief of Safety

CTA—Center Test Authority

DoD—Department of Defense

DTA—Delegated Technical Authority

FOA—Flight Operations Authority

IATT—Interim Authority to Test

IAW—In Accordance With

IRB—Institutional Review Board

LDTO—Lead Developmental Test Organization

LTO—Lead Test Organization

M&S—Modeling and Simulation

MAJCOM—Major Command

MFR—Military Flight Release

PM—Program Manager

PTO—Participating Test Organization

R&D—Research and Development

RAA—Risk Acceptance Authority

S&E—Scientist and Engineer

SRB—Safety Review Board

SUT—System Under Test

T&E CSF—Center Senior Functional for Test & Evaluation

TAW—Test Approval Worksheet

TD—Technology Directorate

TEA—Test Execution Authority

TEO—Technology Executive Officer

TPM—Test Planning Meeting

TRB—Technical Review Board

Terms

Airworthiness (AW)—The property of an air system configuration which enables it to safely attain, sustain, and complete flight in accordance with its approved usage and operating limits.

Center Test Authority (CTA)—IAW DAFI99-103, CTA is the Center-level office responsible for overseeing/managing test and Evaluation functional processes at their respective Center and maintaining test rigor across their portfolio of T&E programs. Within AFRL, CTA serves as focal point to the TEO, TD Test Lead, PM, and program test team for test program assistance and to AFRL leadership for issues concerning T&E policy and procedures as they relate to S&T decision making.

Field Test—Any test that occurs outdoors or does not fall into the laboratory test category. This includes (but is not limited to) any research that involves flying in the National Airspace (NAS), explosives testing, rocket engines, performing research on ranges, etc. Field research is further categorized into one of three categories: ground test, flight test, or space test.

Flight Operations Authority (FOA)—The group commander designated (or equivalent) who is responsible for the oversight of day-to-day flight operations and compliance with USAF and AFMC flight operations policies. FOAs also ensure ORM principles are emphasized before all flying activities. Unique to AFRL, FOA approval of test activities also serves as final certification that all applicable requirements of the AFRL Flight Activities Process have been satisfied.

Flight Tests—Any test activity involving a vehicle that moves through the air making use of the physics of controlled or maneuvering aerial transport, including ground activities with an intent for flight. It does not include activities where the flight path is solely ballistic in nature, but it does include flight constrained by captive means such as netted enclosures, walled facilities, tethers, etc.

Ground Tests—Any non-flight test and non-space activity conducted in a field environment or on aircraft without intent for flight.

Intent for Flight—Intent for flight is considered to exist when aircraft brakes are released and/or takeoff power is applied for commencing an authorized flight. Intent for flight continues until either the fixed-wing aircraft taxies clear of the runway or, for helicopters and/or vertical takeoff and landing aircraft, the aircraft has alighted and the aircraft weight is supported by the landing gear. Clear of the runway means the entire aircraft is physically off the active runway. Hover taxi is considered flight.

Laboratory Test—Is testing which occurs indoors within a laboratory in a controlled setting. This includes (but is not limited to) chemistry laboratories, laser tests, and clean rooms.

Lead Test Organization (LTO)—The designation given an AFRL program team when it decides to lead the conduct of a test and/or be responsible for overseeing other organizations supporting their flight research program. The LTO designation accrues when the AFRL program team elects not to turn over test execution leadership for their program to an LDTO.

Lead Developmental Test and Evaluation Organization (LDTO)—The lead government organization that is most qualified, resourced, and/or capable to conduct a test and/or be responsible for overseeing a confederation of T&E organizations, each with different but necessary skills, in support of a test program. LDTO designations are made by the TEO (delegated within AFRL to TD Directors/Deputies) through AFRL/DO and HQ AFMC/A3/6 (as required).

Mishap—An unplanned occurrence, or series of occurrences, that results in damage to Department of Defense (DoD) property; occupational illness to DoD personnel; injury to on- or off-duty DoD military personnel; injury to on-duty DoD civilian personnel; or damage to public or private property, or injury or illness to non-DoD personnel, caused by DoD activities. Mishaps are classified by total direct mishap cost and the severity of injury/occupational illness

Participating Test Organization (PTO)—Any test organization required to support a lead test organization by providing specific data or resources for a test program or activity.

Program Manager (PM)—As used within this instruction, the designated individual with responsibility for and authority to accomplish S&T program objectives. The PM is accountable for credible cost, schedule, and performance reporting to the TEO.

Residual Safety Risk—Safety risk which remains after recommended mitigation measures have been applied.

Safety Risk—The relative probability and consequence that an endeavor will experience damage to or destruction of resources, and/or injury or death by the personnel involved in or affected by the activity, regardless of whether the risk is test unique. A mitigated safety risk results when measures are applied to reduce the probability of occurrence or severity of consequence associated with the hazard(s).

Space Tests—Any test activity that takes place in space, characterized as orbital and lunar trajectory space flights, including beyond geosynchronous orbit (objects departing the influence of Earth's gravity).

Test—An act or observation for the purpose of discovering something unknown, to understand a principle or supposition, or for demonstrating repeatability of a postulated capability or phenomenon. Within AFRL tests include laboratory and field tests, experiments, and demonstrations and applies to all such activities that involve AFRL assets (full or part ownership) or AFRL personnel (government civilian, military, and support contractors). It also applies to activities where AFRL or its contracted agents either hold mishap investigation responsibility or have more than a minimal risk of liability.

Test Planning Meeting (TPM)—A meeting held as a part of or subsequent to the Initial Program Formulation Phase of the AFRL test Process to permit the PM and test team to introduce their test activity concept to the AFRL organizations and personnel that oversee the test review and approval processes (to include ISSMs, SE, the CE [or delegate, such Branch/Division Technical Advisor] and the AFRL Test Lead). At the TPM, Functional and process representatives, the PM, and test team work together to identify and tailor AFRL review and approval process requirements and milestones that will apply to the program. A primary goal is to identify long-lead items the program must address to ensure they are resolved in time to meet program goals. Early tester involvement is a key principle undergirding the concept of the TPM.

Unexpected Event—Any unexpected occurrence, or series of occurrences, during test that results in (or has the potential to cause) injury or death, damage to the SUT (excluding normal wear and tear), property damage, significant departure from planned performance, or departure from the airspace, or significant deviations from expected technical results/data. An unexpected event may or may not be classified as a mishap.

Attachment 2

SUGGESTED CRITERIA TO USE IN TECHNICAL RISK ASSESSMENTS

Figure A2.1. Suggested Criteria to Use in Technical Risk Assessments.

Risk Area	LOW	MEDIUM	HIGH
SUT Maturity	Mature, **FULLY** proven design (i.e., software, hardware and components) or a design with few/minor changes from a known. Analogous design peer or baseline. **SIGNICANT** previous testing in Lab, Field and/or Flight Test environments.	Less mature, **PARTIALLY** proven design (i.e., software, hardware, and components) or a design with some significant changes from known/analogous design peer or baseline. **SOME** previous testing in Lab, Field and/or Flight Test environments.	Immature or new, **UNPROVEN** design (i.e., software, hardware, and components) or "first of" with little to no known/analogous design peer or baseline. **LITTLE** previous testing in Lab, Field and/or Flight Test environments.
SUT Performance	Performance is stable, understood, and predictable with **HIGH CONFIDENCE** across all areas of planned test envelope.	Performance is somewhat stable, understood, and predictable with at least **MEDIUM CONFIDENCE** across all areas of planned test envelope.	Performance is somewhat stable, understood, and predictable with **LOW CONFIDENCE** across all areas of planned test envelope.
Test Objectives, Methodology & Data Analysis	**SIGNIFICANT** buildup approach events completed (M&S, HITL, SIL, Lab/Ground/Flight Test). **STRONG** traceability between test objectives, requirements, previous test results, and design of the test. **HIGH CONFIDENCE** in test methodology, test point selection, MOPs, evaluation criteria, data analysis and/or predicted results. Few if any test changes anticipated.	**SOME** buildup approach events completed (M&S, HITL, SIL, Lab/Ground/Flight Test). **SOME** traceability between test objectives, requirements, previous test results, and design of the test. **SOME CONFIDENCE** in test methodology, test point selection, MOPs, evaluation criteria, data analysis and/or predicted results. Few if any test changes anticipated.	**LITTLE** buildup approach events completed (M&S, HITL, SIL, Lab/Ground/Flight Test). **WEAK** traceability between test objectives, requirements, previous test results, and design of the test. **LOW CONFIDENCE** in test methodology, test point selection, MOPs, evaluation criteria, data analysis and/or predicted results. Few if any test changes anticipated.
Instrumentation	Mature, proven data parameters, sample rates, resolution, truth sources/sensors, data acquisition system(s), etc. All available and known **HIGH CONFIDENCE**	Less mature or partially proven data parameters, sample rates, resolution, truth sources/sensors, data acquisition system(s), etc. Some available or known **MEDIUM CONFIDENCE**	Immature or unproven data parameters, sample rates, resolution, truth sources/sensors, data acquisition system(s), etc. Few available or known **LOW CONFIDENCE**
Risk Area	LOW	MEDIUM	HIGH
SUT Operations, Maintenance & Sustainment	Operation, maintenance, and troubleshooting procedures documented and completed with **MINOR** omissions in key SUT operational areas.	Operation, maintenance, and troubleshooting procedures documented and completed with **SIGNIFICANT**	Operation, maintenance, and troubleshooting procedures documented and complete with **CRITICAL** omissions

	Operators and maintainers have significant, recent experience and have **HIGH CONFIDENCE** in ability to operate, maintain, and sustain SUT as required for test.	omissions in key SUT operational areas. Operators and maintainers have significant, recent experience and have **MEDIUM CONFIDENCE** in ability to operate, maintain, and sustain SUT as required for test.	in key SUT operational areas. Operators and maintainers have little/no, recent experience and have **LOW CONFIDENC**E in ability to operate, maintain, and sustain SUT as required for test.
Test Vehicle Modification & Integration	Modification and integration procedures are **FULLY** defined. Test vehicle has been previously modified in **HIGHLY** similar fashion with analogous SUT integrated successfully. Modification and integration team are **HIGHLY** experienced with vehicle/SUT and have **HIGH CONFIDENCE** in their ability to modify test vehicle and integrate while maintaining cost and schedule.	Modification and integration procedures are **SIGNIFICANT** defined. Test vehicle has been previously modified in **SOMEWHAT** similar fashion with analogous SUT integrated successfully. Modification and integration team are **SOMEWHAT** experienced with vehicle/SUT and have **MEDIUM CONFIDENCE** in their ability to modify test vehicle and integrate while maintaining cost and schedule.	Modification and integration procedures are **POORLY** defined. Test vehicle has been previously modified with limited similarity and no analogous SUT has been integrated successfully. Modification and integration team are **LITTLE** experienced with vehicle/SUT and have **LOW CONFIDENCE** in their ability to modify test vehicle and integrate while maintaining cost and schedule.
Test Resources Airspace/Range Availability	Few schedule issues or concerns. **HIGH CONFIDENCE** regarding test resources, airspace or range availability.	Some schedule issues or concerns. **SOME CONFIDENCE** regarding test resources, airspace or range availability.	Serious schedule issues or concerns. **LOW CONFIDENCE** regarding test resources, airspace or range availability.
Test Events & Schedule Adequacy	Schedule is adequate to accomplish the number/types of events. **HIGH CONFIDENCE** that contingencies can be mitigated within the current schedule.	Schedule is somewhat aggressive to accomplish the number/types of events. **MEDIUM CONFIDENCE** that contingencies can be mitigated within current schedule	Schedule is highly aggressive to accomplish the number/types of events. **LOW CONFIDENCE** that contingencies can be mitigated within the current schedule