

**BY ORDER OF THE COMMANDER  
HILL AIR FORCE BASE**

**HILL AFB INSTRUCTION 99-103**



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**Test and Evaluation**

**OO-ALC TEST AND EVALUATION (T&E)  
PROCESS**

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This instruction implements AFMCI 99-103, *Test and Evaluation (T&E) Test Management*, and further delineates AFI 99-103, *Capabilities Based Test and Evaluation*, and AFMC sup 1 to AFI 91-202, *The USAF Mishap Prevention Program*, and provides guidance and procedures for all T&E conducted by or for Ogden Air Logistics Center (OO-ALC), or that puts OO-ALC assets (material and personnel) at risk. It provides for risk reduction and establishes a disciplined test management process. 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 major command (MAJCOM) publications/forms managers. Ensure that all records created as a result of processes prescribed in this publication are maintained in accordance with AFMAN 33-363, *Management of Records*, and disposed of in accordance with Air Force Records Information Management System (AFRIMS) Records Disposition Schedule (RDS) located at <https://www.my.af.mil/gcss-af61a/afirms/afirms/>.

**SUMMARY OF CHANGES**

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## 1. Applicability.

1.1. Test and Evaluation (T&E) is a key part of acquisition, sustainment, and modification of systems and is a critical tool for the test approval authority to use in decision making. This instruction provides the approval authority with a disciplined approach to manage T&E risks within a program. These risks are primarily technical (overall method of test and data acquisition) and safety (injury to people or damage to equipment). The OO-ALC Test Representative (TESTREP), the Center Test Authority (CTA) office (OO-ALC/ENT) and the Safety Office (OO-ALC/SE) will provide test planning guidance and assistance throughout the test process.

1.2. The test process outlined in this instruction applies to all developmental, qualification and sustainment T&E conducted by OO-ALC organizations, conducted as a requirement of OO-ALC organizations, or that may pose a safety or environmental risk to OO-ALC assets, both material and personnel unless the test is to be conducted at or by a government test center, in which case that test center's processes apply.

1.2.1. All OO-ALC organizations shall use this process.

1.2.2. The Test and Evaluation Strategy (TES) approval authority will ensure compliance with established procedures under AFI 99-103 and AFMCI 99-103 for all non-OO-ALC test organizations that conduct tests for OO-ALC. Test organizations may be approved to use their own, equivalent technical and safety review procedures but that approval must be based in part on OO-ALC personnel participation in that process. This includes tests conducted by another service, Major Air Force Commands (MAJCOMs), the Air Force Reserve, the Air National Guard, tenant units, and contractors.

1.2.3. If T&E is conducted for the OO-ALC by a contractor, the approval authority will assure the contract is used to ensure compliance with established procedures in accordance with (IAW) AFI 10-220, Contractor's Flight, and Ground Operations. The

contract shall make provisions for government review, approval and oversight for testing at contractor facilities. The contract should also provide for deficiency reporting IAW AFI 99-103 and contractor participation in government forums such as Integrated Test Teams (ITTs), Technical Review Boards (TRBs), and Safety Review Boards (SRBs).

1.2.4. Any test activity that generates notable safety or environmental risk to OO-ALC assets (material or personnel) should be brought to the attention of the CTA for review.

1.2.5. All aircraft and associated munitions staging from Hill AFB are required to be identified IAW Hill AFB Instruction 10-401, *Support of Units Deployed to Hill AFB*.

1.3. Activities including testing of Commercial Off the Shelf items; Non-Developmental Items; potential Form, Fit, Function, and Interface (F3I) changes; modifications; field service evaluations; shelf life evaluations; and manufacturing and repair source qualifications are considered T&E and are governed by this instruction.

1.4. Activities that are a normal part of the maintenance or training function e.g., routine functional check flights, engine runs after Programmed Depot Maintenance, or routine operational training missions, are not governed by this instruction. Procedures conducted according to approved technical orders, to include approved equipment manufacturer publications used in place of technical orders, are not considered T&E under this instruction. However, if an item has been altered beyond the established repair or production processes to such an extent that the technical or safety risk associated with its ordinary function is increased; the quality checks performed to verify completeness and accuracy would fall under the guidance of this instruction.

1.5. Wing supplements to this instruction and other OO-ALC organization Operating Instructions and business practices pertaining to test shall be coordinated through the CTA.

**2. General Responsibilities.** General responsibilities are listed in AFI 99-103, *Capabilities-Based Test and Evaluation*; AFMCI 99-103, *Test Management*; and AFI 91-202 AFMC Supplement 1, *The US Air Force Mishap Prevention Program*. Responsibilities specific to the OO-ALC are as follows:

2.1. **OO-ALC Commander (OO-ALC/CC):** The OO-ALC Commander establishes the OO-ALC's local processes for managing T&E IAW Section 2.6. of AFMCI 99-103. For example: designating Responsible Test Organizations (RTOs), conducting TRB/SRB/Test Readiness Review (TRR)/ Configuration Control Board (CCB) processes.

2.1.1. Responsible for establishing a CTA organization to oversee, conduct, or otherwise accomplish the OO-ALC's T&E requirements.

2.1.2. Final approval authority for all high safety risk test plans (as discussed in [Attachment 5](#)) associated with programs under her/his authority not conducted by a test center.

2.1.3. Approval authority for Memorandums of Agreements establishing TESTREP positions at the OO-ALC.

2.1.4. IAW AFI 99-103, the OO-ALC Commander has delegated to the Wing Commander or Wing Director of the organization with configuration management responsibility, the approval authority of ITT charters, TESs, certification of readiness for dedicated operational T&E, and fielding decisions for modifications that qualify for use

of the AF Form 1067, *Modification Proposal*, process for his/her respective portfolio of sustainment programs.

**2.2. Program Managers (PMs):** The PM may delegate some or all of these responsibilities.

2.2.1. Final approval of all low safety risk test plans (as discussed in **Attachment 5**) associated with programs under their authority not conducted by a test center. If the PM chooses to delegate this responsibility, his/her designee for approving test plans may be no lower than his/her deputy or chief engineer.

2.2.2. Responsible for ensuring that personnel involved with T&E on their systems are familiar with Air Force, AFMC, and local guidance on the management and conduct of testing.

2.2.3. Ensures designation of a Test Manager (TM).

2.2.4. Ensures the program's compliance with this instruction.

2.2.5. Integrates the T&E process into the weapon system configuration control process.

2.2.6. Provides test funding and resources as mutually agreed upon with the test organizations.

2.2.7. Forms ITTs as early as possible and assists the ITT in structuring all testing into a TES, developing an integrated test plan, and establishing other ITT documents in support of the requirements and acquisition strategies.

2.2.8. Coordinates with the appropriate MAJCOM headquarters to request operational MAJCOM units to support Developmental Test and Evaluation (DT&E) activities.

2.2.9. Ensures a RTO is designated for the program or that justification for not designating a RTO is provided.

2.2.10. Additional responsibilities for PMs are listed in section 3.8. of AFI 99-103.

**2.3. Test Manager (TM):** The TM is typically a system engineer in the PM organization, who should have test experience and be Acquisition Professional Development Program T&E level one or higher.

2.3.1. Responsible for the overall management, planning, and execution of the test program.

2.3.2. Is familiar with Air Force, AFMC, and local guidance on the management and conduct of testing.

2.3.3. Ensures a test plan is developed for all test projects. The test plan will typically include the test procedures and any applicable Test Hazard Analysis (THAs). The TM has overall responsibility for the contents of the test plan (**Attachments 3, 4 and 5** contain information and guidance for the TM). This responsibility includes ensuring that the plan is complete and ready for technical and safety reviews.

2.3.4. Ensures an AF IMT 813, *Request for Environmental Impact Analysis*, is developed and forwarded with the draft detailed test plan to the 75th Civil Engineering Group Environmental Management Division (75 CEG/CEV) for screening and approval of tests conducted at Hill AFB, the Little Mountain Test Annex, or on the Utah Test and Training

Range (UTTR). A single AF IMT 813 may be used for a class of similar tests. Testing at other locations requires approval by their equivalent environmental management function.

2.3.5. Coordinates with the customer to ensure that the test objectives meet the customer's needs.

2.3.6. Ensures that the test is conducted IAW the test plan.

2.3.7. Ensures Deficiency Reports (DRs) are written and tracked IAW AFI 99-103, T.O. 00-35D-54, *USAF Deficiency Reporting and Investigating System*, and AFI 63-501, *Air Force Acquisition Quality Program*.

2.4. **Center Test Authority (CTA):** The CTA is the single focal point for T&E and the T&E process at the OO-ALC. Responsibilities of the CTA are listed in section 2.2 of AFMCI 99-103. In addition, the CTA can provide test directors (TDs) as needed to plan and execute test programs when the CTA is designated as a RTO or Participating Test Organization (PTO).

2.5. **Test Director (TD):** The TD will plan and conduct all pre-test briefings and reviews, ensure test procedures/cards are prepared and approved, and ensure all planning, coordination and approvals are complete prior to the start of testing. The TD ensures that all supporting agencies are scheduled, monitors critical technical and safety data during testing while guiding the test crew through the test cards/procedures, and ensures all post-test documentation is completed. The TD is usually a member of the test organization or the CTA.

2.6. **Test Representative (TESTREP):** The TESTREP provides a link between the test centers and the CTA. Responsibilities and description of the TESTREP are listed in section 2.3 of AFMCI 99-103. If a TESTREP is not assigned to the CTA, the CTA will perform the duties of the TESTREP. The TESTREP makes preliminary assessments of test technical and safety risks for the PM in support of the systems engineering process. The TESTREP also participates in local TRBs and SRBs and signs the test plan as a reviewing authority.

2.7. **Responsible Test Organizations (RTO):** RTOs are developmental test agencies qualified to plan, manage, conduct, and report on government DT&E and oversee contractor DT&E. Responsibilities of the RTO are listed in section 3.13. of AFI 99-103 and section 2.4. of AFMCI 99-103. The lead test organization wing commander or director is the approval authority for all medium safety risk tests not conducted at a test center. The test organization is generally responsible for developing the detailed test plan, the safety appendix, test procedures, the test what-ifs, and the test cards. The executing test organization takes on the safety responsibility for the test by signing the Hill AFB Form 519, *Test Hazard Analysis (THA)*.

2.7.1. 514<sup>th</sup> Flight Test Squadron (514FLTS): When the 514FLTS is selected to participate in the project, it will:

2.7.1.1. Participate in the ITT.

2.7.1.2. Develop the detailed test plan and safety appendix, test what-ifs, and test cards.

- 2.7.1.3. Develop support agreements with other organizations for required test support.
  - 2.7.1.4. Participate in the TRBs, SRBs, conduct TRRs, and test briefings/debriefings.
  - 2.7.1.5. Accept safety responsibility for the test.
  - 2.7.1.6. Control the conduct of the test IAW the test planning documents.
  - 2.7.1.7. Track, analyze, and report test results and deficiencies.
  - 2.7.1.8. Maintain a lessons learned database, apply lessons learned to all test planning, and forward lessons learned to CTA.
  - 2.7.1.9. Provide a Flight Safety Officer to assist the project crew members and TD with the test hazard analysis and safety planning, as well as reviewing and signing all test hazard analysis forms for developmental, qualification or sustainment tests and evaluations performed by the 514 FLTS.
  - 2.7.1.10. Provide project crew members: Project crew members support test planning by providing aircraft technical expertise, test planning support, TRB/SRB support, and test execution support.
- 2.8. **OO-ALC Safety (75 ABW/SE):** The Chief of Safety or his/her designee is the SRB Chairperson for tests conducted for the OO-ALC. The safety review process is called out in AFI 99-103, and is outlined in AFI 91-202/AFMC Supplement 1, *The US Air Force Mishap Prevention Program* (Chapter 13 – Test Safety Review Process). 75 ABW/SE will review all test plans under its authority for safety risks. The SRB Chairperson will review and approve all test plans for safety risks.
- 2.8.1. Manages the OO-ALC test safety risk reduction process.
  - 2.8.2. Determines when a formal SRB is required. The SRB Chairperson also ensures appropriate independent expert participation in reviews and approvals for all testing.
- 2.9. **Integrated Test Team (ITT):** Responsibilities of the ITT are listed in section 3.14. of AFI 99-103. Membership, duties, responsibilities, and the method of conducting business should be documented in an ITT charter. A standing ITT is acceptable for similar programs on a single weapon system. The ITT can form test teams or test integrated product teams (TIPTs) to address T&E data analysis, problem solving, test planning, test execution, and reporting to meet DT&E and operational test objectives during all testing phases. A recommended ITT Charter Outline is provided as Attachment 4 in AFMCI 99-103.
- 3. RTO Selection Process.** The CTA oversees the center's RTO approval process and as such will assist the PM organization and/or ITT in the selection of a qualified RTO. The ITT will nominate through the PM, its selection for RTO to the designated representative for approval. The OO-ALC Commander has delegated RTO approval authority to the Wing Commander or Wing Director of the organization with configuration management responsibility. The ITT will ensure this selection process is done as early as possible. The PM organization and/or ITT shall provide rationale to the RTO approval authority if a RTO is deemed unnecessary.
- 4. OO-ALC Test and Safety Plan Review Process.**

4.1. The test organization is generally tasked by the ITT to develop the detailed test plan, the test procedures, the safety appendix, the test what-ifs, and the test cards. Prior to test conduct, each test and safety plan must be subjected to technical and safety reviews IAW AFI 99-103, AFI 91-202, and AFI 91-202/AFMC Sup 1. After the test plan (**Attachment 3**) and the safety plan containing the associated THA(s) (Attachment 4) have been developed, the test plan, with the safety plan (Attachments 4 and 5), will be reviewed by the CTA/TESTREP. The CTA/TESTREP will make an independent assessment of technical and safety risk. The CTA may choose to waive the TRB according to established criteria, if it determines the test plan is adequate and of low technical risk; all other tests require a TRB. In the absence of a TESTREP, the CTA may seek an independent concurrence of risk assessment from a test center. The CTA will summarize the test and risk in a Test Program Introduction Sheet which will be sent to a test center for technical and safety review. If the test is of low technical and safety risk, but a review board is required; the TM, with the assistance of the CTA, will arrange for a local TRB and SRB. Based on scope, complexity, similarity to previous tests, and anticipated risk level, 75 ABW/SE may choose to waive a formal SRB according to established criteria and just route the test plan through the appropriate experts.

4.2. If the test is of medium or high technical or safety risk, or it is determined that the test can only be accomplished by a test center, then the test center must be involved to a greater extent. The test center may be designated as the RTO or may have more involvement in the review process. If the test center becomes the RTO, then the test center review process will be followed. If the test center is not the RTO, then the OO-ALC review process will be followed with appropriate participation from the test center. The formal TRB will ensure a thorough assessment of the test plan for technical soundness and adequacy. It will verify that the overall method of test and test data acquisition is adequate to evaluate the requirements and to verify that the objectives can be met with acceptable technical risk. Safety planning is conducted on all tests to identify risks, reduce those risks as much as possible, and gain acceptance of the residual risk by the proper authority.

4.3. The TM and test organization is responsible for the safety planning and identification of hazards. The TM and test organization will identify test safety hazards by:

4.3.1. Consulting with other personnel with experience in similar testing and system operation.

4.3.2. Reviewing the lessons learned databases for hazards identified/lessons learned in other test projects of a similar nature.

4.3.3. Reviewing the contractor system safety plans and analysis. These include system/subsystem hazard analysis.

4.3.4. Reviewing the contractor and Government previous test results including component qualifications, modeling and simulation, hardware-in-the-loop, and integration.

4.3.5. Attempting to identify new hazards that may be unique to the operation of the new item or mission environment.

4.3.6. Reviewing the safety requirements for assets/facilities when non-OO-ALC assets/facilities are used.

4.3.7. Eliminating/Reducing/Controlling Test Hazards. The TM and test organization will identify methods to eliminate, reduce, or control the test hazards applying the following safety order of precedence:

4.3.7.1. Design out the test hazard.

4.3.7.2. Reduce risk to an acceptable level through change in test design.

4.3.7.3. Incorporate safety devices.

4.3.7.4. Provide caution and warning devices.

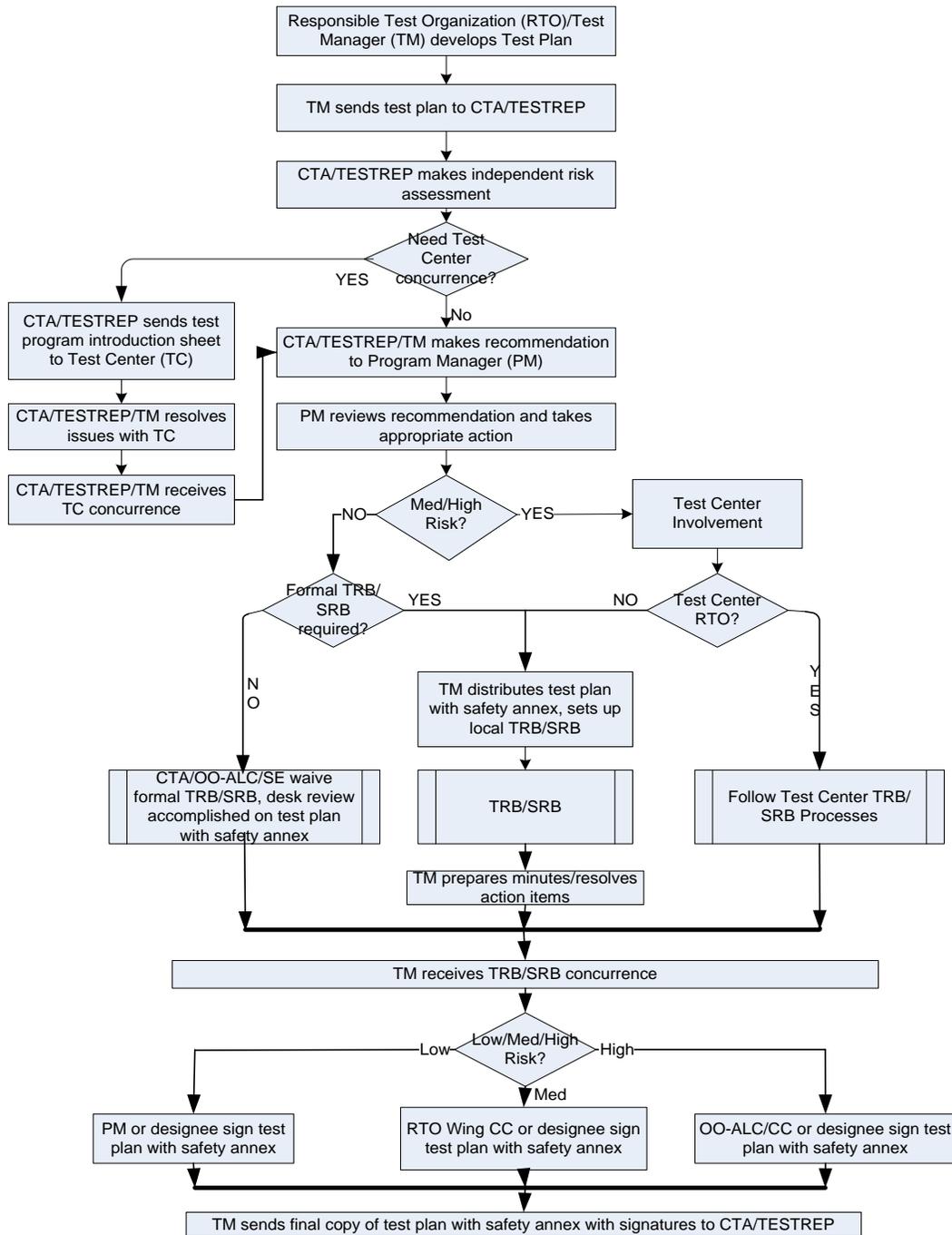
4.3.7.5. Develop test procedures and provide proper training of the individuals conducting the test. In cases where predictive data is not available, special emphasis will be placed on adding build-up test points.

4.3.8. Preparing advance copies of the Hill AFB Form 518, *Test Project Safety Review (Initial and Amendment)*, and Hill AFB Form 519(s), *Test Hazard Analysis (THA)*. **Attachment 4** of this instruction contains instructions for completion of these forms.

4.3.9. Ensuring a proper review is accomplished by submitting test plans early enough to obtain final approval at least 10 business days prior to start of testing. Simple, low-risk tests should be submitted at least 20 days prior to start of testing. Test plans associated with larger test programs or complex test plans may require more than the minimum 20 days allocated for the test plan review process. Early involvement of CTA, TESTREP, and 75 ABW/SE will expedite the review process. Submitting the test plan for review without sufficient time to complete all review actions may result in a delay of testing.

4.4. Test Approval. After the CTA/TESTREP, TRB Chairperson, and SRB Chairperson have coordinated on the test plan, the plan must still receive final approval. The approval official for the test plan and attached safety planning documents is dependent on the level of residual risk as determined by the TRB and SRB. The PM or his/her designee (no lower than his/her deputy or chief engineer) has final test approval authority for all low risk tests not conducted by a test center. If a RTO has been designated, the PM may designate test approval authority to the lead test organization's squadron commander or director. For low risk flight tests this approval level is raised to the RTO's group commander or director. The RTO's wing commander or director is the test approval authority for all medium risk tests not conducted by a test center. The OO-ALC Commander is the final approval authority for all high risk tests not conducted by a test center. Final test plan approval is required before testing can be conducted. Figure 1 outlines the test plan review process at OO-ALC. Approval authorities may designate in writing an alternate. The TRB or SRB may also raise the approval level for tests with high visibility or special interest. *Note: Prior to this review process, the test plan/THA should be reviewed internally within the PM's organization.*

Figure 1 OO-ALC Test Plan Review Process.



**5. Technical and Safety Review Boards.** OO-ALC manages and mitigates risks by adequate technical and safety review.

5.1. **TRB/SRB Scheduling.** The TM, with the assistance of the CTA will arrange for a local TRB and SRB. The test organization will conduct the TRB/SRB. The board members must have adequate time to review the test/safety plan prior to the meeting, five working days is a minimum.

5.2. **Technical Review Board (TRB).** The CTA has oversight of the TRB process. The CTA will maintain a list of qualified OO-ALC personnel to chair TRBs for OO-ALC projects. The CTA will evaluate all detailed test plans for technical adequacy and technical risk. The CTA may choose to waive the TRB according to established criteria, if it determines the test plan is adequate and of low technical risk; all other tests require a TRB. The TRB will ensure a thorough assessment of the test plan for technical soundness and adequacy. It will verify that the overall method of test and test data acquisition is adequate to evaluate the requirements and to verify that the objectives can be met with acceptable technical risk.

5.2.1. **TRB Membership:** The CTA will determine the required membership. TRB members should be senior in experience in their appropriate disciplines. The TRB must include members who are technically qualified, with test management experience, and are independent of the program. Mandatory TRB members include representatives from the test organization, CTA, and test item IPT. Other representatives may be required if their area of responsibility is involved. These include OO-ALC/SE, the test range, Explosive Ordnance Disposal (EOD), aircraft maintenance, Airfield Management, Fire Protection, Bioenvironmental Engineering, and Environmental Management. For flight tests, representatives from the weapons system program management and the aircrew are required. If the CTA/TESTREP makes a preliminary assessment that a flight test is medium or high safety risk, Test Center/Wing participation is required. Participation may be as a voting board member or through generation of a letter of technical adequacy after review of the completed test plan.

5.2.2. **TRB Documentation.** Concerns, action items, and inadequacies in the test plan discovered by the TRB will be documented by the TM in the TRB minutes. A technical risk assessment will also be documented in the minutes.

5.2.3. **TRB Action Items.** The TM must resolve all action items, as determined by the TRB Chairman, prior to completing the test plan safety review. TRB minutes along with any corresponding action item responses become part of the test documentation.

5.3. **Safety Review Board (SRB).** 75 ABW/SE has oversight of the SRB process. The Chief of Safety (OO-ALC/SE) or designated alternate is the SRB Chairperson. At a minimum, if it is determined that a formal SRB is not required, the TESTREP/CTA and the SRB Chairperson will review the test plan with safety appendix for safety plan adequacy and risk assessment. Based on scope, complexity, similarity to previous tests, and anticipated risk level, 75 ABW/SE may choose to waive a formal SRB according to established criteria and just route the test plan through the appropriate experts. The SRB will come after the TRB. The SRB will evaluate the detailed test plan and the draft safety appendix for

adequacy of the safety planning. The SRB will ensure hazards have been identified and reduced to minimum reasonable level. Test mishap accountability will be clearly documented. The SRB will evaluate the extent to which the severity and the probability of occurrence of known hazards have been minimized and assess the residual safety risk level using the OO-ALC Subjective Risk Assessment Method ([Attachment 5](#)).

5.3.1. SRB Membership. 75 ABW/SE will determine the required membership and the voting board members. SRB members must be technically qualified and not have sufficient project involvement to present a conflict of interest. Absence of a voting member may result in cancellation or delay of the SRB. Mandatory SRB members include representatives from OO-ALC/SE, the test organization, the CTA, the TESTREP, and engineering. Other representatives may be required if their area of responsibility is involved. These include system safety for the weapons system, aircrew, test range, EOD, Fire Protection, and Bioenvironmental Engineering. If the TESTREP/CTA makes a preliminary assessment that a flight test is medium or high safety risk, Test Center/Wing participation is required. Participation may be as a board member or through coordination on the completed test plan.

## 6. Test Documentation Coordination.

6.1. Documentation Package. After the SRB, the test organization will include SRB minutes and resolution of action items in Section V of the Hill AFB Form 518. The test organization will then prepare a complete test documentation package for the coordination process. This documentation package will be arranged in a five-part folder, as shown in **Table 1**.

**Table 1. Documentation**

DOCUMENT	LOCATION
Project Title	Outside Front Cover
Detailed Test Plan	Inside Front Cover
Hill AFB Forms 518 and 519	Tab 1
Test Procedures, Test Cards, Checklists, What-Ifs (if completed)	Tab 2
TRB Minutes or Waiver Letter and AF IMT 813	Tab 3
Supporting Documentation	Tab 4

6.2. Coordination Cycle. After completing the documentation package, the test organization will route the documentation package for required coordination signatures on the Hill AFB Form 518. When obtaining 388<sup>th</sup> Fighter Wing (388FW) signatures, the 388<sup>th</sup> Fighter Wing's Range Safety Section (388FW/SEY) may generate a 388FW signature page for routing through the Major Range and Test Facility Base (MRTFB) Test Approval Authority. The following must coordinate on the package by signing the Hill AFB Form 518: OO-ALC/SE, a representative of the PM, and the squadron commander or squadron director of each test organization. Also required is any other organization with Test Mishap Accountability. The Hill AFB Form 518 is approved by the RTO squadron commander or director.

6.3. Coordination Comments. Any comments by the coordination officials will be added to the Hill AFB Form 518. Before adding a comment, the coordination official will notify the test organization so the issue may be resolved, if possible, at the lowest level. The RTO squadron commander or director will ensure all comments/issues are resolved, if possible, before approving the Hill AFB Form 518. The 75 ABW/SE and CTA may require reconvening the TRB and SRB to consider any changes resulting from these comments. The TRB Chairperson and SRB Chairperson will then coordinate on the detailed test plan.

6.4. Test Approval. The detailed test plan, and thereby the complete test documentation package, is approved by the test approval authority as explained in Paragraph 4.2

## 7. Test Execution.

7.1. Test Readiness Review (TRR). The TRB will determine if a TRR is required. The TRR will be scheduled by the TD and conducted by the test organization approximately one to seven days before active testing begins. Attendance will include as a minimum representatives of the CTA, PM, test organization, and the test item operator (aircrew for flight test). The TD and the test item operator may attend by conference call if off-site scheduling considerations warrant. The TRR will assess all required versus accomplished preparations for the test. Test procedures, test cards, test risks, and what-ifs are usually briefed. Sample TRR checklists and what-ifs are available from the CTA.

7.2. Test Procedures and Test Cards. System operators and range controllers conduct the test IAW test procedures, test cards, and checklists. Step-by-step test setups and switch settings are detailed to include entrance and exit configurations/conditions and go/no go criteria in the test procedures and test cards. These procedures or cards are prepared jointly by the TD, test organization, operators, and controllers; and coordinated on by the test organization's safety officer. Test cards for flight tests must be approved by the flying organization's squadron commander.

7.3. Test Conduct. The TD will assist the test organization to plan and conduct all pre-test briefings and reviews, ensure testing documentation is prepared and approved, and ensure all planning, coordination and approvals are complete prior to the start of testing. The test organization will assemble the test assets and schedule the test events. The test organization will conduct a briefing with system operators and controllers prior to each test event. Procedures and limitations will be reviewed. During the conduct of the test, operators and controllers cannot deviate from the test procedures or test cards unless authorized by the test organization. The test organization is responsible for ensuring test conduct is within the constraints of the detailed test plan and safety documents.

7.3.1. Unexpected Events. Unexpected events may include but are not limited to: damage to the test article or support equipment, exceeding safety-of-test limits, an unfavorable departure from predicted simulation/analysis, or any occurrence judged by a team member to warrant a safety-related pause in the test project. If an unexpected event occurs during the test, the test project will be halted (~~knock it off~~) and 75 ABW/SE will be notified to see if a test plan/safety document amendment is required. Any member of the test team can call ~~knock it off~~ at any time during the test.

7.3.2. Changes during test conduct. Deviations from the test plan during the test are not authorized unless the CTA and 75 ABW/SE representatives determine that they are

within the scope of the technical and safety planning. Changes exceeding the scope of the original planning require a test plan amendment. Document amendments using a Hill AFB Form 518 following the instructions in [Attachment 4](#). Unless 75 ABW/SE determines that the risk level is changed, the amendment requires the same coordination and approval as the original test plan.

7.3.3. Extended Testing. Tests extending more than five years since the test plan approval date or with more than 20 amendments must be resubmitted to the CTA and 75 ABW/SE for technical and safety reviews.

## 8. Test Reporting.

8.1. Type of Report. The test organizations are responsible for reporting test results, deficiencies, and enhancements. Test data must be available to all ITT members. The ITT will determine the type and frequency of reports. A test report can vary in scope from simply providing raw data to a comprehensive Technical Report that includes thorough analysis, conclusions, and recommendations.

8.2. Report Review and Approval. Test reports must be timely, factual, and concise. Reviews by a technical writer and Office of the Staff Judge Advocate (OO-ALC/JA) should be considered for reports contributing to significant program decisions. Test reports will be approved by the test organization squadron commander or director.

8.3. Report Distribution. The ITT will determine the report distribution. Reports are not releasable outside of the Air Force without approval by the PM and contracting officer. Standard Form 298, *Report Documentation Page*, with distribution statement is usually attached to the back of the report front cover. The OO-ALC Engineering Directorate, Scientific, and Technology Information Office (OO-ALC/EN STINFO) officer will assist in distribution statements and archiving reports IAW AFI 61-204, *Disseminating Scientific, and Technical Information*.

8.4. Report Format. Generally, test reports follow the same format as the test plan with sections added for deficiencies, conclusions, and recommendations. Test Center/Wing report writing guidebooks and examples are available from the CTA.

8.5. Special Reporting Requirements. Live Fire testing, operational testing, and programs on the Office of the Secretary of Defense oversight list have special reporting requirements found in AFI 99-103.

8.6. Deficiency Reports (DR). Deficiency reporting is required. The PM is responsible for maintaining the database and acting on submitted DRs IAW TO 00-35D-54-WA-1, *USAF Deficiency Reporting, Investigation, and Resolution*. **Note:** AFI 99-103, 6.10. has further guidance. The test organizations are normally the originating point for the watch item tracking (WIT) lists and DRs. The ITT is responsible for prioritizing DRs and ensuring that a WIT and DR notification and tracking system is available to all stakeholders during the testing. WITs and DRs that have not been closed out must be mentioned in the final report.

8.7. Lessons Learned. Documenting lessons learned is important to build the knowledge and experience base in the test community. Test participants are encouraged to submit wide applicability lessons learned and best practices to the CTA.

8.8. Project Completion. The TM must notify 75 ABW/SE and the CTA within 30 days following the final test event. Notification includes listing any test and 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.

**9. Prescribed and Adopted Forms.**

9.1. Prescribed Forms.

Hill AFB Form 518, *Test Project Safety Review*

Hill AFB Form 519, *Test Hazard Analysis (THA)*

9.2. Adopted Forms.

AF Form 847, *Recommendation for Change of Publication*

AF IMT 813, *Request for Environmental Impact Analysis*

Standard Form 298, *Report Documentation Page*

ANDREW E. BUSCH, Major General, USAF  
Commander, Ogden Air Logistics Center

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

AFI 61-204, *Disseminating Scientific, and Technical Information*, 30 Aug 2002  
AFI 99-103, *Capabilities Based Test and Evaluation*, 26 Feb 2008  
AFI 91-202\_AFMC Sup 1, *The USAF Mishap Prevention Program*, 11 Nov 2005  
AFMCI 21-126, *Temporary 2 (T-2) Modification of Aerospace Vehicles*, 19 Jul 2005  
AFMCI 99-103, *Test Management*, 22 Nov 2004  
AFMAN 37-123, *Management of Records*, 1 Aug 1994  
Federal Acquisition Regulation (FAR), 1 Jan 2000  
Hill AFBI 10-401, *Support of Units Deployed to Hill AFB*, 5 Oct 2004  
Military Standard 882D, *Standard Practice for System Safety*, 10 Feb 2000  
RCC Std 321-02, *Common Risk Criteria for National Test Ranges*, 1 Jun 2002  
T.O. 00-35D-54-WA-1, *USAF Deficiency Reporting, Investigation, and Resolution*, 1 May 2007

***Abbreviations and Acronyms***

**FW**—388th Fighter Wing  
**FW/SEY**—388th Fighter Wing's Range Safety Section  
**CEG/CEV**—75th Civil Engineering Group Environmental Management Division  
**FLTS**—514th Flight Test Squadron  
**AFB**—Air Force Base  
**AFI**—Air Force Instruction  
**AFMAN**—Air Force Manual  
**AFMC**—Air Force Materiel Command  
**AFMCI**—Air Force Materiel Command Instruction  
**CCB**—Configuration Control Board  
**CTA**—Center Test Authority  
**DR**—Deficiency Report  
**DT&E**—Developmental Test and Evaluation  
**EOD**—Explosive Ordnance Disposal  
**F3I**—Form, Fit, Function, and Interface  
**FAR**—Federal Acquisition Regulations  
**IAW**—In Accordance With

**IMT**—Information Management Tool  
**IOT&E**—Initial Operational Test and Evaluation  
**IPT**—Integrated Product Team  
**ITT**—Integrated Test Team  
**MAJCOM**—Major Command  
**MOP**—Measure of Performance  
**MRTFB**—Major Range and Test Facility Base  
**OO**—ALC—Ogden Air Logistics Center  
**OO**—ALC/CC—OO-ALC Commander  
**OO**—ALC/JA—Office of the Staff Judge Advocate  
**OO**—ALC/SE—OO-ALC Safety Directorate  
**OO**—ALC/EN STINFO—OO-ALC Engineering Directorate, Science and Technology Information Office  
**OO**—ALC/ENT—OO-ALC Center Test Authority  
**OPR**—Office of Primary Responsibility  
**PM**—Program Manager  
**PTO**—Participating Test Organization  
**RTO**—Responsible Test Organization  
**SRB**—Safety Review Board  
**STINFO**—Science and Technology Information  
**T&E**—Test and Evaluation  
**TD**—Test Director  
**TES**—Test and Evaluation Strategy  
**TEMP**—Test and Evaluation Master Plan  
**TESTREP**—Test Representative  
**THA**—Test Hazard Analysis  
**TIPT**—Test Integrated Product Team  
**TM**—Test Manager  
**T.O.**—Technical Order  
**TRB**—Technical Review Board  
**TRR**—Test Readiness Review  
**UTTR**—Utah Test and Training Range  
**WIT**—Watch Item Tracking

### *Terms*

**Deficiency Report (DR)**—The report used to identify, document, and track system deficiency and enhancement data while a system is in advanced development, T&E, or operational transition.

**Evaluation Criteria**—An expression of a standard on which a judgment is based, usually expressed as a parameter (for example: percentage, rate, user rating).

**Flight Test**—Any test requiring an aerospace vehicle to move under its own power.

**Form, Fit, Function, and Interface (F3I)**—F3I is a term applied in specifications to achieve interchangeable parts where complete design freedom is not allowed in that the physically interchangeable parts must function within the defined physical architecture. **Form:** The term form addresses the physical characteristics of an end item. For hardware items, this would include characteristics such as (1) the product envelope (which could include both internal and external envelopes) (2) weight or mass (3) center of gravity and (4) moments of inertia. The term has less significance for software items, but could include memory storage requirements, throughput requirements, etc. **Fit:** The term fit is primarily applicable to hardware end items, and addresses the "mating" characteristics with other hardware items and with the user/operator. It would include characteristics such as (1) the location relative to a defined datum of mating surfaces/features (2) the location relative to a defined datum of features designed to facilitate handling, assembly, and installation and (3) mating surface/feature requirements such as flatness or contour. **Function:** The term function addresses what the end item must be capable of doing for a defined set of conditions. In addition to the obvious performance characteristics, this would include requirements in performance terms for reliability, useful life, maintainability, supportability, and other "-ilities" in general. **Interface:** The term interface addresses the way the hardware or software interacts with other systems or segments of the same system.

**Integrated Test Team (ITT)**—A cross-functional team of empowered representatives from multiple disciplines and organizations and co-chaired by operational testers and the program manager. The ITT is responsible for developing the T&E strategy and TEMP, assisting the acquisition community with T&E matters, and guiding the development of integrated test plans.

**Program Manager (PM)**—1. The designated individual, with responsibility for and authority to accomplish program objectives for development, production, and sustainment to meet the user's operational needs. The PM shall be accountable for credible cost, schedule, and performance reporting to the milestone decision authority. 2. Applies collectively to system program directors, product group managers, single managers, acquisition program managers, and weapon system managers. The PM has total life cycle system management authority.

**Safety Review Board (SRB)**—A committee formed to review the test plan and identify any potential safety hazards, possible causes and effects, and develop procedures required to minimize safety risks during testing.

**Technical Review Board (TRB)**—A committee of experienced personnel not directly associated with the test program to provide an independent technical assessment of the test plan.

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

by which systems are measured against requirements and specifications, and the results analyzed so as to gauge progress and provide feedback. It requires a unique planning effort and procedures outside of or in addition to established TOs. The failure of or unexpected results from these procedures may result in a costly loss of the data or create a safety or environmental risk.

**Test Approval Authority**—The individuals ultimately responsible for accepting the SRB and TRB results and approving the test to proceed with any residual risk.

**Test Cards**— A detailed step by step guide for those conducting the test and generally used by a single organization. Test cards are more detailed than test procedures, though they may be the same product. Generally, used in flight tests.

**Test Hazard Analysis (THA)**—Worksheets included in the safety appendix of the test plan. The THA identifies test hazards, causes, and effects, and establishes risk reduction methods. It is used to determine the residual level of safety risk.

**Test Integrated Product Team (TIPT)**—Any temporary group consisting of testers and other experts who are focused on a specific test issue or problem. There may be multiple TIPTs for each acquisition program.

**Test Manager**—The individual designated by the PM as responsible for the overall management, planning, and execution of a test. The TM is typically a system engineer in the PM organization.

**Test Mishap Accountability**—The organization that pays for test-related repairs and replacements must be written and approved in the test planning documentation. Testing often requires the preplanned damage/destruction of a unique test asset. Even where damage is not planned, testing involves unknowns that could increase the likelihood of damage/loss. This is part of the cost of conducting the test and in no way implies blame or mishap responsibility.

**Test Objectives**—Declarations of what is expected to be achieved. Objectives should be short sentences beginning with an action verb followed by the objective and qualifying phrases. (E.g. evaluate the test item separation characteristics when released at low altitude (10,000 feet))

**Test Plan**—A documented approach, resources, and schedule to verify compliance of a system or one of its elements by test.

**Test Procedures**—A detailed step by step guide for those conducting the test. This may include more than one organization and can be included as part of the test plan.

**Test Representative (TESTREP)**—A Test Center/Wing advisor and liaison to OO-ALC. TESTREP qualifications are listed in AFMCI 99-103.

**Watch Item Tracking (WIT)**—A problem or suspected problem found during testing that is tracked to collect additional data prior to submitting a DR.

**What—Ifs**—Pre-briefed and approved test conduct decisions. Using What-Ifs is encouraged to reduce the need for real-time decision making when coordination with all knowledgeable personnel is not practical. These decisions must not exceed the scope and limitations of the test plan and safety documentation.

**Attachment 2**

**TEST PLAN SIGNATURE PAGE FORMAT SAMPLE**

TEST PLAN: ID NUMBER

TITLE:

**PREPARED BY:**

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NAME	Date
Title, Organization, Office	

**REVIEWED BY:**

---

NAME	Date
Test Manager, Organization, Office	

---

NAME	Date
TESTREP, Center Test Authority, OO-ALC/ENT	

---

NAME	Date
Other individuals as required with Title, Organization, Office	

---

NAME	Date
Chairman, Technical Review Board, Organization, Office	

---

NAME	Date
Chairman, Safety Review Board, Organization, Office	

**APPROVED BY:**

---

NAME	Date
Title, Organization, and Office as determined by risk level	

DISTRIBUTION STATEMENT

### Attachment 3

**TEST PLAN GUIDANCE/CHECKLIST-** In general, test plans should follow the guidelines of afftc-tih-93-01, air force flight test center test plan preparation guide, may 94 (available from the CTA upon request). This handbook is used as a guide; for many of the small-scale tests that occur, the test plan can be tailored significantly, especially since much of the information requested in the guide may not apply. As a minimum, TMs preparing a test plan should review the test plan checklist (appendix c to the air force flight test center test plan preparation guide) while writing their test plan. The tm should include as attachments to the test plan:

- Signature page (per Attachment 2 of this instruction).
- Planned schedule
- A letter indicating the system engineering analysis technical and safety risk levels
- Test Hazard Analysis (per Attachment 4 of this instruction)

The elements of a test plan should have sufficient detail for a technically qualified person not associated with the program to understand the test requirements and objectives and see that the test plan will meet those requirements and objectives.

### TAILORED DETAILED TEST PLAN

*Detailed Test Plan Title*

#### A3.1. INTRODUCTION.

A3.1.1. Background. This should be a short paragraph with the following information: identify the test requester, pertinent test history, expected time frame of the test, number of test missions, and general purpose of the test. Include the operational deficiency which the item is intended to remedy, if applicable, the stage in the research and development cycle to which the item has progressed, and any known pending decision(s) based on test results.

A3.1.2. Test Objectives. This section lists each objective individually as a short, concise statement. The test objectives serve as a declaration of what is expected to be achieved. Objectives should be short sentences beginning with an action verb followed by the objective and qualifying phrases. For example: "Evaluate the test item separation characteristics when released at low altitude (10,000 feet)." Each objective should have at least one Measure of Performance (MOP), and associated Evaluation Criteria.

**Table A3.1. Test Objective Action Verbs**

ACTION VERB	DEFINITION
Collect	To gather test data that requires no subsequent analysis, such as bomb fragment data or time-space-position information data.
Compare	To perform a detailed examination of the similarities and differences in test items.
Demonstrate	To show something qualitative or quantitative by doing.
Determine	To discover certain measurable or observable characteristics of a test item.
Evaluate	To establish overall worth (effectiveness, adequacy, usefulness, or capability) of a test item.

Verify	To confirm a suspected, hypothesized, or partly established contention. (This verb should be used sparingly because it implies that a test item has already demonstrated a capability and the test is just confirming that fact.)
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A3.1.3. Scope of Test and Test Limitations. Describe the number of test items or flights. Identify modes and parameters not controlled or measured, facility and operational restrictions, etc. that will constrain the testing or limit the applicability of the test results.

**A3.2. TEST ITEM DESCRIPTION.** This section should include a short paragraph describing each test item in adequate detail to understand all aspects of the test.

**A3.3. TEST RESOURCES.**

A3.3.1. Test Items. Identify units under test and other assets needed to accomplish the test. Include sources and ownership.

A3.3.2. Facilities and Range Support. Specify test locations. Include key personnel, targets, control room, hot pads, etc.

A3.3.3. Aircraft Operations. List the source of aircraft and aircrew. Include the aircraft configuration, necessary modifications, Operational Flight Program versions, etc. Also include maintenance and load crew sources and responsibilities.

A3.3.4. Instrumentation. List required instrumentation data. Include locations and sources of data, reference checkout, calibration, and operation procedures. Instrumentation requirements should include the following:

A3.3.4.1. Instrumentation system resources including telemetry, Time Space Position Information, meteorological, transducer and photo documentation requirements.

A3.3.4.2. Data Requirements List. List parameters to be monitored/recorded. Include sample rates, range, accuracy, resolution, and pre-conditioning. Define which parameters are go/no-go, both from a technical and safety viewpoint (e.g. the aircraft will not take off or will abort the test condition if a no-go parameter is unavailable.) The measurements and parameters could be categorized as:

A3.3.4.2.1. Category 1. Mandatory for safe conduct of the test (if not available, the test will be aborted until repairs are made).

A3.3.4.2.2. Category 2. Required to meet a specific test objective (if not available, those tests will be aborted).

A3.3.4.2.3. Category 3. Desirable to accomplish the test objective and support data analysis, however other alternate means of assessment can be substituted.

A3.3.4.3. Data Products List. Specify display/reporting format, units, and delivery schedule.

A3.3.5. Test Project Management. List key personnel and include function, organization, and telephone number.

**A3.4. METHOD OF TEST.** This section describes the actual method to be followed in satisfying each test objective. Detailed procedures are provided for each type of test that will be performed. Describe test conditions; sample sizes; test item operational mode; critical geometry; aircraft configuration; flight profile; switch settings; etc. Fully define any terminology peculiar

to this test methodology. List the sequence of test events and any pass-fail results or management decision milestones that must be satisfied before test completion or proceeding to the next test event. For tests with many phases or test events, put a general paragraph here and detailed procedures in an appendix.

**A3.5. TEST REPORTING.** Specify products the test organization will provide (e.g. transfer of data, data processing and analysis, technical report, recommendation for certification, final data products, etc.) Also, specify how deficiencies will be tracked and reported.

**A3.6. REFERENCES.** Reference earlier testing (plans, tailored Military Standards, test reports), specifications and other contractual requirements documents, aircraft configuration/modification documentation, and system and facility operational limitations.

**Attachment 4****INSTRUCTIONS FOR COMPLETING HILL AFB FORMS 518 AND 519****A4.1. Hill AFB Form 518: Test Project Safety Review (Initial and Amendment)**

A4.1.1. USE. This form introduces and summarizes the test, documents the research of lessons learned, records the proceedings of the SRB, and provides a vehicle by which the OO-ALC command structure gives final approval for the conduct of the test.

A4.1.2. PREPARATION. The test organization fills out the sections of the form except for Risk Level and Safety Review Synopsis. These will be completed using the results of the SRB. Examples of completed Hill AFB Form 518s and additional instructions are available from the CTA.

A4.1.3. AMENDMENTS. This form is also used to document any changes to the test or test item and/or changes to the safety planning and an amendment can be used to request appropriate Test Approval Authority approval before continued testing.

**A4.2. Hill AFB Form 519. Test Hazard Analysis (THA)**

A4.2.1. USE. This form is a worksheet for developing the THA. Each worksheet documents a test unique hazard and the actions the project will take to control the hazard to an acceptable level of risk. The collection of worksheets becomes the THA.

A4.2.2. THA. The THA is an analytical approach to breaking the mishap chain of events between the initial cause and the ultimate effect. Between the Cause and the Effect is the Hazard – the dangerous situation to be avoided through Minimizing Procedures, or remedied through Emergency Procedures.

A4.2.3. TEST HAZARD. A Test Hazard is a hazardous situation that may have an increased likelihood of occurrence due to this test. For example, mid-air collision with non-participating aircraft is usually not considered a test hazard. However, if the very nature of the test may increase the probability of this hazard above that of normal operations, it should be addressed as a test hazard. Pre-existing hazards associated with the weapon system shall be considered.

A4.2.4. PREPARATION. The test organization is responsible for developing the THA but other test participants may submit additional worksheets. For flight tests, the aircrew must participate. The SRB considers the adequacy of the Minimizing Procedures and Emergency Procedures and assigns a Mishap Severity Category, Mishap Probability, and resulting Risk Level. Filled in examples of the Hill AFB Form 519 and additional instructions are available from the CTA.

### Attachment 5

**TEST PLAN SAFETY** - In order to ensure that an adequate safety review can be accomplished for tests, all test plans submitted to the center safety office for review shall include a safety plan as required by AFI 91-202/AFMC supplement 1 (chapter 13, test safety review process). The safety plan, if not a part of the test plan or included on the hill AFB form 518, shall be included as an appendix to the test plan and shall contain as a minimum:

- Go/no-go criteria for test performance
- Mishap prevention responsibility (which aircrew will perform the test? What individual is responsible for ensuring the safe conduct of the test?)
- Mishap accountability determinations (which organization possesses the aircraft used? Which organization has accident accountability? What organization is responsible for mishap reporting?)
- THA that identifies all test unique hazards and the actions necessary to minimize or control them

When a contractor performs test plan development, the PM should include in the contract any language necessary to ensure that THAs are performed and provided as part of the test plan. For tests falling under existing contracts, THAs can be performed by program office personnel with assistance from the RTO or the CTA. The following pages have a risk assessment chart, THA sample document, and instructions.

### **OO-ALC SUBJECTIVE RISK ASSESSMENT METHOD**

This section is based on Appendix A in Military Standard 882D, *Standard Practice for System Safety*, which can be used to provide further detail.

**A5.1. Mishap Probability.** This is a subjective evaluation of the probability of the effect occurring. Considerable insight, experience, and engineering judgment are required from the board members.

**Table A5.1. Mishap Probability.**

Description	Level	Specific Individual Item	Fleet or Inventory
Frequent	A	Likely to occur often in the life of an item, with a probability of occurrence greater than $10^{-1}$ in that life.	Continuously experienced.
Probable	B	Will occur several times in the life of an item, with a probability of occurrence less than $10^{-1}$ but greater than $10^{-2}$ in that life.	Will occur frequently.
Occasional	C	Likely to occur sometime in the life of an item, with a probability of occurrence less than $10^{-2}$ but greater than $10^{-3}$ in that life.	Will occur several times.
Remote	D	Unlikely but possible to occur in the life of an item, with a probability of occurrence less than $10^{-3}$ but greater than $10^{-6}$ in that life.	Unlikely, but can reasonably be expected to occur.
Improbable	E	So unlikely, it can be assumed occurrence may not be experienced, with a probability of occurrence less than $10^{-6}$ in that life.	Unlikely to occur, but possible.

**Table A5.2. Mishap Severity Category. A qualitative measure of the worst credible mishap.**

Description	Category	Environmental, Safety, and Health Result Criteria
Catastrophic	I	Could result in death, permanent total disability, loss exceeding \$1M, or irreversible severe environmental damage that violates law or regulation.
Critical	II	Could result in permanent partial disability, injuries, or occupational illness that may result in hospitalization of at least three personnel, loss exceeding \$200K but less than \$1M, or reversible environmental damage causing a violation of law or regulation.
Marginal	III	Could result in injury or occupational illness resulting in one or more lost work days(s), loss exceeding \$10K but less than \$200K, or mitigatable environmental damage without violation of law or regulation where restoration activities can be accomplished.
Negligible	IV	Could result in injury or illness not resulting in a lost work day, loss exceeding \$2K but less than \$10K, or minimal environmental damage not violating law or regulation.

**A5.2. Risk Level.** The degree of residual risk assumed by OO-ALC management. Management approval allows the proposed test to be accomplished in the manner and under the conditions specified. The risk level is determined by entering the mishap category and probability into the risk assessment chart below.

**Table A5.3. Risk Level Assessment.**

<b>SEVERITY PROBABILITY</b>	<b>Catastrophic</b>	<b>Critical</b>	<b>Marginal</b>	<b>Negligible</b>
<b>Frequent</b>	1	3	7	13
<b>Probable</b>	2	5	9	16
<b>Occasional</b>	4	6	11	18
<b>Remote</b>	8	10	14	19
<b>Improbable</b>	12	15	17	20

**Table A5.4. Risk Level Description.**

<b>Risk Assessment Level</b>	<b>Risk Category</b>	<b>Description</b>	<b>Risk Approval Authority</b>
1-5	High	Tests which present a significant risk to personnel, equipment, or property, even after all precautionary measures have been taken.	OO-ALC Commander
6-9	Medium	Tests which present a greater risk than normal operations to personnel, equipment, or property, even after all appropriate controls have been applied, measures have been taken, and require more than routine supervision.	RTO Wing Commander
10-20	Low	Tests which present no greater risk than normal operations after appropriate controls have been applied. Routine supervision is appropriate.	Program Manager

A5.2.1. Quantitative Risk Assessment. If sufficient data are available to form a quantitative assessment of residual risk, this should be used to supplement the subjective method. RCC Std 321-02, *Common Risk Criteria for National Test Ranges*, sets acceptable mishap probability and severity thresholds.