

**BY ORDER OF THE COMMANDER  
AIR FORCE TEST CENTER**

**AIR FORCE TEST CENTER INSTRUCTION  
91-203**



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**Safety**

**AFTC TEST SAFETY REVIEW POLICY**

**COMPLIANCE WITH THIS PUBLICATION IS MANDATORY**

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This publication implements Air Force Instruction (AFI) 91-202 Air Force Materiel Command (AFMC) Supplement. This publication provides further policy and guidance to Chapter 13. It directs the application of system safety principles to the planning and conduct of all Air Force Test Center (AFTC) and other designated AFMC test programs (reference paragraph 1.5) regardless of the agency conducting the tests. It also provides guidance for the application of system safety principles to AFTC training programs, logistics testing, and publications. Organizations within AFTC will supplement this instruction to provide a detailed local test safety review process. Draft supplements must be submitted to AFTC/SE for coordination and TW or Complex Commander for approval. Attachment 1 lists abbreviations and acronyms used in this instruction. Refer recommended changes and questions about this publication to the Office of Primary Responsibility (OPR) using the AF Form 847, *Recommendation for Change of Publication*; route AF Forms 847 from the field through the appropriate functional chain of command. The authority to waive wing/unit level requirements in this publication is Tier 3. See AFI 33-360, *Publications and Forms Management*, Table 1.1 for a description of the authorities associated with the Tier numbers. Submit requests for waivers through the chain of command to the appropriate Tier waiver approval authority, or alternately, to the Publication OPR for non-

tiered compliance items. Ensure that all records created as a result of processes prescribed in this publication are maintained in accordance with (IAW) Air Force Manual (AFMAN) 33-363, Management of Records, and disposed of IAW Air Force Records Disposition Schedule (RDS) located in the Air Force Records Information Management System (AFRIMS).

**(96TW)** This supplement implements Air Force Test Center Instruction 91-203. This supplement applies to all activities conducted through the 96th Test Wing (96 TW) including, but not limited to, test and training operations. The term “test” as it relates to the safety review process includes both test and training operations conducted through the 96 TW. This supplement provides clarification to responsibilities and procedures for test safety reviews for the 96 TW. Tests include ground, waterborne and airborne testing and training activities involving 96 TW personnel, aircraft, test ranges, equipment or airspace. It applies to system program managers, program engineers, test engineers, test and range safety engineers and aircrews that are responsible for incorporating safety planning and review into the conduct of test and training programs. The 96th Test Group (96 TG) is not subject to this publication and will be guided by the 96 TG Supplement to AFTCI 91-203, 96 TG 91-1; 96th Test Group Test Safety Review 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 the appropriate functional’s chain of command. Ensure that all records created as a result of processes prescribed in this publication are maintained IAW Air Force Manual (AFMAN) 33-363, *Management of Records*, and disposed of IAW Air Force Records Information System (AFRIMS) Records Disposition Schedule (RDS).

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## Chapter 1

### INTRODUCTION

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

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

**1.3. Safety Review Process Goals.** The goal of any test safety review process is to prevent mishaps during test activities. This process should identify test hazards and establish both procedures and corrective actions to eliminate or control the hazards. The process will allow independent reviewers to evaluate test unique hazards identified by the test team, assess proposed mitigations and corrective actions, and affirm the test team's proposed overall risk level. Once the independent review board has agreed upon and proposed an overall risk level, the safety plan is reviewed and approved by leadership at a level appropriate for the assessed risk.

#### 1.4. Risk Management

1.4.1. Risk Management is the main tool used to prevent mishaps and is the essence of any test safety review process within AFTC. While each test may be unique, the test safety review process for each test will follow a predictable, consistent process. The policy outlined in this instruction and the processes defined in local supplements are tailored to manage risk unique to test activity.

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

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

**1.6. Scope.** This instruction applies to:

1.6.1. Any ground or flight test activity utilizing AFTC assets. AFTC assets include:

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

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

1.6.2. Any activity where the AFTC/CC or subordinate commander has responsibility for the safety of the general public as the Major Range and Test Facility Base Commander IAW DoD 3200.11.

1.6.3. Any activity utilizing AFTC assets that presents unique hazards not covered by published procedures or management directives.

1.6.4. AFMC assets when AFTC units are assigned as Lead Developmental Test Organization (LDTO).

1.6.5. Any AFTC unit assigned or acting in the capacity of an LDTO that is responsible for the safe conduct of test, even when AFTC assets are not at risk.

1.6.6. Any activities specified by the subordinate unit Test Safety Office.

**1.7. Waivers.** The AFTC Commander is the waiver authority for this instruction. Guidance in AFI 91-202, AFMC Sup Chapter 13 would still apply unless waived separately. The AFTC Chief of Safety (AFTC/SE) may approve minor variations from this instruction provided that the intent of the test safety process and this instruction are adequately met. Any variations or waivers approved by AFTC will be documented in an MFR and included in the Safety Annex to the Test Plan.

1.7.1. **(Added-96TW)** The deviation authority of this supplement resides with 96 TW/CC.

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

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

1.8.2. When a test activity must deviate from a technical order or flight manual, units will follow current command guidance. If a waiver is required, a copy of the approved waiver will be filed in the Safety Annex. Test teams will note the deviation in the test plan and incorporate safety planning as required.

## Chapter 2

### SAFETY RESPONSIBILITIES

#### 2.1. Test Approval and Coordination Responsibilities

2.1.1. Responsibilities of personnel/organizations involved in the test safety approval and coordination phase are as follows:

2.1.2. The AFTC/CC will:

2.1.2.1. Be the approval authority for this instruction.

2.1.2.2. Be the waiver authority for this instruction.

2.1.3. AFTC/SE will:

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

2.1.3.2. Review local supplements to this instruction.

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

2.1.4. AFTC Test Safety Office will:

2.1.4.1. Organize an annual test safety process meeting with all AFTC organizations to review local test safety process best practices.

2.1.4.2. Assess compliance of AFTC organizations with this instruction when conducting inspections in accordance with AFI 91-202.

2.1.4.3. Approve locally developed Test/System Safety training courses.

2.1.5. Wing or Complex Commander will: Approve local supplements to this instruction.

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

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

2.1.6.1.1. **(Added-96TW)** The 96 TW Test and Range Safety Office (96 TW/SEU) is the OPR for this supplement and the implementation of the AFTC Test Safety Review Policy for all 96 TW test and training operations.

2.1.6.1.2. **(Added-96TW)** The Chief of Test and Range Safety will provide a Range Safety Engineer (RSE) who will:

2.1.6.1.2.1. **(Added-96TW)** Serve as the primary Test and Range Safety Officer for the program/ activity.

2.1.6.1.2.2. **(Added-96TW)** Normally document the minutes of the Safety Review Board (SRB) in the format of a Safety Review Board Summary (SRBS) (Attachment 3), approve any submitted Test Hazard Analysis (THA) forms based on the SRB discussion and prepare the Safety Annex for 96 TW/SE approval.

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

2.1.6.3. Provide initial and annually recurring test safety review process training for Wing/Complex/Unit personnel (including contractor personnel as appropriate) who are involved in test safety planning.

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

2.1.6.5. Provide guidance and assistance to test unit personnel on test safety planning.

2.1.6.6. Designate or act as the Safety Review Board (SRB) chairperson (if required).

2.1.6.7. Approve independent safety reviewers chosen by test teams in accordance with **Section 2.3.**

2.1.6.8. Notify HQ AFMC/SE/A3 and asset owner of high risk tests, IAW AFI 91-202\_AFMCSUP.

2.1.6.9. Ensure an archive of approved test packages and associated documentation is maintained and available to test teams.

2.1.6.9.1. **(Added-96TW)** Official 96 TW test packages contain all project documentation in a Test Directive (TD). The TD is archived electronically in LiveLink according to the project Job Order Number (JON). Access to the electronic archive is provided by the 96 TW on an individual basis. The JON Project Folders are accessed using the link <https://livelink.eglin.af.mil/livelink/livelink.exe/open/973132>.

2.1.6.9.2. **(Added-96TW)** A database of approved THA forms is maintained within LiveLink separate from the official TD and supporting documentation. This separate online archive enables a quick search of hazard minimizing procedures and its associated risk assessment. The THA forms are accessed using the link <https://livelink.eglin.af.mil/livelink/livelink.exe/open/20528919>.

2.1.6.9.2.1. **(Added-96TW)** THA forms are submitted to the SRB through a LiveLink workflow. The workflow may be initiated using the link <https://livelink.eglin.af.mil/livelink/livelink.exe/open/20850989>.

2.1.6.10. **(Added-96TW)** For Air Force munitions, the Chief of Systems Safety (96 TW/SES) will provide a Systems Safety Engineer who will:

2.1.6.10.1. **(Added-96TW)** Be a member of the SRB and be knowledgeable on the system(s) or munitions that are being tested or used in training.

2.1.6.10.2. **(Added-96TW)** Provide a design safety certification statement to the SRB for the weapon system(s) and/or munitions being tested or used for training.

2.1.6.11. **(Added-96TW)** For activities involving any ammunition, flares, explosive devices, aircraft store/weapon systems or directed energy weapon, the Chief of Weapons Safety (96 TW/SEW) will provide a representative to the SRB.

## 2.2. Test Unit Safety Planning Responsibilities

2.2.1. Responsibilities of personnel within a test unit during the test safety planning and review phase are as follows:

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

2.2.2.1. Review and provide coordination for all test and safety plans within their organization.

2.2.2.2. Approve Low Risk test activities as delegated by Group CC (or equivalent).

2.2.2.3. Approve Negligible Risk test activities if applicable per local supplement to this instruction.

2.2.2.4. Ensure all unit personnel involved in safety planning or execution are familiar and comply with this instruction and local supplements and receive initial and annual test safety training.

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

2.2.3. Safety plan authors will:

2.2.3.1. Complete a locally developed Test/System Safety training course offered by the Wing/Complex Test Safety Office and approved by AFTC/SET.

2.2.3.2. Maintain currency by completing continuation training annually.

2.2.3.3. Develop safety plans in accordance with **Chapter 4** of this Instruction and local supplements.

2.2.3.4. Ensure drafted safety plans clearly and adequately provide enough information to support an approval decision.

2.2.3.5. Identify a proposed final project risk level to the independent reviewers.

2.2.4. Test Team will:

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

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

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

2.2.4.4. Ensure tests are being conducted per published technical orders and Air Force Instruction guidance, or waivers are submitted/approved.

2.2.4.5. **(Added-96TW)** Report any changes to the TD/Method of Test (MOT)/Concept of Operations (CONOPS) as specified in Paragraph 8.2.2 of this supplement.

2.2.5. **(Added-96TW)** The 96 TW or other responsible or participating test organization will provide a Test Engineer (TE), Test Manager (TM) or equivalent who will:

2.2.5.1. **(Added-96TW)** Participate in the SRB at 96 TW or SRB for each of their programs.

2.2.5.2. **(Added-96TW)** Ensure personnel involved in the test are briefed on the hazards, minimizing procedures and the requirements stipulated in the Safety Annex to the Test Directive or other published safety document(s).

2.2.6. **(Added-96TW)** For airborne tests, the 96th Operations Group (96 OG) or other test agency using the 96 TW facilities will assign a primary aircrew member who will:

2.2.6.1. **(Added-96TW)** Assist the TE in preparation for the SRB to include participating in identifying any test unique hazards, proposing any hazard minimizing procedures and completing AFTC Form 5000 to be delivered prior to the SRB.

2.2.6.2. **(Added-96TW)** Attend and participate in the SRB.

2.2.6.3. **(Added-96TW)** Ensure that applicable hazards and minimizing procedures identified in the Safety Annex and applicable TEA stipulations are included in the aircrew checklist and are addressed during the aircrew pre-mission brief.

### **2.3. Independent Safety Reviewer Responsibilities**

2.3.1. Independent Safety Reviewers must be independent of the test program and should have appropriate qualifications; be senior in test experience or have formal Test Pilot School training; and have sufficient expertise in the test activity to be reviewed. To the maximum extent possible, independent safety reviewers should be the same individuals that served as independent reviewers for the technical review (if applicable). For an SRB, minimal membership includes Chief of Test Safety Office or designee as the SRB chairperson plus technical, operations, test facility and maintenance reviewers (as required). The SRB chairperson must be independent of the test program and a government employee. Senior leaders (Squadron Commander or above) satisfy this requirement. Independent reviewers will be approved by the Wing or Complex Test Safety Office in accordance with qualification guidelines set forth in local supplements to this instruction. Individual reviewer responsibilities are as follows:

2.3.1.1. **(Added-96TW)** The 96 TW/SEU RSE assigned to a particular test or training program will provide the necessary safety support throughout the program. The RSE provides safety guidance for specific operations conducted at the Eglin Test and Training Complex (ETTC). The 96 TW Safety Office maintains its independence by having no vested interest in the cost, schedule or successful outcome of the test/training program being supported; their only interest being in the safe conduct of the test/training operation.

2.3.1.2. **(Added-96TW)** The 96 TW executes ground, weapon, and flight test and training programs. Independent Reviewer qualifications will be based upon the type of program requiring safety review. 96 TW/SEU will determine if an individual is qualified to participate in an SRB as an Independent Reviewer. All Independent Reviewers must have accomplished the initial and annually recurring test safety review process training as provided by 96 TW/SEU (or equivalent training.) For flight programs, an Independent Reviewer must also be a graduate of Test Pilot School. 96 TW/SEU will also determine if the Independent Reviewer has sufficient expertise in the activity being reviewed. Risk

assessment inputs by approved Independent Reviewers will be without regard to cost, schedule and outcome of the test/training program.

2.3.1.3. **(Added-96TW)** Every effort will be made to include local independent and expert participants in the conduct of 96 TW SRBs. The SRB chairperson will determine if those individuals are qualified to fill the roles of technical and operational reviewers, and will designate board members as Independent Reviewers. If a local Independent Reviewer is not available, the SRB chairperson will ensure Independent Reviewers can participate in some fashion during the scheduled SRB. The test team should work with the RSE well in advance of the planned SRB in order to obtain a non-local Independent Reviewer.

2.3.2. SRB Chairperson will:

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

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

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

2.3.3. Technical Reviewer will: Ensure technical safety hazards are identified and appropriately controlled (eliminated, mitigated, or residual risk determined to be acceptable).

2.3.4. Operations Reviewer will:

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

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

2.3.5. Facility Reviewer (if required) will: Ensure hazards related to operating and maintaining facility-based test systems are identified and appropriately controlled.

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

2.3.7. Optional Reviewers, as deemed necessary by the SRB chair, may include but are not limited to:

2.3.7. **(96TW)** In any SRB, additional expertise from other sources may and should be called upon when required.

2.3.7.1. Range Safety/Range Operations Engineer

2.3.7.2. Flight Safety Representative

2.3.7.3. Test Engineer

2.3.7.4. System Safety Engineer

2.3.7.5. Ground Safety Representative

2.3.7.6. Weapons Safety Representative

2.3.7.7. EOD Representative

- 2.3.7.8. Test Requestor / Item Contractor
- 2.3.7.9. Airspace Representative
- 2.3.7.10. Logistics Representative
- 2.3.7.11. Munitions Representative
- 2.3.7.12. Fire Department Representative
- 2.3.7.13. Bioenvironmental Engineer
- 2.3.7.14. Medical Representative
- 2.3.7.15. Environmental Management Office Representative
- 2.3.7.16. Range O&M Representative
- 2.3.7.17. Laser or Directed Energy Safety Representative
- 2.3.7.18. Flight Termination System Analyst

## Chapter 3

### RISK ASSESSMENT

**3.1. General.** Risk is defined as a combination of mishap severity and mishap probability. The overall risk level is the degree of risk assumed by leadership in allowing the proposed test to be accomplished in the manner described and under the conditions specified. Test teams will assess risk; independent reviewers will evaluate test unique hazards identified by the test team, assess proposed mitigations and corrective actions, and affirm the test team's proposed overall risk level. Once the independent review board has agreed upon a risk level, they will make a recommendation for a final risk level to the Test Execution Authority (TEA) as outlined in [Chapter 6](#). Test teams use system safety techniques, prior experience, legacy system research, and overall engineering judgment to identify test hazards and assess risk by evaluating the credible outcome (mishap severity) of each hazard together with the associated probability of occurrence. The mishap severity and probability is then plotted on a Risk Assessment Matrix to determine the hazard's overall risk level. Although the goal is to minimize risk through good test and safety planning/review processes, the test may result in residual risk that must be directly accepted by the TEA in accordance with [Section 6.1](#).

**3.2. Determine Mishap Severity.** The mishap severity category is a qualitative assessment of the most reasonable credible mishap consequence that could occur with all mitigation in place. For activities at AFTC organizations, the mishap severity categories are shown in [Table 3.1](#). The assessment should incorporate engineering judgment and/or past experience with similar tests or systems with all minimizing procedures and corrective actions in place. Descriptive definitions should be used as the primary criteria for assessing mishap severity. However, quantitative values may be used for higher cost test articles. Quantitative values for mishap severity listed in [Table 3.1](#) may be adjusted to match current guidance specified in AFI91-204, *Safety Investigations and Reports*.

**Table 3.1. Mishap Severity Definitions**

MISHAP SEVERITY	Level	Descriptive	Quantitative <sup>1</sup>	Mishap Class
Catastrophic	1	Loss of life, aircraft, facility, or expensive and unique system	> \$2M	A
Critical	2	Severe injury, lengthy hospital stay, or permanent injury. Severe aircraft, equipment or property damage	\$500K - \$2M	B
Marginal	3	Minor injury, medical treatment requiring lost work days, but no permanent injury. Minor damage	\$50K - \$500K	C
Negligible	4	Superficial injury, little or no first aid required. Incidental, less than minor damage	< \$50K	D/E

**1 - Use values listed in table, or current AFI91-204 guidance, whichever is higher**

**3.3. Determine Mishap Probability.** The safety reviewers will subjectively assess the *mishap* probability with all mitigation in place. The mishap probability level should qualitatively and/or quantitatively measure the likelihood of the *mishap* occurring due to personnel error, environmental conditions, design inadequacies, procedural deficiencies, or system/subsystem component failure or malfunction. The assessment should incorporate engineering judgment and past experience with similar tests or systems with all minimizing procedures and corrective actions in place. If available, the test team and safety reviewers should consider the system safety analysis results from the contractor or system program office in order to understand areas of known concern. For operations where there is a well-developed database or sophisticated modeling/simulation, probabilities may be expressed quantitatively as  $1 \times 10^{-4}$ ,  $3.8 \times 10^{-6}$ , etc. However, for developmental testing, the ability to compute numeric failure probability values with confidence is difficult because these activities involve new, complex, and often unproven systems. Therefore, **Table 3.2** also contains descriptive probability definitions (along with some example descriptive statements) that should be used as a standard to consistently assess mishap probability for all AFTC test activities.

**3.3. (96TW)Table 3. 2. #6 footnote added for Improbable probability.**

**Table 3.2. Mishap Probability Definitions**

Probability	Level	Descriptive	Quantitative (Probability of occurrence per event <sup>1</sup> )
Frequent	A	Very likely to occur <sup>2</sup>	$> 10^{-1}$
Probable	B	Likely to occur <sup>3</sup>	$< 10^{-1}$ but $> 10^{-2}$
Occasional	C	Some likelihood to occur, but not expected <sup>4</sup>	$< 10^{-2}$ but $> 10^{-3}$
Remote	D	Unlikely to occur <sup>5</sup>	$< 10^{-3}$ but $> 10^{-6}$
Improbable	E	Highly unlikely to occur	$< 10^{-6}$

1 - Event may be defined in local supplements to this instruction.

2 - Test activity (or something similar) done before and a mishap occurred or very nearly did. The test exceeds the design limits. There are multiple test-unique single points of failure possible.

3 - Test activity (or something similar) done before and came close to a mishap. The test is at the design limit. There is at least one test-unique single point of failure possible.

4 - All available analysis has been conducted and no information suggests the chance of mishap occurrence is Frequent or Probable. Test activity may never have been done before but areas of concern have been identified. The test is nearing the design limit.

5 - Test activity (or something similar) done before with no problems encountered. Well within the design limits. No test-unique single points of failure.

(96TW) IMPROBABLE: There just is not a problem. Nothing has ever gone wrong. Several failures required to have any significant consequences.

**3.4. Risk Assessment Matrix.** The risk assessment matrix, shown in **Figure 3.1**, is a tool for assessing mishap risk of test hazards as documented in safety planning documents. The risk categories are discretely divided into four shaded regions to distinguish between NEGLIGIBLE (hashed), LOW (white), MEDIUM (grey), and HIGH (diagonal pattern) risk levels. The correlation of approval authorities with the assigned overall risk level is discussed in **Chapter 4**. Despite the discrete distinction between each risk level, safety reviewers are reminded of the subjective nature of their assessment. This subjectivity is illustrated within the Risk Matrix using two curved subjectivity lines. The region between the subjectivity lines denotes a subjective MEDIUM risk level. Any block bisected by a subjectivity line becomes a “block of subjectivity”. A subjective assessment differing from the discrete risk level blocks is addressed further in **Paragraph 3.6.1**. The use of the matrix defined in **Figure 3.1** and locally developed

Test Safety Review Processes defined in supplements to this instruction are in accordance with AFI 91-202, *The US Air Force Mishap Prevention Program*, AFMC Sup, Chapter 13.

**Figure 3.1. Risk Assessment Matrix**

		Mishap Severity Category			
		<b>Catastrophic – I</b> Death, System/Facility Loss (e.g. Class A Mishap)	<b>Critical – II</b> Severe Injury, Major System/Facility Damage (e.g. Class B Mishap)	<b>Marginal – III</b> Minor Injury, Minor System/Facility Damage (e.g. Class C Mishap)	<b>Negligible – IV</b> Less than Minor Injury or System/Facility Loss (e.g. Class D/E Mishap)
Probability of Mishap Occurring During the Test	<b>Frequent (A)</b>				
	<b>Probable (B)</b>	<b>HIGH</b>			
	<b>Occasional (C)</b>		<b>MED</b>		
	<b>Remote (D)</b>			<b>LOW</b>	
	<b>Improbable (E)</b>				<b>NEGLIGIBLE</b>

**3.5. Negligible Risk.** The negligible overall risk category reflects a subset of “low” risk applicable to activities that are normal or routine operations. The Negligible Risk category is defined as hazards where the severity and probability assessments fall in the Negligible Severity column and Occasional, Remote, or Improbable Probability rows on the Risk Assessment Matrix. Due to the subjective nature of any risk assessment, an overall assessment greater than negligible for these blocks could still be appropriate.

3.5.1. For the severity category to be Negligible, the consequences of a mishap attributable to test activities must be less than minor injury or system damage. For personnel, the impact of the injury or illness equates to no work days lost. For equipment or facilities, less than minor damage equates to losses less than \$50,000 (or current Class D definition). Applicable mishap probabilities for NEGLIGIBLE risk are limited to “occasional, “remote”, or “improbable” levels. If the test team or reviewers identify test unique hazards that warrant a Test Hazard Analysis document, then an overall risk category of NEGLIGIBLE is not appropriate.

3.5.2. Examples include: ride-along data collection points, special instrumentation checkouts, form-fit-function checkouts of non-critical hardware/software, sensor or system tests, or logistics testing activities that do not directly affect the airworthiness of an aircraft or performance of a test facility nor are they required for hazard avoidance.

**3.6. Determine Overall Risk Assessment.** An overall risk level assessment is accomplished after all hazards to the test have been identified and mitigations are clearly defined and

documented in accordance with **Section 4.4**. Hazards that are unique to the test will be documented in the AFTC Form 5000, *Test Hazard Analysis (THA)*. Hazards associated with normal operation and maintenance may be documented in a locally produced Baseline Hazard Analysis (BHA) form. Plot the combination of mishap severity and probability on the Risk Assessment Matrix for each hazard. Once all the individual hazards are plotted, the test team will discuss the safety aspects of the plan and propose an overall project risk level. Project risk will be no lower than the lowest assessed risk from all the hazards. A detailed explanation of THAs and BHAs is discussed in **Section 4.4 Test Package Documentation**.

3.6.1. Subjective Assessments. As discussed in previous sections, both the THA and overall risk assessment can be highly subjective as each test team member and safety reviewer incorporates engineering judgment and/or past experience with similar tests or systems into their risk level assessment. Because of this subjectivity, a test team or safety reviewer may conclude that risk levels that fall within “blocks of subjectivity” may be higher or lower than depicted by the discreet risk level regions. For this reason, test teams and safety reviewers may utilize the subjectivity lines to fine tune their risk assessment if THA or overall risk assessment falls within a block bisected by a subjectivity line. The region between the subjectivity lines denotes a subjective MEDIUM risk level. Therefore, subjective risk assessments may only be adjusted one risk level higher or lower than the discrete risk assessment. The use of subjectivity lines is at the discretion of each Wing or Complex per supplements to this instruction.

3.6.1. (96TW) The expectation for SRB assessment is to use discrete risk level assessments for each identified hazard. The use of the subjectivity lines will be determined on a case-by-case basis dependent on the hazard discussion at the SRB and at the discretion of the SRB chairperson.

3.6.2. THA Risk Assessment. The test team may assess the pre- and post-mitigation mishap severity category and probability level by plotting both on the Risk Assessment Matrix at **Figure 3.1**. This provides a comparison between initial and residual risk levels to evaluate the adequacy of safety measures and best available solution. Test teams and safety reviewers should note that although a minor improvement to the safety plan may not change the assessed “severity”, “probability”, or “risk”; it will still reduce the actual risk. The residual risk level determined by the test team for each THA acts as a proposal for the independent safety reviewers to affirm or adjust as necessary.

3.6.3. Overall Risk Assessment. The test team will propose an overall risk level for the test plan as determined by procedures discussed in this section. During the safety review phase (outlined in **Chapter 5**), the independent safety reviewers will have a general discussion of the test, identified hazards, and associated mitigation to generate opinions on the residual risk. The discussions should be candid and result in a general agreement by the board, although disagreements may occur. Safety reviewers will weigh the control measures in place, their experience with the types of tests, and the system under test (SUT) to assess the overall risk. The cumulative risk may (and frequently does) exceed the assessed risks for all THAs individually. However, the overall risk cannot be lower than the risk associated with any individual THA. The safety reviewers must also consider the complexity of the test, the potential for safety-related “unknown unknowns”, and their own experience with similar test activities. By using the Risk Assessment Matrix (**Figure 3.1**) and referencing the overall risk level descriptions, shown in **Table 3.3**, each safety reviewer should assess overall risk and

provide justification for their assessment. This justification is especially important if subjective assessments are incorporated as outlined in [Paragraph 3.6.1](#)

**Table 3.3. Overall Risk Level Assessment**

<b>Assessment</b>	<b>Description and Implication</b>
HIGH RISK	Tests or activities that present a significant risk to personnel, equipment, and/or property even after all precautionary measures have been taken.
MEDIUM RISK	Tests or activities that present a greater risk to personnel, equipment, and/or property than normal operations even after all precautionary measures have been taken.
LOW RISK	Test or activities that present no greater risk than normal operations. Routine supervision is appropriate
NEGLIGIBLE RISK	Activities that are normal, routine, and operationally representative

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

3.6.3.2. If appropriate, the risk may be assessed separately for AFTC and non-AFTC assets, for different phases of the test programs, or for individual test events.

**3.7. Elevated Risk Activities.** Certain tests conducted at AFTC organizations have demonstrated a higher than normal risk due to the inherent hazards involved. However, if the analysis of test activities clearly indicates that the predicted performance (flying qualities, pilot induced oscillation susceptibility, flutter margin, loads margin, etc.) is well within acceptable levels, the test point need not be considered elevated risk. This may be especially true if the analysis model has been validated through other simulation or test activity. In the absence of quantitative probability data, however, use the following list of tests as a *guide* in identifying those tests which require close analysis to determine if an elevated risk level is warranted. The following list is not all inclusive, other similar activities may also be considered elevated risk:

3.7.1. Rocket motor test firing.

3.7.2. High Mach air load wind tunnel testing.

3.7.3. Radome vulnerability assessment testing.

3.7.4. Scaled model loads testing.

3.7.5. First flights of new/modified aircraft configurations (including new structures, changes to: flying qualities, performance, armament configurations, and major T-2 modifications).

3.7.6. New or modified aircraft life support systems.

3.7.7. Flight envelope expansion.

3.7.8. Flutter testing.

3.7.9. High speed testing of legacy aircraft up to envelope limits.

- 3.7.10. Rejected takeoffs, or performance landings at high sink rates, high crosswinds, or high brake energy levels.
- 3.7.11. Single-engine aircraft air start envelope determination.
- 3.7.12. High angle of attack, spin prevention and out of control tests.
- 3.7.13. Helicopter height-velocity envelope determination.
- 3.7.14. Ground and air minimum control speed determination.
- 3.7.15. Flight tests of development or prototype unmanned vehicles.
- 3.7.16. Tests involving high energy devices or hazardous materials.
- 3.7.17. Armament testing to include testing with live warheads.
- 3.7.18. Powered flight of developmental or prototype missiles.
- 3.7.19. Flight envelope clearance tests of new armament or release systems.
- 3.7.20. Photo/safety chase of any weapon during fly-out or termination.
- 3.7.21. Terrain avoidance and terrain following tests.
- 3.7.22. Initial man/equipment aerial deliveries.
- 3.7.23. Photo/safety chase of dynamic or low altitude maneuvering.

## Chapter 4

### TEST SAFETY PLANNING PHASE

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

#### **4.2. Safety Considerations During Test Planning.**

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

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

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

#### **4.3. Safety Planning Objectives.**

4.3.1. Identify Test Unique Hazards. The team will identify unique hazards associated with each type of test or activity. In some cases test activities may elevate the risk associated with routine operational hazards, thus requiring additional safety planning. The following are some additional suggestions for identifying test unique hazards.

4.3.1.1. Refer to archived safety planning for consideration of similar tests.

4.3.1.2. Contact personnel or test teams with experience in similar test activities or testing.

4.3.1.3. Research technical aspects via technical libraries, internet, etc.

4.3.2. Eliminate or Control Hazards in the Following Order of Precedence.

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

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

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

4.3.2.4. Provide caution and warning devices to detect an unsafe condition or trend.

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

#### 4.4. Test Package Documentation

4.4.1. The “test package” shall be an all-encompassing package of documents consisting of a test plan, safety plan, and any other appendices or documentation that support the test planning. The safety plan will be located in the “Safety Annex” to the test plan. Additional guidance on the test planning process and documentation can be found in local Wing or Complex test planning instructions.

4.4.1.1. **(Added-96TW)** The official 96 TW test package is known as the Test Directive (TD). Annexes to the TD include the MOT and/or CONOPS, Technical Support Annex (TSA), Logistics Annex (LA) and Safety Annex (SA). For the purposes of the implementation of AFTCI 91-203, the 96 TW Test Directive’s MOT/CONOPS serves as the “test package”.

4.4.1.1.1. **(Added-96TW)** The MOT details the test request, objectives, test items, ground and/or airborne support, test procedures or CONOPS and potential hazards. Proposed minimizing procedures are integrated in the MOT and reviewed as part of the SRB briefing (AFTCI 91-203, Chapter 5). These procedures can also be found documented in the THA form or detailed in a separate MOT/CONOPS potential hazards paragraph. The safety plan procedures are the focal point of the SRB brief. The approved details/resources of the test are documented in the Safety Annex following the template in Attachment 2 of this supplement; further Safety Annex descriptions are found in Paragraph 4.4.6 of this supplement.

4.4.2. The safety plan should follow documentation guidance from Chapter 13, paragraph 13.5.4, of AFI 91-202, *The US Air Force Mishap Prevention Program* as supplemented by AFMC. The safety plan shall also include documentation of General Minimizing Procedures (GMPs), THAs, BHAs, and a BSR (if applicable). THAs will be documented on an AFTC Form 5000, *Test Hazard Analysis*. BHAs will be documented in accordance with local supplements. Format and structure of the safety plan may be further defined in local supplements to this instruction.

4.4.2.1. THAs are stand-alone documents that assess the risk associated with a single test unique hazard. A hazard is any condition that has the potential of causing a mishap. Confirm that the hazard is not a hazard associated with the basic operation of the aircraft, test article, vehicle, system under test, or facility. If the hazard is not unique to the series of tests, no THA is required. For example, midair collision with non-participating aircraft and bird strikes are not generally considered test unique hazards. However,

should the very nature of the test increase the probability of these hazards above that of normal operations, they should be addressed as test unique hazards. The THA will include the following:

4.4.2.1. **(96TW)** The THA form, as a stand-alone working-level document, is not intended to be a directive document requiring the procedures defined on the form to be followed; those requirements will be defined in the published and signed Safety Annex with THA forms attached. The THA form communicates the logic behind the risk assessment for test-unique hazards and provides reference safety material for future test teams who may conduct similar tests or encounter similar hazards. Members invited to the SRB will ensure THA forms are completed and delivered to the Test and Range Safety Officer prior to the SRB. The SRB will discuss and approve the proposed risk level and minimizing procedures or assign a new risk level and/or modify the proposed minimizing procedures. The final approved THA form will be included in the Safety Annex as appropriate based on the outcome of the SRB. A database of past final THA forms is maintained for the test community to search past hazards and their minimizing procedures.

4.4.2.1.1. Mishap severity and probability of the Hazard as discussed in detail in **Chapter 3**.

4.4.2.1.2. Causes are anything that could lead to the presence of the hazard. This is the cause of the hazard, not the mishap. There may be more than one cause.

4.4.2.1.3. Effect is the mishap that may happen if the hazard is not controlled. The mishap is what the THA is trying to prevent and is directly related to the mishap severity level.

4.4.2.1.4. Controls or Minimizing Procedures should be an action or procedure and tied to a specific cause, causes, or effect it is trying to control. These attempt to break the chain of events linking the causes to the hazard.

4.4.2.1.5. Corrective Actions or Emergency Procedures are the list of actions taken to prevent or mitigate a mishap (the effect) if the hazard occurs. Actions may be taken by the control room, ground personnel, flight crew, test facility operators, and anyone else participating in the test. Test unique and hazard specific emergency procedures would be listed here. If not test unique, corrective actions may state operation manual procedures will be followed. These attempt to break the chain of events linking the hazard to the mishap.

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

4.4.2.1.7. **(Added-96TW)** While hazard identification should have been accomplished leading up to the SRB, emphasis should be placed on identifying items of special interest for THA/SRB consideration including but not limited to:

4.4.2.1.7.1. **(Added-96TW)** New systems or system variants: aircraft, stores, instrumentation, test equipment

4.4.2.1.7.2. **(Added-96TW)** Unique and/or unprecedented systems not

previously used in the test environment: aircraft, stores, instrumentation, test equipment

4.4.2.1.7.3. **(Added-96TW)** Expansion of development systems to new user groups/test teams:

4.4.2.1.7.4. **(Added-96TW)** Unfamiliar procedures

4.4.2.1.7.5. **(Added-96TW)** Transitions of responsibility

4.4.2.1.7.6. **(Added-96TW)** Modifications to established procedures or test resources

4.4.2.1.7.7. **(Added-96TW)** Unproven or seldom used test methods

4.4.2.1.7.8. **(Added-96TW)** Unfamiliar/unproven supporting analytical techniques

4.4.2.1.7.9. **(Added-96TW)** First-time test events for the system (e.g. aircraft, aircraft component, store) under test or for the specific system configuration, or combination of systems, (e.g. aircraft loadout, electronic subsystem combination) under test

4.4.2.1.7.10. **(Added-96TW)** Testing to address changes in systems under test, whether due to:

4.4.2.1.7.10.1. **(Added-96TW)** Pre-planned upgrades

4.4.2.1.7.10.2. **(Added-96TW)** Modifications resulting from deficiencies identified by inspection/review

4.4.2.1.7.10.3. **(Added-96TW)** Corrective actions addressing failures in previous related tests

4.4.2.1.7.10.4. **(Added-96TW)** Test approaches with a history of associated failures/problems

4.4.2.1.7.10.5. **(Added-96TW)** Systems/subsystems/components with a history of associated failures/problems

4.4.2.1.7.10.6. **(Added-96TW)** Additional research and/or analysis

4.4.2.1.7.10.7. **(Added-96TW)** Test range restrictions (location, weather, additional resources)

4.4.2.1.7.10.8. **(Added-96TW)** Test point/phase changes (reorder points, insert/complete phase, etc.)

4.4.2.1.7.10.9. **(Added-96TW)** Test point specific requirements (additional requirements for elevated risk test points)

4.4.2.1.7.10.10. **(Added-96TW)** Familiarization or additional training

4.4.2.1.7.10.11. **(Added-96TW)** Aircrew restrictions (experience level, qualifications, number aboard, required equipment, etc.)

4.4.2.1.7.10.12. **(Added-96TW)** Aircraft restrictions (capabilities or equipment that would simplify/enhance test conduct)

4.4.2.1.7.10.13. (Added-96TW) Munitions modifications

4.4.2.1.8. (Added-96TW) A few typically generic hazards that may become test unique due to the nature of the test should also be considered.

4.4.2.1.8.1. (Added-96TW) Bird strikes are not generally considered to be a test-unique hazard. But if, during the execution of a test, flight through a known bird-roosting area is necessary, then “bird strikes” would be a test-unique hazard.

4.4.2.1.8.2. (Added-96TW) Heavy equipment operations are not generally considered to be a test-unique hazard. But if during the execution of a test, a novel aircraft loading method is proposed using non-standard heavy equipment, then “heavy equipment operation” would be a test-unique hazard.

4.4.2.1.8.3. (Added-96TW) Mid-air collision is not generally considered to be a test-unique hazard. But if during the execution of a test, safety/photo chase requirements could potentially increase the likelihood of proximity or relative translation at periods when the aircrew could be distracted while executing other tasks, then “chase aircraft collision” would be a test-unique hazard.

4.4.2.1.9. (Added-96TW) It may be difficult to tell just when a standard parameter or action becomes test-specific. Some good indications would be:

4.4.2.1.9.1. (Added-96TW) If the test includes events that could be characterized as a system demonstration, system variant, or system combination for the first time.

4.4.2.1.9.2. (Added-96TW) If the test includes demonstrating systems at conditions outside the bounds of previous demonstrations.

4.4.2.1.9.3. (Added-96TW) If the test involves significantly modifying standard procedures.

4.4.2.1.9.4. (Added-96TW) If personnel unfamiliar with the test were to conduct the test and needed or wanted a briefing to better understand the associated hazards.

4.4.2.1.9.5. (Added-96TW) If a nominal hazard probability is increased because of the nature of the test.

4.4.2.1.10. (Added-96TW) Taking all entered information into consideration, the risk assessment is determined using the Risk Level Assessment and the definitions found in AFTCI 91-203, Chapter 3. This defines the overall risk level for the identified hazard. Any test or training point/event subject to this hazard would then be according to highest hazard risk assessment.

4.4.2.2. GMPs are stand-alone phrases/statements and used to address test article restrictions, test build-up, critical parameter monitoring, go-no-go criteria, weather or environmental criteria, and flight test chase requirements among other items of test safety concern. Some general minimizing procedures from THAs or BHAs may be repeated as a GMP if desired for emphasis.

4.4.2.3. Baseline Hazard Analysis (BHA) – An analysis used to document known hazards concerned with the normal day-to-day operation and maintenance of a system, subsystem or facility.

4.4.2.4. Baseline Safety Report (BSR) – A compilation of the entire baseline hazard analysis for a test unit, plant operation, utility, etc. The BSR allows the individual hazard analyses that make up the baseline to be evaluated in a comprehensive package and thus shows the interaction of the systems and interfaces.

4.4.3. Safety plans may be prepared electronically or printed and arranged in hardcopy format. Electronic signatures may be used for coordination and approval of electronic packages.

4.4.4. Statement of Capability (SOC). The following wording must be included in any SOC that is transmitted to a customer when the safety review process is required: “AFTC Safety Review: The proposed test/activity must be reviewed using the procedures contained in AFTCI 91-203, AFTC Test Safety Review Policy and any local supplements to this instruction. To support this review, safety planning must begin early in the program.”

4.4.5. Mishap Accountability. Detailed information on mishap accountability and investigating responsibility must be provided by the test team in the Safety Annex when deviating from AFI 91-204, or if non-Air Force assets are involved, to include pre-mishap planning. A memorandum of agreement is the preferred method when multiple agencies are involved.

4.4.6. **(Added-96TW)** Safety Annex. The Safety Annex shall contain the identified hazard(s), minimizing procedure(s), and risk assessment(s) consolidated from the Test Safety Review Process. Typically, the minimizing procedures developed from the SRB and/or THA forms (AFTC Form 5000) are consolidated and published in the Safety Annex as “Safety Requirements”. Attachments to the Safety Annex may include the SRB Summary (SRBS), THA forms or other related documents as necessary. It also may contain other essential range safety criteria such as approved test areas, test items, danger areas, safety instrumentation requirements, etc. The Safety Annex format is shown in Attachment 2. Final approval of the Safety Annex resides with the Director of Safety or designated representative.

4.4.7. **(Added-96TW)** Safety Review Board Summary (SRBS). An SRBS documents the results of the SRB and will, as a general rule, contain a list of attendees, brief background material, a Design Safety Certification statement (usually provided by 96 TW/SES), a mishap accountability statement, safety footprint development methodology and notes of all topics that were discussed. Any test/training activity contingent on any waivers (i.e. Chase waiver, deviations from AFTCI 91-203 and/or 96 TW Supplement) requires discussion at the SRB and will be included in any hazard risk assessment and documented in the SRBS. Any waiver not approved by the required authority after the SRB will require a reassessment by the SRB. The SRBS will identify how the hazard risk assessments apply to the proposed test points for tests which contain identifiable test points, test sets or test matrices. The SRBS should also include a discussion of items that were determined not to be a hazard as well as those identified as hazards. The rationale for determining the hazard minimizing procedures should be clearly documented in the SRBS (e.g., safety chase is required to inspect the store for security after each test point or terminate testing NLT one hour prior to sunset so as to

preserve adequate ambient lighting for completing a visual BDA). The SRBS format is shown in Attachment 3. Final approval of the SRBS resides with the Chief of Test and Range Safety or a designated representative.

## Chapter 5

### TEST SAFETY REVIEW PHASE

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

5.1.1. Determine the type of safety review (examples in [Paragraph 5.2.2](#)) and consult Wing/Complex Test Safety office for concurrence.

5.1.2. Evaluate the probability and severity category for each Test Hazard Analyses (THAs) or Baseline Hazard Analyses (BHAs) ([Chapter 3](#)). Provide to the safety reviewers the proposed overall risk level and any test points or test phases which may have a lower risk than the overall risk level (if they exist). Include the rationale for the varying risk levels. The proposed risk level(s) will be considered during the independent safety review.

5.1.3. Develop a list of safety reviewers following guidance in [Section 2.3](#)

**5.2. Safety Review.** The purpose of the Safety Review phase is to allow an independent team to formally review the test unit's safety planning to ensure that all test hazards have been identified and mitigated, and then assess the residual risk. The documentation from the Safety Review phase should reflect a suitable level of clarity and maturity for the Test Execution Authority to make an informed decision on whether to proceed with test execution. The Wing or Complex Test Safety office is the focal point for the Safety Review phase.

5.2.1. Objectives:

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

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

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

5.2.1.4. Ensure the safety annex clearly and adequately provides enough information to support an approval decision by senior leadership.

5.2.1.5. **(Added-96TW)** Ensure that any test through the 96 TW will be accomplished with all due respect to the safety of the public, aircrew, activity participants and facilities involved.

5.2.1.6. **(Added-96TW)** Provide a forum by which 96 TW customers, 96 TW/SE, 96 OG/CC, 96 TW/ CC and AFTC/CC are assured the test will be conducted as safely as possible.

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

5.2.2.1. Safety Review Board (SRB).

5.2.2.2. Electronic Safety Review (ESR).

5.2.2.3. Combined Technical Review Board (TRB)/SRB.

5.2.2.4. Negligible Risk Review (NRR).

**5.3. Safety Review Board.** The SRB is a formal safety review meeting attended by independent safety reviewers and project personnel, and is chaired by a designated Wing or Complex Test Safety office representative. The decision to conduct an SRB is based primarily on the test plan size, complexity, maturity of test item/methodology, and expected risk level. To the maximum extent possible, independent safety reviewers chosen for the SRB should be the same individuals that served as independent reviewers for the technical review. This is to ensure continuity of information regarding test methodology is preserved throughout the review and approval process and should result in a more insightful and thorough SRB.

**5.4. Combined TRB/SRB.** For those tests that are easily understood, less complex, or lower in risk, the test team may request a combined TRB/SRB in lieu of separate technical and safety reviews to minimize impact to resources and shorten the timeline. Teams should contact the Test Safety office for final determination on this course of action. Teams will ensure that the test plan is sufficiently mature for safety review prior to the combined TRB/SRB.

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

**5.6. NEGLIGIBLE Risk Review.** A Negligible Risk Review (NRR) is a streamlined technical and safety review process applicable to a subset of low risk tests. Resultant test hazards cannot have severities greater than “negligible” or probabilities greater than “Occasional” (See [Figure 3.1](#), Risk Assessment Matrix). Test activities that are normal, routine, and operationally representative are also candidates for an NRR process since the risk is effectively the same as the operational risk.

5.6.1. NRR Qualification. NRR qualification of a test program should be proposed by the test team to the Wing or Complex Test Safety office who will make the final determination based on the following criteria:

5.6.1.1. The risk level for the test activity must be assessed as negligible and fall within the hashed blocks in the Risk Assessment Matrix, (see [Figure 3.1](#)). Examples of these activities are listed in [Paragraph 3.5.2](#).

5.6.1.2. Testing will adhere to normal operating procedures and existing risk control measures as defined in the approved flight manual(s), technical orders, test facility procedures, and/or operational guidance/instructions (e.g. Air Force Instructions, Air Force Materiel Command Instructions, and Air Force Test Center Instructions).

5.6.1.3. GMPs are allowed only to the extent that they clarify or further restrict already existing guidance. If the test team or reviewers identify test unique hazards that warrant a Test Hazard Analysis document, then the NRR process is not appropriate.

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

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

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

5.6.2. NRR documentation will be located in the Safety Annex to the Test Plan.

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

5.6.3.1. **(Added-96TW)** For all 96 TW test and training activities, the negligible risk category will remain within and be assessed as low risk.

5.6.3.2. **(Added-96TW)** An electronic streamline risk assessment process (96 TW Livelink workflow) exists for evaluating tests that follow Standard Operating Procedures (SOP) in conjunction with the TD/MOT/CONOPS for facilities such as J-PRIMES, GWEF and McKinley Climatic Laboratory. This process may be used at the discretion of the SRB chairperson after review of the MOT/CONOPS for the specific activity. Additional electronic streamline risk assessments will be approved by 96 TW/SEU as appropriate.

**5.7. (Added-96TW) SRB Schedule.** The SRB will be scheduled after the Lead Development Test Organization (LDTO) or Participating Test Organization (PTO) has completed their technical review of the MOT or CONOPS. The SRB should be held as late in the planning cycle as possible. Any changes to the MOT or CONOPS after the SRB has been completed could result in the requirement to re-accomplish the Test Safety Review Process resulting in the re-evaluation of the previously defined risk assessment, re-convening of the SRB and/or additional review by the Test Execution Authority (TEA). A typical SRB timeline is shown in Table 5.1. This schedule will vary depending on test complexity, test safety issues, urgency, etc. Streamlined test planning guidance is contained in the 96 TW Plan 70, *Crisis/Command Directed Rapid Response Testing*. Reconvening of the SRB or review by the TEA will be done at the discretion of the SRB chairperson or TEA, respectively.

**Table 5.1. (Added-96TW) SRB Timeline**

Timeline	Events
SRB-(5-10) workdays	The SRB will normally be scheduled between 5 and 10 workdays of receipt of all necessary documentation. Documentation <sup>1,2</sup> will include TD with MOT/CONOPS, flight profiles, Recommended Flight Clearance (RFC), mission summaries, system descriptions, munitions types/quantities, test item recovery or dud analysis requirements, test areas, targets, AFTC Form 5000 (THA) and other information as required.
SRB-2 workdays	The SRB chairperson will contact the SRB requester with any concerns not addressed.
SRB	Key members as approved by the SRB and defined in Paragraph 5.8 present and prepared to discuss the hazards associated with the documented activity
SRB + 8 workdays	Safety Annex signed and ready for publication
	1 – These documents and information are not required for all SRBs. Draft versions are satisfactory. The SRB chairperson will determine if the required documentation is sufficient to proceed with SRB scheduling. 2 – All documentation delivered will include AFTC Form 5001 with appropriate personnel identified and signatures as required.

**5.8. (Added-96TW) SRB Membership.** Membership will be determined by the type of test being conducted, the responsible test organization and where the test is being conducted. SRB membership for each of these types of tests will be IAW AFTCI 91-203, Paragraph 2.3; SRB members may fulfill multiple roles as defined and approved by the SRB chairperson. At a minimum, one member of the SRB will be designated an Independent Reviewer.

5.8.1. (Added-96TW) The required SRB core members for all flight tests include:

5.8.1.1. (Added-96TW) Test and Range Safety Engineer

5.8.1.2. (Added-96TW) Flight Safety Representative

5.8.1.3. (Added-96TW) Test Engineer, Test Manager or equivalent

5.8.1.4. (Added-96TW) Test Aircrew Representative. All tests using any ammunition, flares, explosive devices, aircraft store/weapons system or directed energy weapon will also require a Weapon Safety Representative and Explosive Ordnance Disposal (EOD) representation as necessary. Any Air Force compatibility test conducting carriage or release of a new store, suspension hardware or aircraft/store configuration; expanding the carriage or release envelope of an existing store; or expanding the carriage or release envelope of an existing aircraft/store configuration will require a SEEK EAGLE Program Representative. Deviations from this core membership will be coordinated between the required core member and the SRB chairperson prior to the SRB.

5.8.2. (Added-96TW) The required SRB core members for all ground tests include:

5.8.2.1. **(Added-96TW)** Test and Range Safety Engineer

5.8.2.2. **(Added-96TW)** Test Engineer, Test Manager or equivalent. All tests using any ammunition, flares, explosive devices, aircraft store/weapons system or directed energy weapon will also require a Weapon Safety Representative and EOD representation as necessary. Deviations from this core membership will be coordinated between the required core member and the SRB chairperson prior to the SRB.

**5.9. (Added-96TW) SRB Member Responsibilities.** All SRB members must attend the SRB having reviewed the MOT/CONOPS, with an understanding of the identified hazards and any proposed minimizing procedures, and submitted any THA forms as necessary.

5.9.1. **(Added-96TW)** Test and Range Safety Officer (96 TW/SEU)

5.9.1.1. **(Added-96TW)** Establish contact with the test requester, test engineer and test pilot/aircrew member in order to initiate a preliminary review of the test.

5.9.1.2. **(Added-96TW)** Prior to the SRB, review the MOT or CONOPS to ensure all topics pertinent to the test are addressed.

5.9.1.3. **(Added-96TW)** Review the 96 TW/SEU THA database to determine if there are any applicable topics to consider in the SRB.

5.9.1.4. **(Added-96TW)** Complete, as needed, AFTC Form 5000 (THA) for each newly identified test-unique hazard.

5.9.1.5. **(Added-96TW)** Schedule the SRB IAW the scheduling timeline detailed in Table 5.1. All efforts should be used to notify participants between five and ten workdays prior to the SRB. This will allow all members to arrange their schedules and review applicable documentation.

5.9.1.6. **(Added-96TW)** Document the safety requirements in the format shown in the Safety Annex template (Attachment 2). All documented test unique hazards and mitigating/minimizing procedures should be included in the Test Approval Brief (TAB).

5.9.1.7. **(Added-96TW)** Document the minutes of the SRB in the format shown in SRBS template (Attachment 3). The SRBS will document all subjects discussed at the SRB. The SRBS will detail not only the aspects of the test that were identified as being hazardous, but also those that were rejected as not being hazardous and the reasons for that determination.

5.9.2. **(Added-96TW)** Systems Safety Engineer (96 TW/SES)

5.9.2.1. **(Added-96TW)** For USAF munitions and test items, 96 TW/SES responsibilities include:

5.9.2.1.1. **(Added-96TW)** Review the system design or modification to identify system design hazards.

5.9.2.1.2. **(Added-96TW)** Provide a Design Safety Certification statement to be incorporated into the SRBS.

5.9.2.1.3. **(Added-96TW)** As applicable, participate in the early system design phases to identify and eliminate design hazards.

- 5.9.2.1.4. **(Added-96TW)** Provide the SRB with an assessment of the weapon system's or munition's potential hazards.
- 5.9.2.1.5. **(Added-96TW)** Identify any potential hazards associated with weapons design regarding warhead safe separation from the parent aircraft.
- 5.9.2.1.6. **(Added-96TW)** Complete and/or provide inputs to AFTC Form 5000 (THA) for each identified system design hazard as required.
- 5.9.2.2. **(Added-96TW)** For non-USAF munitions and test items, provide systems safety expertise as needed and dependent upon the data and time available for analysis. Test item contractor, test range customer and/or other service systems safety organization may provide the Design Safety Certification statement and other required inputs in lieu of 96 TW/SES.
- 5.9.3. **(Added-96TW)** Flight Safety Representative (96 TW/SEF)
- 5.9.3.1. **(Added-96TW)** Review the flying objectives and procedures as defined in the MOT/CONOPS prior to the SRB and provide flight safety expertise relative to those objectives/procedures.
- 5.9.3.2. **(Added-96TW)** Ensure mishap accountability is addressed at the SRB and documented in the SRBS.
- 5.9.3.3. **(Added-96TW)** Complete, as needed, AFTC Form 5000 (THA) for each newly identified flight related test-unique hazard.
- 5.9.3.4. **(Added-96TW)** Some unique tests may require flight safety expertise and/or independence by organizations other than 96 TW/SEF as determined by 96 TW/SEF.
- 5.9.4. **(Added-96TW)** Weapons Safety Representative (96 TW/SEW)
- 5.9.4.1. **(Added-96TW)** Review the weapons objectives and procedures as defined in the MOT/CONOPS prior to the SRB and provide weapons safety expertise relative to those objectives/procedures.
- 5.9.4.2. **(Added-96TW)** Ensure operations involving ammunition, flares, explosive devices, aircraft stores/weapons systems or directed energy weapons are conducted IAW applicable DoD and AF requirements.
- 5.9.4.3. **(Added-96TW)** Verify explosive safety training qualifications on project personnel required to either handle munitions or perform explosive operations.
- 5.9.4.4. **(Added-96TW)** Review, coordinate on and approve all munitions tie-down procedures (trailer transportation) of munitions.
- 5.9.4.5. **(Added-96TW)** Identify any hazards associated with the recovery and analysis (x-ray, sawing and disassembly) of dud or misfired munitions.
- 5.9.4.6. **(Added-96TW)** Review, coordinate and approve all munitions assembly/disassembly procedures, modification of explosive items, EOD Safe Handling and Recovery Procedures (SHARP), technical data packages and hung ordnance procedures.

5.9.4.7. **(Added-96TW)** Verify and approve correct storage requirements if non-standard (i.e., items not stored in munitions storage area or requiring licensed locations on range.)

5.9.4.8. **(Added-96TW)** Complete, as needed, AFTC Form 5000 (THA) for each newly identified weapons or explosive test-unique hazard.

5.9.5. **(Added-96TW)** Ground Safety Representative (96 TW/SEG)

5.9.5.1. **(Added-96TW)** Review the objectives and procedures as defined in the MOT/CONOPS prior to the SRB and provide ground safety expertise relative to those objectives/procedures.

5.9.5.2. **(Added-96TW)** Provide inputs to AFTC Form 5000 (THA) for each identified ground safety related hazard, as required.

5.9.6. **(Added-96TW)** Test Engineer, Test Manager or equivalent

5.9.6.1. **(Added-96TW)** Provide Test and Range Safety with all details of the test as outlined in Table 5.1 of this supplement.

5.9.6.2. **(Added-96TW)** Identify any hazards associated with all operations involved with the test. This will include but not be limited to:

5.9.6.2.1. **(Added-96TW)** Weapons build-up site, qualification of personnel involved in the build-up, weapon transportation and weapon load.

5.9.6.2.2. **(Added-96TW)** Target locations, target movement (e.g., blocks), target construction, target disposition/clean up, etc.

5.9.6.2.3. **(Added-96TW)** Instrumentation requirements that may require personnel inside the weapon safety footprint.

5.9.6.3. **(Added-96TW)** Complete, as needed, AFTC Form 5000 (THA) for each newly identified test-unique hazard.

5.9.7. **(Added-96TW)** Test Pilot or Aircrew Representative. Test aircrews need to be involved with test programs from program inception. Aircrew inputs need to be made throughout the MOT development process. In conjunction with the test engineer, the test aircrew is required as needed to develop THA by identifying test-unique hazards, determining causes and effects and developing minimizing procedures. AFTC Form 5000 (THA) should be completed by the test engineer and test aircrew and delivered to Test and Range Safety prior to the SRB per Table 5.1. The test aircrew and/or test engineer will brief these THAs at the SRB.

5.9.7.1. **(Added-96TW)** Review the MOT/CONOPS to ensure all aircraft performance requirements are within the design capabilities of the aircraft.

5.9.7.2. **(Added-96TW)** Ensure the test is conducted IAW current USAF, AFTC, 96 TW and/or other applicable instructions.

5.9.7.3. **(Added-96TW)** For any test points near, at or exceeding the aircraft envelope, identify any hazards and develop minimizing procedures to be presented at the SRB.

- 5.9.7.4. **(Added-96TW)** Advise the SRB on any flight requirements that exceed the aircraft flight design limits or may put the aircraft/aircrew in a hazardous situation.
- 5.9.7.5. **(Added-96TW)** For store release missions, ensure all pre-launch switch settings can be completed within the test area. If not, identify to the SRB any hazards that may be associated with switch settings.
- 5.9.7.6. **(Added-96TW)** Discuss hung ordnance procedures, if applicable. Where local standard hung ordnance procedures are not appropriate; develop, coordinate and brief alternative procedures for the specific program.
- 5.9.7.7. **(Added-96TW)** Identify any condition unique to the proposed test profiles (for example: weather, bird strike, low altitude flight) that may put the aircraft/aircrew in an elevated risk situation. Present the appropriate minimizing procedures to the SRB.
- 5.9.7.8. **(Added-96TW)** When possible, coordinate with the SEEK EAGLE Program representative all hazards associated with maneuvering with the aircraft/store configuration prior to the SRB.
- 5.9.8. **(Added-96TW)** The SEEK EAGLE Program (AFI 63-104) Representative.
- 5.9.8.1. **(Added-96TW)** Provide the SRB with documentation generated in support of the planned testing, recommended flight clearance, risk assessment, engineering letter or certification recommendation.
- 5.9.8.2. **(Added-96TW)** Provide the SRB with mission summaries associated with the planned test.
- 5.9.8.3. **(Added-96TW)** Provide a store separation assessment for each ejection, release, dispense or launch of a store or system. The store separation assessment should also be accompanied by relevant aircraft loads assessment (e.g., dynamic response, kick-back forces), as necessary.
- 5.9.8.4. **(Added-96TW)** Provide safe escape/safe separation analysis for live weapon releases/launches. Identify any hazards associated with safe escape/safe separation for the parent or chase aircraft as requested by 96 TW/SEU.
- 5.9.8.5. **(Added-96TW)** Identify any potential hazards associated with maneuvering with the test aircraft/store configuration (aircraft loads, store loads, aircraft flutter, aircraft handling). All efforts should be made to coordinate hazards associated with maneuvers with aircrews prior to the SRB.
- 5.9.8.6. **(Added-96TW)** Identify any potential hazards associated with operation of all test aircraft/store configurations which may adversely impact safety through unintended electromagnetic compatibility or interference (EMC/EMI) issues.
- 5.9.8.7. **(Added-96TW)** Complete and/or provide inputs to ATFC Form 5000 (THA) for each flight clearance identified hazard in the area of their expertise, as required.
- 5.9.9. **(Added-96TW)** EOD Representative (96 CES/CED)
- 5.9.9.1. **(Added-96TW)** Provide the SRB with explosive operations expertise.
- 5.9.9.2. **(Added-96TW)** Identify any hazards associated with the disposal or recovery or unspent, dud or misfired munitions.

5.9.9.3. **(Added-96TW)** Identify any hazards associated with the recovery and analysis (x-ray, sawing) of unspent, dud or misfired munitions.

5.9.9.4. **(Added-96TW)** In conjunction with weapon designer inputs, identify wait times for dud recovery.

5.9.9.5. **(Added-96TW)** Identify any unique hazards which are involved with safing, downloading and transportation of weapons which are recovered during an aircraft emergency hung store situation.

5.9.9.6. **(Added-96TW)** Complete and/or provide inputs to ATFC Form 5000 (THA) for each identified explosive hazard, as required.

5.9.10. **(Added-96TW)** Bioenvironmental Engineer (96 AMDS/SGPB).

5.9.10.1. **(Added-96TW)** Provide the SRB with bioenvironmental expertise.

5.9.10.2. **(Added-96TW)** Identify any health hazards associated with radiation exposure including, but not limited to, ionizing radiation, radio frequency (RF) radiation, laser radiation and microwave radiation.

5.9.10.3. **(Added-96TW)** Identify and advise the SRB on health hazards associated with chemical or other hazardous material exposures and the use of personal protective equipment (PPE).

5.9.10.4. **(Added-96TW)** Identify and advise the SRB on heat stress issues.

5.9.10.5. **(Added-96TW)** Identify and advise the SRB on potential health risks associated with tests affecting the environment.

5.9.10.6. **(Added-96TW)** Identify and advise the SRB on potential audio health risks.

5.9.10.7. **(Added-96TW)** Complete and/or provide inputs to ATFC Form 5000 (THA) for each identified bioenvironmental hazard, as required.

**5.10. (Added-96TW) SRB Agenda.** The SRB is fundamentally a risk management effort. The SRB is neither a pre-TAB (dry run) nor a test planning meeting. The SRB can be in any form that effectively communicates test-related information to the members of the SRB. At the discretion of the SRB chairperson, the SRB may be convened and conducted using a variety of means to include meetings, email, telecon, VTC, etc. In a typical SRB, the test engineer will brief the planned systems under test; test objectives, test design, procedures, and any preliminarily identified test-unique hazards and associated minimizing procedures to the board. The SRB briefing should address, at a minimum, the following topics to a level of detail which supports a risk assessment.

5.10.1. **(Added-96TW)** System(s) description.

5.10.2. **(Added-96TW)** Test background to include test requester, purpose, scope, timeline, and resources involved.

5.10.3. **(Added-96TW)** Test objectives.

5.10.4. **(Added-96TW)** Method of test to include data collection, facilities, personnel, ranges, flight profiles and agencies involved.

5.10.5. **(Added-96TW)** Any special test requirements.

5.10.6. **(Added-96TW)** Missions summaries and highlights to include test design (if necessary), test approach precedence/justification, analogous systems/tests, supporting analysis, inherent risk mitigation and adopted risk mitigation.

5.10.7. **(Added-96TW)** Test specific hazards and any potential minimizing procedures.

5.10.8. **(Added-96TW)** All AFTC Form 5000 (THA) for the test.

5.10.9. **(Added-96TW)** Proposed risk assessment and conclusion.

**5.11. (Added-96TW) SRB Discussion.** After the briefing, the SRB chairperson will lead a discussion to review whether hazards have been adequately identified and addressed. The SRB chairperson will also strive to discern any other potential test-unique hazards or safety problems. This discussion will emphasize the following areas of concern:

5.11.1. **(Added-96TW)** General questions.

5.11.2. **(Added-96TW)** Review existing AFTC Form 5000 for test-unique hazards, adequate/ appropriate minimizing procedures, adequate emergency procedures and any comments.

5.11.3. **(Added-96TW)** Complete or finalize any requirement for new THA forms as necessary.

5.11.4. **(Added-96TW)** Consider any additional risk mitigation that could reasonably be applied.

5.11.5. **(Added-96TW)** Assign risk levels using the risk level assessment as outlined in AFTCI 91-203, Chapter 3.

5.11.6. **(Added-96TW)** Summarize any open action items, risk levels associated with individual test parameters, exact wording of any restrictions placed on the test, reasons for restrictions and risk categories, and other items that will appear in the SA or SRBS.

## Chapter 6

### TEST SAFETY APPROVAL PHASE

**6.1. Approval Authorities and Notification Levels.** All activities conducted in accordance with paragraph 1.6 require approval before beginning execution. The approval phase provides appropriate leadership the opportunity to make an informed risk acceptance and test approval decision based on the safety review and risk assessment completed in the safety review phase. The Test Execution Authority (TEA) for these activities is based on the proposed risk level as outlined in **Table 6.1**. Approval is defined as permission to conduct or participate in the test program or activity granted by the appropriate TEA. The TEA may require a Test Approval Brief (TAB) to assist in making an informed decision. Signature of the TEA on AFTC Form 5001, *Test Project Safety Review*, constitutes acceptance of the risk and approval to begin activities under the conditions set forth in the test package. A signed safety package does not authorize deviation from Air Force, AFMC, or AFTC instructions or directives.

**Table 6.1. Approval Process Coordination Path**

Organization Level	NEGLIGIBLE Risk	LOW Risk	MEDIUM Risk	HIGH Risk
Safety Office	Coord	Coord	Coord	Coord
Squadron CC (or equivalent)	Approve	Coord	Coord	Coord
Group CC (or equivalent)	Info	Approve*	Approve	Coord
Wing/Complex CC	Not Required	Info	Info	Coord
AFTC SE	Not Required	Not Required	Not Required	Coord
AFTC CC	Not Required	Not Required	Not Required	Approve**
HQ AFMC/SE/A3	Not Required	Not Required	Not Required	Info

\* may be delegated in writing to Squadron CC (or equivalent)  
 \*\* may be delegated in writing to Wing or Complex Commanders

**6.2. Delegation.** When approval authority is delegated to a lower organization level, the approval coordination path in **Table 6.1** is still followed but with an info copy sent to the original approving authority. Signature delegation will be no lower than the applicable deputy/vice commander.

### 6.3. LOW Risk Activities.

6.3.1. The Group CC (or equivalent) is the TEA for approval to execute all low-risk test events. However, final approval to execute low risk test may be delegated in writing to the Squadron CC (or equivalent) in compliance with AFI 91-202 as supplemented by AFMC.

6.3.2. NEGLIGIBLE Risk activities, as defined in **Paragraph 3.5**, are a subset of LOW Risk and may be approved no lower than the Squadron CC (or equivalent). If the Squadron CC is unavailable for approval, NEGLIGIBLE Risk activities default to LOW Risk approval requirements.

**6.4. Elevated Risk Activities.** Elevated risk activities are those that result in a residual risk level of MEDIUM or HIGH. Example elevated risk activities are provided in **Section 3.7** but are not limited to activities on this list.

6.4.1. MEDIUM Risk Test Approval. The Group CC (or equivalent) is the TEA for approval to execute all MEDIUM risk test events.

6.4.2. HIGH Risk Test Approval.

6.4.2.1. The AFTC/CC is the TEA for all HIGH risk test events. Final approval to execute HIGH risk test may be delegated in writing to the Wing or Complex CC.

6.4.2.2. If non-AFTC assets/personnel are involved, the asset owner must be notified of the high residual risk prior to test execution. Notification method will be established in local supplements.

6.4.2.3. HQ AFMC/SE/A3 must be notified of high risk tests prior to execution in accordance with AFI 91-202 AFMC Sup para 13.3.4.6. AFTC/SE will send this notification in conjunction with HIGH risk safety plan approval. Wing/Complex Safety offices will inform AFTC/SE when HIGH risk packages have been approved if TEA has been delegated to Wing or Complex CC level.

**6.5. Test Approval Brief.** The TEA or any other Commander on the Approval Coordination Path may require a Test Approval Brief to assist in making an informed decision. A TAB should be an executive level meeting that provides a test program overview and highlights test unique hazards, mitigation procedures, discussion points during the independent review, and any contention or disagreement by the independent board and the test team. The TAB may be combined with an SRB if the TEA is in attendance.

6.5.1. **(Added-96TW)** The TAB is established to provide a management level review of test safety and provide final approval of the test. The TAB may be presented during a formal TAB review (formally Airborne Test Safety/Review Board, ATR/SB) or during an informal or out-of-cycle meeting at the discretion of the TEA. This meeting is the forum where control decisions are made and the residual risk level identified at the SRB is accepted, rejected, minimized further or elevated to a higher authority for approval. This review/approval is accomplished prior to the start of the test conduct phase by a board of members highly qualified in their respective fields or some subset as necessary. The TEA approves a test or recommends approval only when all hazards have been reviewed, satisfactory planning and analysis have been conducted, and procedures have been established to allow accomplishment of the test with a high expectation of safe conduct. The TEA does not provide or approve airworthiness certification, flight clearances, design safety certification, or test safety criteria (for example, impact footprints or Flight Termination System certifications). These certifications must be obtained from appropriate sources and reviewed and approved at the SRB, which occurs prior to scheduling the TAB. The TEA is authorized to establish additional test limitations or restrictions when required. Any limitations and/or restrictions which conflict with the requirements published in the Safety Annex must also be approved and documented by the Directory of Safety or designee.

6.5.2. **(Added-96TW)** TAB Criteria. The TEA will review/approve all tests, for which 96 TW is the Lead Development Test Organization (LDTO), tests that involve 96 TW possessed

aircraft or flight by aircrews assigned to 96 TW, or when TEA review is otherwise requested. Questions regarding review criteria should be referred to the TAB monitor.

6.5.3. **(Added-96TW)** Formal TAB review structure.

6.5.3.1. **(Added-96TW)** Members are appointed by the 96 TW/CC. The designated TEA is the TAB president. In the TEA's absence, a designated alternate, who must be a rated aircrew member for review/approval of flight tests, must be present and will preside during the TAB. At least one 96 TW/SE representative, a monitor and all available members will also attend each meeting. The TEA can direct attendance by particular members as circumstances dictate.

6.5.3.2. **(Added-96TW)** Contractor or System Project Office (SPO) personnel may attend at the invitation of the test engineer.

6.5.4. **(Added-96TW)** Responsibilities/Authority.

6.5.4.1. **(Added-96TW)** The 96 TW/CC is the reviewing authority for TAB. This responsibility may be delegated to the group or squadron level as appropriate and at the discretion of the 96 TW/CC.

6.5.4.2. **(Added-96TW)** The TEA will:

6.5.4.2.1. **(Added-96TW)** Designate TAB members for approval by 96 TW/CC for tests assessed at medium or low risk levels.

6.5.4.2.2. **(Added-96TW)** Preside during the TAB or if unable to attend, ensure that a designated alternate presides. If an alternate presides for tests which the president remains the TEA, the president will remain responsible for reviewing the TAB and all documentation before test approval. The president may grant verbal approval when time constraints require. TAB documentation will be sent to the TEA as soon as possible after the verbal approval. Final approval will be documented by endorsement to the TAB minutes. If the TEA is not available, the designated alternate may grant approval on a case-by-case basis.

6.5.4.2.3. **(Added-96TW)** Direct that any mission disapproved not be executed until discrepancies are resolved and approved by the TEA.

6.5.4.3. **(Added-96TW)** The TEA has the authority to perform the following actions, which will be documented by letter, if appropriate, with copies sent to concerned agencies.

6.5.4.3.1. **(Added-96TW)** Provide for the routine administration of the TAB to include obtaining 96 TW/CC approval for TAB membership.

6.5.4.3.2. **(Added-96TW)** Approve minor changes to active tests within the general limits previously approved by the TEA. These changes will be coordinated with 96 TW/SE.

6.5.4.3.3. **(Added-96TW)** Impose specific test restrictions such as data review at intermediate steps in a sequence.

6.5.4.4. **(Added-96TW)** TAB members will attend and participate in formal TAB meetings.

6.5.4.5. (Added-96TW) The TAB monitor will:

6.5.4.5.1. (Added-96TW) Schedule tests to be reviewed at the weekly TAB meetings.

6.5.4.5.2. (Added-96TW) Arrange nonscheduled meetings as directed by the TEA.

6.5.4.5.3. (Added-96TW) Act as recorder at TAB meetings, or if unable to attend, ensure that a designated alternate acts as a recorder and document the minutes of the meeting.

6.5.4.5.4. (Added-96TW) Provide the minutes of the TAB meeting for TEA approval.

6.5.4.5.5. (Added-96TW) Ensure documentation is filed in the test central file folder. This documentation will include TAB meeting minutes and a copy of the TAB slides used. Information copies of the above items will be sent to the 96 TG/CC for those tests conducted at Holloman AFB.

6.5.4.5.6. (Added-96TW) Send a copy of the TAB meeting minutes to the 96 TW/CC or TEA as necessary.

6.5.4.5.7. (Added-96TW) Accomplish all necessary administrative actions associated with TAB activities.

6.5.4.6. (Added-96TW) The 96 TW Programming Engineer will:

6.5.4.6.1. (Added-96TW) Include either the statement "TAB action is required" or the statement "TAB action is not required" in the TD based on criteria in Paragraph 6.5.2 of this supplement.

6.5.4.6.2. (Added-96TW) Inform the TAB monitor when approved tests which have been suspended or terminated are reactivated.

6.5.4.7. (Added-96TW) The Test Engineer/Manager who requires TAB action will:

6.5.4.7.1. (Added-96TW) Request the TAB review. The format in Attachment 5 will be used to request the TAB. Send the request to the TAB recorder so it is received no later than five workdays before the requested TAB date to allow adequate notification of the TAB members and briefers. This may be sent by email or on letterhead. Missions may be scheduled prior to the TAB review but will not be accomplished until the TAB has been completed.

6.5.4.7.2. (Added-96TW) Make sure the following actions are completed before the TAB review, if they apply to the test:

6.5.4.7.2.1. (Added-96TW) 96 TW/SE SRB conducted and TD Safety Annex published.

6.5.4.7.2.2. (Added-96TW) Obtain Flight Clearance approval.

6.5.4.7.2.3. (Added-96TW) 96 TW Configuration Control Board (CCB) review.

6.5.4.7.2.4. (Added-96TW) Munitions, maintenance and aircrew checklist preparation. If hardware/ munitions are not available/approved, these checklists may be completed after the TAB has convened. The TAB will identify that the

checklists will be completed prior to the mission execution.

6.5.4.7.2.5. **(Added-96TW)** All applicable personnel (contractor, test pilot/chief pilot, maintenance, etc.) have been contacted and agree on the requirements that must be met to allow the test aircraft/assets to fly chase aircraft or training missions. Refer to Attachment 6 for a guide to determine the specific requirements.

6.5.4.7.3. **(Added-96TW)** Provide supporting documents to the TAB monitor so that they are received no later than two workdays before the TAB. Documents should include either four paper copies, one electronic file or a link to the network location of the electronic file of each document. Required documents include:

6.5.4.7.3.1. **(Added-96TW)** Aircraft systems group (SG) or AFSEO recommended flight clearance (if applicable).

6.5.4.7.3.2. **(Added-96TW)** Flight profiles.

6.5.4.7.3.3. **(Added-96TW)** 96 TW/SE TD Safety Annex.

6.5.4.7.3.4. **(Added-96TW)** Modification flight manual supplement for test items that are designated mini-mods (if applicable). Refer to Attachment 7 for format.

6.5.4.7.3.5. **(Added-96TW)** Aircrew checklists compatible with the munitions and maintenance checklists that have been certified by the appropriate aircrew designated in the 96 OG Personnel Qualification Roster.

6.5.4.7.3.6. **(Added-96TW)** Form letter (see Attachment 8) outlining requirements that must be met to allow the test aircraft/asset to fly chase or training missions. This letter should include any additional restrictions required. After TEA approval, this letter will be signed by the TAB president and distributed with the minutes.

6.5.4.7.4. **(Added-96TW)** Present the briefing to the TEA with the assistance of the test aircrew member (as applicable) and representatives of any of the appropriate engineering organizations (e.g., SEEK EAGLE compatibility engineer briefing on specific compatibility test plans and justification), if required.

6.5.4.8. **(Added-96TW)** The 96 TW/SE representative(s) will:

6.5.4.8.1. **(Added-96TW)** Assist the Test Engineer in accomplishing safety-related tasks in preparation for the TAB review.

6.5.4.8.2. **(Added-96TW)** Support the TAB and be prepared and knowledgeable of the safety aspects of each test reviewed.

6.5.4.9. **(Added-96TW)** The Test Aircrew Member will:

6.5.4.9.1. **(Added-96TW)** Act as the test coordinator in preparing a test for TAB review if a Test Engineer/Manager has not been assigned.

6.5.4.9.2. **(Added-96TW)** Assist the Test Engineer in preparing TAB slides and the aircrew checklist. The test aircrew member will be responsible for completing the

method of test portion of the TAB and ensuring that it is a thorough and accurate review of the test.

6.5.4.9.3. **(Added-96TW)** Brief the operational aspects of the TAB.

6.5.4.9.4. **(Added-96TW)** Ensure the planned flight profile (e.g., Compatibility Flight Profile [CFP], flutter matrix), discrete test data points and overall mission flight requirements (e.g., chase aircraft, aerial refueling, range support aircraft, range requirements) are reviewed by the appropriate aircraft test director and qualified pilot, presented at the TAB and reviewed again by the operations supervisor prior to first flight. Test data points (incremental buildup to test endpoints, as required), data point parameter tolerances including over-speed provisions, Go/No-Go criteria and abort procedures will be established and briefed to the TAB.

6.5.4.10. **(Added-96TW)** The Engineering Organization (e.g., AFSEO) will:

6.5.4.10.1. **(Added-96TW)** Provide representatives to the TAB meetings who are familiar with specific flight clearance aspects for each test review. This portion of the briefing will include, but not necessarily limited to, the aircraft's anticipated flying qualities, flutter speed, store separation characteristics, limiting load factors and waivers to MIL-STD-1289. The flight clearance for CFP missions will specifically address the appropriate buildup test points and anticipated flying qualities when data or analysis indicate the need due to degraded stability or control characteristics.

6.5.4.11. **(Added-96TW)** The 96 OG/CC will process requests for TAB review action for tests at Holloman AFB involving resources at Eglin and Holloman. The TAB will convene at Eglin.

6.5.4.12. **(Added-96TW)** All personnel involved in the 96 TW mission will immediately notify the Test Engineer or any TAB member of any test hazards that occur. The Test Engineer will in turn notify the TAB and 96 TW/SE.

6.5.5. **(Added-96TW)** TAB Review Procedures.

6.5.5.1. **(Added-96TW)** TAB reviews are normally conducted at weekly scheduled meetings; however, if short notice or out-of-cycle TAB review is required, the TAB president (or alternate) may authorize an unscheduled TAB meeting.

6.5.5.2. **(Added-96TW)** Although TAB review is formally structured all participants are encouraged to present facts and expertise which bear on the test being reviewed. Every effort is made to arrive at a consensus of opinion regarding all points discussed; however, the TAB president decides the final TAB position. Members who disagree with the president's decision may request that their opinion be included in the minutes.

6.5.5.3. **(Added-96TW)** The recorder will review the proposed minutes of the meeting before it adjourns. No flight test missions will be flown until the TAB minutes have been signed. The minutes will reflect one of the following:

6.5.5.3.1. **(Added-96TW)** The test is approved, as briefed.

6.5.5.3.2. **(Added-96TW)** The test is approved with stipulations, which will be listed in the TAB minutes and briefed prior to each mission/activity. Flight stipulations will be briefed to the aircrew at each flight briefing. TAB stipulations are

equivalent to any safety requirements as published in the Safety Annex and will be followed as such.

6.5.5.3.3. **(Added-96TW)** The test is disapproved pending further study, better preparation or review by the 96 TW/CC, etc.

6.5.5.3.4. **(Added-96TW)** Certain parts of the test are approved, but further TAB review is required prior to approval of the remaining parts. This additional review may involve data analysis, aircrew workload evaluation, etc.

6.5.5.3.5. **(Added-96TW)** The test is approved as a high, medium or low risk test and ensures that there is a valid operational requirement for all high or medium risk test points.

6.5.5.3.6. **(Added-96TW)** Designate weather-sensitive flights.

6.5.5.4. **(Added-96TW)** If the TAB decides to recommend approval of a high risk test, the 96 OG/CC will brief the 96 TW/CC and AFTC/CC on all hazardous aspects of the tests. Primary emphasis will be on the development and refinement of detailed procedures necessary to ensure a safe, successful mission. High risk test missions will not be conducted without the approval of the AFTC/CC IAW AFTCI 91-203, Table 6.1.

6.5.5.4.1. **(Added-96TW)** If the TAB decides to recommend approval of a medium risk test, test mission activities and/or sorties containing medium risk test points will not be executed without the approval of the 96 OG/CC. The 96 TW/CC will be notified as required in AFTCI 91-203, Paragraph 6.4.

6.5.5.5. **(Added-96TW)** When the TAB president signs the minutes for a flight test, Attachment 8 "Sample Restriction for Test Aircraft" will also be signed outlining the requirements that must be met to allow the test aircraft/asset to fly chase or training missions. If changes to the letter are needed, the Test Engineer will make the required changes and ensure the letter is signed prior to the first test mission.

6.5.6. **(Added-96TW)** If a change is made to any of the items requiring TEA approval after a test has been reviewed by the TAB (listed in Paragraph 7), the Test Engineer must request SRB review and TEA approval of the changes. This may be accomplished by reconvening the SRB and TAB or by direct approval by the TAB president for minor changes with the general limits previously approved by the TEA. A letter in the format shown in Attachment 5 will be prepared and forwarded to the SRB chairperson and the TAB recorder to reflect the changes. Before the letter is forwarded, the test aircrew member (as applicable and/or necessary) will initial as appropriately in Paragraph 2, signifying coordination with the Test Engineer on the changes. The Test Engineer will coordinate with the SRB and TAB presidents to determine if another SRB and/or TAB is warranted, or the SRB and/or TAB presidents may approve the change as endorsement.

6.5.6.1. **(Added-96TW)** Changes are considered major or minor and are defined in Chapter 8 of this supplement.

6.5.7. **(Added-96TW)** Informal TAB review structure.

6.5.7.1. **(Added-96TW)** An informal or out-of-cycle TAB is a meeting which, for unusual circumstances, is held at other than normally scheduled TAB weekly meetings

and is attended by only a limited number of members. Examples of the types of tests which may be reviewed by an informal TAB review are:

- 6.5.7.1.1. **(Added-96TW)** A classified test where the need-to-know is restricted to a limited number of individuals.
- 6.5.7.1.2. **(Added-96TW)** A test which falls under a TD intended for use on a recurring basis by other test programs, when the original TD has been reviewed by the TAB. An example of such a test is drone chase support at Holloman AFB.
- 6.5.7.2. **(Added-96TW)** Attendance at an informal TAB review will be dictated by circumstances of the test. As a minimum, the TAB president or designated alternate, a representative from 96 TW/SE, the Test Engineer, test aircrew member (as applicable and/or necessary) and a recorder must be present. The Test Engineer or test aircrew member may act as the recorder for the informal TAB meeting if the test/classification requirements restrict a designated recorder from attending.

## **6.6. Acceptance of Safety Planning across AFTC.**

- 6.6.1. An AFTC test program which has been approved through an AFTC test wing/complex's technical and safety review processes may be executed by a different, supporting, AFTC test wing/complex.
- 6.6.2. The originating test wing will notify the supporting wing when the technical and safety review processes are complete and the test program is approved for execution. The originating test wing will provide the supporting wing with test and safety planning documentation required under the originating test wing processes. The supporting wing may accept this documentation as written, or may request additional safety or test review following their own wing supplement to this instruction. Differences will be resolved by equivalent TEAs from each wing. The supporting wing may then execute any assigned portion of a test program which has been approved to execute under the originating test wing processes.
- 6.6.3. Test execution materials (e.g. test cards or mission decks) may be developed by either the originating or supporting test wing. The organization creating the mission materials will adhere to local guidance for formatting, content and approval. Mission materials will be approved by the executing organization in accordance with their local procedures.

## Chapter 7

### TEST EXECUTION PHASE

**7.1. General.** The procedures, restrictions, and mitigations documented in the Safety Plan must be observed while conducting the test in order to maintain the accepted level of risk. Safety Plan requirements take precedence over those specified in the test plan. The safety plan is a contract between the test team and senior leadership.

**7.2. Test Card/Test Period Directive Preparation and Approval.**

7.2.1. Test Cards/Test Period Directives/etc. are documents describing the test activity procedures in a step-by-step or checklist format. These documents are used by test teams to successfully complete test activities. They may be reused for multiple test programs but should not be overly general in documentation. Inherently, they should be a synopsis of operation, test and/or manufacturing technical data immediately available to reference for the test team in executing test activities effectively, efficiently and safely.

7.2.2. During test card or test period directive preparation, the test team will review applicable general minimizing procedures, test hazard analysis and Baseline Hazard Analysis to ensure the procedures comply with safety limits, procedural constraints or approved Test Plan requirements.

7.2.3. Test execution procedures, whether documented in test cards or another format, must be approved prior to use during testing. Test card approval levels will be documented in local Wing/Complex instructions.

**7.3. Test/Mission Execution Briefing.** During the test/mission execution brief, the test team will address the procedures and restrictions specified in the Safety Plan. As a minimum, all general minimizing procedures, test hazard analyses and baseline hazard analyses applicable to that particular test will be covered during the test briefing

**7.4. Unusual Events.** An “unusual event” or “unexpected test result” is any occurrence that warrants a safety-related pause in the test program. If an unusual event occurs, the test team will consult with the Wing or Complex Test Safety Office representative and associated test points will be placed on hold. Once a recovery plan of action is determined, unusual events will normally be documented with a safety plan amendment. Testing of the suspended test points may be resumed upon approval of the appropriate change documentation, as described in **Chapter 8**. Unusual events include, but are not limited to:

**7.4. (96TW)As the Test Safety Office for the 96th Test Wing:** 96 TW/SEU will notify the appropriate agencies and organizations of any “unusual event” or “unexpected test result”. 96 TW Weapons Safety will be notified of all unusual events involving ammunition, flares, explosive devices, aircraft stores/weapons systems or directed energy weapons. 96 TW/SEU may elect to reconvene the SRB to review and revalidate that all associated risks have been mitigated/addressed before future testing can continue. Any necessary modifications to the applicable safety plan will be documented and approved for the appropriate risk level.

7.4.1. Damage to the test article or support equipment.

7.4.2. Exceeding safety of test limits.

7.4.3. Unfavorable departure from predicted simulation/analysis.

7.4.4. Occurrence of a THA/BHA hazard requiring corrective action.

7.4.5. Occurrence of a hazard requiring corrective action not already mitigated by procedures defined in a THA/BHA form.

7.4.6. Any lesson learned that needs to immediately pass to the entire test team.

## Chapter 8

### CHANGES AND TIME LIMITS

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

**8.2. Major Changes.** Any potential change in risk level (higher or lower), major test plan change, changes to safety planning, and unusual events are considered major changes that affect test conduct or safety planning. Major changes require additional safety planning, independent safety review, and approval before continued testing with these changes incorporated.

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

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

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

8.2.2. Major Test Plan Change. The definition of major test plan change will be outlined in local supplements. Generally, substantive changes to test objectives, technical approach, or test procedures will also require an amendment to safety planning as defined in the Safety Annex. Individuals performing the final safety review should be the same as those from the original package, if available. For multi-discipline test plans, only the discipline(s) affected by the amendment need to be included for review along with an operations representative.

8.2.2. **(96TW)** Changes are considered major if the change is outside/expands the scope of the MOT/CONOPS, if the assigned risk level has changed or is expected to change, if any published safety requirement is expect to be amended or if the change introduces any additional test unique hazards not assessed by the SRB or increases the probability/severity of any previously identified hazard. The amended MOT/CONOPS should be forwarded to 96 TW/SEU for evaluation and recommendation for the type of SRB to be convened IAW AFTCI 91-203, Chapter 5.

8.2.3. Change to Safety Planning. Any change to content of the safety plan is considered a change to safety planning. The desired changes could be more restrictive or less restrictive than the approved safety planning.

8.2.4. Unusual Event. Safety plan documentation following an unusual event should describe the occurrence of the event, summarize the cause(s) as they are understood by either

analysis or hypothesis, and identify the test team's intended path for the resumption of testing.

**8.3. Minor and Administrative Changes.** Some changes to the approved test package may be classified as minor or administrative only and will be defined in local supplements. Minor test plan changes may include changing the flight conditions of test points, adding test points (provided the new conditions are within the approved envelope of test points), or deleting test points that are not a part of safety build-up. An administrative change to the test package clarifies information contained in the package and does not affect test conduct or safety planning. Locally approved procedures for documenting and approving minor or administrative changes may be defined in supplements to this instruction. The test unit commander (or equivalent) may be the approval authority for any changes not defined as Major Changes in **Section 7.2**.

**8.3. (96TW)Changes are considered minor:** If the change does not alter the test procedures as defined in the MOT/CONOPS or affect the risk assessment if no safety requirements are expected or if no new test unique hazards have been introduced. The amended MOT/CONOPS should be forwarded to 96 TW/SEU for evaluation and recommendation for the type of SRB to be convened if necessary.

**8.4. Time Limit.** Safety plans will be reviewed at least every three years. Baseline Safety Reports and USAF Test Pilot School standard curriculum event safety plans will be reviewed at least every four years. Teams will identify any new risks and mitigation plans; highlight key issues experienced since approval or the last review; and purge non-applicable guidance from the plan. Teams will document reviews on an AFTC Form 5001 in accordance with **Chapter 6**.

ARNOLD W. BUNCH, Maj Gen, USAF  
Commander

**(96TW)**

DAVID A. HARRIS, Brigadier General, USAF  
Commander

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

**AFI 33-360**, *Publications and Forms Management*, 25 September 2013

AFI 91-202, *The US Air Force Mishap Prevention Program*, 5 August 2011

AFI91-204, *Safety Investigations and Reports*, 12 February 2014

**AFI 91-202\_AFMCSUP**, *The US Air Force Mishap Prevention Program*, 9 July 2013

**Prescribed Forms**

AFTC Form 5000 – Test Hazard Analysis

AFTC Form 5001 – Test Project Safety Review

***Abbreviations and Acronyms***

**BHA**—Baseline Hazard Analysis

**BSR**—Baseline Safety Report

**ESR**—Electronic Safety Review

**GMP**—General Minimizing Procedures

**LDTO**—Lead Developmental Test Organization

**NRR**—Negligible Risk Review

**RM**—Risk Management

**SE**—Safety Office

**SOC**—Statement of Capability

**SRB**—Safety Review Board

**SUT**—System Under Test

**TAB**—Test Approval Brief

**TEA**—Test Execution Authority

**THA**—Test Hazard Analysis

**TIS**—Test Information Sheet

**TRB**—Technical Review Board

***Terms***

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

**Baseline Hazard Analyses (BHA)**— An analysis used to document known hazards concerned with the normal day-to-day operation and maintenance of a test system, subsystem or ground test facility.

**Baseline Safety Report (BSR)**— A compilation of BHAs that constitute the hazards associated with the specific operation of a test system, subsystem or ground test facility and includes a BHA for all systems to be operated or maintained. The BSR allows the individual hazard analyses that make up the baseline to be evaluated in a comprehensive package and thus shows the interaction of the systems and interfaces.

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

**Deviation**— The intent of the requirement is not met and a waiver must be approved through the appropriate authority.

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

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

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

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

**Mishap**— An unplanned event or series of events resulting in death, injury, occupational illness, or damage to or loss of equipment or property, or damage to the environment.

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

**Risk Assessment Consensus**— Unanimous agreement by the safety reviewers on the overall risk assessment. Less than unanimous agreement must be documented in the Final Safety Review Memorandum.

**Risk Level**— An expression of the danger posed by a hazard in terms of the severity of outcome and the probability of occurrence. Risk = Severity x Probability. Risk levels are assigned to both a test event and the test as a whole.

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

**Safety Annex**— The safety annex is part of the test plan where all safety planning documentation (i.e. the safety plan) is located.

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

**Safety Review Board**— A formal safety review meeting chaired by Wing or Complex Chief of Test Safety or delegate and consisting of independent reviewers as voting members. The meeting is also supported by appropriate project personnel. The product of an SRB is an independently reviewed safety plan and proposed overall risk level of the test for consideration by the TEA.

**Safety Reviewers**— An independent panel of subject knowledgeable individuals that review the test and associated safety plan to ensure test hazards are identified; then eliminated, minimized or controlled to an acceptable level; and to establish the overall risk level. As a safety reviewer, the individual is acting on behalf of the AFTC senior leadership. As a minimum, the safety reviewer panel will be composed of a technical and operations representative who will review the test package. Technical representatives are chosen based on their experience and expertise in the engineering discipline(s) associated with the test activity to be reviewed. Operations representatives are chosen based on their test and operations experience in similar test activities.

**Senior Leadership**— Collective reference to the various Operations Group, Test Wing, Test Complex, and AFTC authorities who coordinate, approve, and review test packages.

**Test and Evaluation (T&E)**—The act of generating empirical data during the research, development or sustainment of systems, and the creation of information through analysis that is useful to technical personnel and decision makers for reducing design and acquisition risks. The process by which systems are measured against requirements and specifications, and the results analyzed so as to gauge progress and provide feedback.

**Test Execution Authority (TEA)**— Senior leader who approves the test package.

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

**Test Organization/Unit**— The organization or unit providing the test facilities, equipment or personnel to conduct a test. The test article may or may not be a resource of the test organization/unit. Also known as the test executing organization (TEO).

**Test Organization/Unit Commander**— The highest ranking individual at the test organization or unit (commander or director). This individual has responsibility for the personnel, equipment and/or facilities for accomplishing the test, and is the individual responsible for reporting mishaps involving the test article or the facilities.

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

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

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

**Test Safety Office**— The division in the safety office that reports directly to the Chief of Safety and is responsible for the implementation and management of the locally developed test safety review process.

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

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

**Variation**— The intent of the requirement is expected to be met.

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

**Attachment 1 (96TW)****GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION*****References***

Air Force Manual (AFMAN) 33-363, *Management of Records*

***Adopted Forms***

AF Form 847, *Recommendation for Change of Publication*

***Acronyms and Abbreviations***

**AFSEO** – Air Force SEEK EAGLE Office

**AFTC** – Air Force Test Center

**CCB** – Configuration Control Board

**CFP** – Compatibility Flight Profile

**CONOPS** – Concept of Operations

**ETTC** – Eglin Test and Training Complex

**JON** – Job Order Number

**LDTO** – Lead Developmental Test Organization

**MOT** – Method of Test

**OPR** – Office of Primary Responsibility

**PTO** – Participating Test Organization

**RSE** – Range Safety Engineer (Test/Range Safety Engineer)

**SA** – Safety Annex

**SPO** – System Project Office

**SRB** – Safety Review Board

**SRBS** – Safety Review Board Summary

**TAB** – Test Approval Brief

**TD** – Test Directive

**TE** – Test Engineer

**TEA** – Test Execution Authority

**THA** – Test Hazard Analysis

**TM** – Test Manager

## Attachment 2 (Added-96TW)

## SAFETY ANNEX

Figure A2.1. (Added) safety ANNEX

AMENDMENT NO. X *(if applicable)*

TEST DIRECTIVE NO. XXXXXXXX

TEST DIRECTIVE AMENDMENT NO. X *(if applicable)*

PROJECT/TEST TITLE

Purpose. *(Briefly discuss the test. Include whether items are live or inert, how many sorties/missions, etc; keep it to one or two sentences. A more detailed description should be included in the SRBS. Also reference the dated MOT.)* The following safety criteria have been established for conduct of the test. The overall risk level for this test is High, Medium, or Low.

Test Areas, Test Aircraft, Test Items (and/or munitions) and Target(s).

Test Areas:

Test Aircraft:

Test Items *(Include munitions and other stores as necessary), include developmental items munitions category IAW EAFBI 11-201:*

Target(s):

Danger Areas.

*(Describe danger area. Include a sketch or the Safety Profile, if appropriate. The danger area may be described in geometric terms. Specify safety distances for lasers and radio frequency radiation. Specify what sites or locations can be manned by essential personnel within the danger area.)*

*(Another danger area)*

Potential Hazards. A Safety Review Board (SRB) was convened on DD MMM YYYY to identify potential hazards and discuss high interest areas. The results of that meeting can be found in the SRB Summary (SRBS) as an attachment to this Safety Annex. Test-specific hazards identified with their post-mitigation residual risk are: *(Hazards are ordered from High to Low)*

Hazard one *(identify this hazard as either high, medium, or low)*

Hazard two *(identify this hazard as either high, medium, or low)*

Safety Requirements.

General Mitigating Requirements

*(Requirements)*

*(Requirements)*

Hazard One

*(Requirements)*

*(Requirements)*

Hazard Two

*(Requirements)*

*(Requirements)*

Range Safety Instrumentation Requirements.

Atch: SRBS

Prepared  
by:

//Digitally  
Signed//

SRB  
Chairperson  
Name

Test and  
Range  
Safety

Approved  
by:

//Digitally  
Signed//

SA  
Approval  
Name

(Deputy)  
Directory  
of Safety

NOTES:

Safety Annex naming convention: JON\_TEST\_TITLE\_SA\_AMD\_01\_SRBS

AMD as appropriate

SRBS as necessary

**Attachment 3 (Added-96TW)**  
**SAFETY REVIEW BOARD SUMMARY**

**Figure A3.1. (Added) Safety review board summary**

TEST DIRECTIVE NO. XXXXXXXX		
TEST DIRECTIVE AMENDMENT NO. X <i>(if applicable)</i>		
PROJECT/TEST TITLE		
<u>Safety Review Board Date:</u> DD MMM YYYY		
<u>High Risk Hazards:</u> Hazard <i>(or None)</i>		
<u>Medium Risk Hazards:</u> Hazard <i>(or None)</i>		
<u>Low Risk Hazards:</u>		
Hazard		
Hazard		
<u>SRB Members:</u>		
<u>Name</u>	<u>Organization</u>	<u>Telephone</u>
SRB Chairperson Name*	96 TW/SEU	xxx-xxx-xxxx
Rank First Last		
...		
...		
*SRB Chairperson		
**via telecon (if applicable)		
<u>Background.</u> <i>(Test purpose, test item description, previous specific and/or related testing, notable first-time or historically hazardous events. Also include expected start date of the test.)</i>		
<u>Design Safety Certifications.</u> All hazardous items to be utilized during this test have been evaluated with respect to design safety <i>(Identify who evaluated any hazardous items, if applicable)</i> . These items are considered to present no unusual or unacceptable hazards during the testing described in the Test Directive.		
<u>Mishap Accountability.</u> Mishap accountability will be IAW AFI 91-204. <i>(If the aircraft is contractor-owned and contractor-operated, then mishap accountability will be with the contractor.) Include any discussion when deviation from AFI 91-204 is requested.</i>		
<u>Safety Footprint Methodology.</u> <i>(Explain how you came up with the size/location of the footprint and hazard distances. Were data provided by contractors, the SPO, or someone else? This section correlates with Para 3 of the SA)</i>		
<u>Discussion Items.</u>		
<u>Hazard One (Severity – Probability).</u> <i>(Relevant discussion about the hazard. Should</i>		

*include the risk assessment based on severity and probability)*

Hazard Two (Severity – Probability). *(Relevant discussion about the hazard. Should include the risk assessment based on severity and probability)*

Other Discussion Items:

*(e.g., Required flight clearances...)*

*(e.g., Weather restrictions...)*

*(Other notable discussion topics)*

Atch: THA Forms

Prepared  
by:

//Digitally  
Signed//

SRB  
Chairperson  
Name

Test and  
Range  
Safety

Approved  
by:

//Digitally  
Signed//

SRBS  
Approval  
Name

Chief of  
Test and  
Range  
Safety

## Attachment 4 (Added-96TW)

## INSTRUCTIONS FOR COMPLETING AFTCI FORM 5000, TEST HAZARD ANALYSIS FORM

**Figure A4.1. (Added) Instructions for Completing AFTCI Form 5000, Test Hazard Analysis Form**

**GENERAL.** The Test Hazard Analysis (THA) form is designed to reduce SRB meeting times by providing a concise way to become familiar with your test. The lower section of the form is designed to be filled out prior to the SRB--usually by the test engineer. Risk levels will be assigned during the SRB. Each form should address a single hazard, although it may contain any number of causes, effects, minimizing procedures and emergency procedures. Please do not address unquestionably "Low Risk" hazards that require no minimizing procedures or hazards intrinsic to aircraft or basic equipment operation.

"HAZARD" is defined as something TEST UNIQUE. It's a CONDITION that has the potential to cause a mishap or an accident resulting in an unfavorable end to the test. For example, a hazard might be the early, unintended detonation of test munitions.

"CAUSE" is defined as the CIRCUMSTANCES or SITUATION that lead to the hazard's occurrence. For example, early detonation might be caused by the proximity of heavy equipment or a chase plane.

"EFFECT" is defined as the MISHAP or ACCIDENT that we are trying to avoid. The EFFECT will determine the MISHAP SEVERITY CATEGORY as defined below. In our running example, the effect might be the loss of equipment, aircraft or lives.

"MINIMIZING PROCEDURES" are the things you do to prevent the hazard from occurring. For instance, you may specify a minimum clearance distance from the munitions.

"EMERGENCY PROCEDURES" are test specific and fairly self-explanatory. Not all hazards will have appropriate emergency procedures.

"COMMENTS" are made by anyone who wishes to record thoughts or considerations: the SRB, Safety, TAB, etc. These may also document risk reduction activities that are performed prior to the test for which the hazard has been identified.

**RISK LEVEL ASSESSMENT.** The risk level is assessed by breaking the hazard into two parts: How much damage might result, and how probable it may be. The amount of damage is categorized according to EFFECT and is fairly straightforward. The probability of occurrence is highly subjective and may be difficult to agree upon. The guidelines below may be of some help.

**MISHAP SEVERITY CATEGORY.**

**CATASTROPHIC:** Loss of life, aircraft, or expensive and unique system. Loss > \$2,000,000 (e.g., Aircraft Class A).

**CRITICAL:** Severe injury, lengthy hospital stay, permanent injury. Severe aircraft, equipment or property damage. Loss > \$500,000 but < \$2,000,000 (e.g., Aircraft Class B).

**MARGINAL:** Minor injury, medical treatment but no permanent injury. Minor damage. Loss >

\$50,000 but < \$500,000.

NEGLIGIBLE: Superficial injury, little or no first aide required. Incidental, less than minor damage. Loss < \$50,000.

**SUBJECTIVE PROBABILITY OF MISHAP.**

FREQUENT: Very likely to occur. Test activity (or something very similar) has been done before and a mishap occurred or very nearly did. The test will exceed design limits. There are multiple single points of failure possible.

PROBABLE: Likely to occur. Test activity (or something similar) done before and came close to a mishap. The test is at the design limit. There is at least one single point of failure possible.

OCCASIONAL: Some likelihood to occur, but not expected. All available analysis has been conducted and no information suggests the chance of mishap occurrence is FREQUENT or PROBABLE. Test activity may never have been done before but areas of concern have been identified. The test is nearing the design limit.

REMOTE: Unlikely to occur. Test activity (or something similar) done before with no problems encountered. Well within the design limits. No single points of failure.

IMPROBABLE: There just is not a problem. Nothing has ever gone wrong. Several failures required to have any serious consequences.

**Attachment 5 (Added-96TW)**  
**FORMAT FOR TAB ACTION REQUEST**

**Figure A5.1. (Added) FORMAT FOR TAB ACTION REQUEST**

(Use email if possible)

DATE

MEMORANDUM FOR

FROM:

SUBJECT: Request for Test Approval Brief Action

1. Request Test Approval Brief action on Wednesday (day month and year) on the following:
  - a. Test number:
  - b. Short title:
  - c. Test engineer:
  - d. Test aircrew:
  - e. Brief description of tests:
  - f. Date first test is to be conducted:
  - g. Classification of presentation:
  - h. Flight clearance number:

(Signature element)

**NOTE:** All requests should be received not later than 5 workdays preceding the requested review date.

**Attachment 6 (Added-96TW)****CHECKLIST FOR DETERMINING REQUIREMENTS/RESTRICTIONS FOR CHASE OR TRAINING MISSIONS****Figure A6.1. (Added) Checklist for Determining Requirements/Restrictions for Chase or Training Missions**

The test engineer should use this checklist to determine the specific requirements that must be met to allow the test aircraft/asset to fly chase or training missions. The test engineer must begin early in planning to determine these requirements because our limited resources dictate that we be as flexible as possible. They should discuss these issues with the customer, contractor, project pilot and anybody else with a vested interest in the test articles.

The test engineer can use this guide to determine what is required and what restrictions apply. They can use this information to draft the letter that pertains to these requirements and restrictions for approval at the TAB.

A6.1. Software: Is there unique test software involved (avionics or flight controls)? Can aircraft be flown on chase and/or training missions with this software loaded? If not, can it be flown after the software is proven safe after a few flights? How many and what kind of flights? Are there any additional restrictions (day/VMC only, air-to-air only, etc.)?

A6.2. Pods, Munitions or Suspension Equipment: What pods, munitions or suspension equipment must be downloaded before the aircraft can be flown on a chase or training mission?

A6.3. Additional Restrictions: Are there any other restrictions in addition to the flight clearance restrictions? Are there any configurations requiring special pilot knowledge or qualifications? If so, what are the configurations and qualifications required?

A6.4. Mission Restrictions: Are there any specific missions that cannot be flown (weapon delivery, BFM, etc.)?

A6.5. Lifting of Restriction: Can any restrictions be lifted after testing has begun? If so, which restrictions? What tests or how many flights must be accomplished prior to lifting those restrictions?

**Attachment 7 (Added-96TW)**

**MODIFICATION FLIGHT MANUAL SUPPLEMENT MINIMOD**

**Figure A7.1. Modification Flight Manual Supplement MINIMOD**

<p>FOR</p> <p>(Insert Long Title)</p> <p>TEST NO. _____</p> <p>AIRCRAFT: (Type)</p> <p>Date:</p> <ol style="list-style-type: none"><li>1. TITLE: (Short Name)</li><li>2. TEST ITEM DESCRIPTION: (Include a description of test item including dimensions.)</li><li>3. PREFLIGHT CHECK: (Include a sketch of the test item, if required, and a step-by-step procedure for aircrew use.)</li><li>4. POSTFLIGHT CHECK: (A step-by-step procedure for aircrew use, if required.)</li></ol>
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## Attachment 8 (Added-96TW)

## SAMPLE RESTRICTION LETTER FOR TEST AIRCRAFT

Figure A8.1. (Added) Sample Restriction Letter for Test Aircraft

Date

MEMORANDUM FOR 40 FLTS/DOO, 96 OSS/OSCSO

40 FLTS/DOM, 96 OSS/OSCSP

FROM: (TAB President)

SUBJECT: TAB Restrictions on Test Aircraft (or Test Asset)

1. The following sets forth the restrictions and requirements that must be met to allow (aircraft type/tail number or specific test asset) to fly chase and/or training missions.

- a. Software: (List applicable restrictions)
- b. Pods, Munitions, or Suspension Equipment: (List applicable restrictions)
- c. Additional Restrictions: (List applicable restrictions)
- d. Mission Restrictions: (List applicable restrictions)
- e. Lifting of Restrictions: (List requirements to lift any or all restrictions)

2. It is everyone's responsibility to ensure these requirements and restrictions are strictly observed. If you have any questions or comments, please contact (test engineer/project pilot and their phone number).

3. The following individual's initials signify concurrence:

Test Engineer \_\_\_\_\_

Project Pilot \_\_\_\_\_

Contractor Rep \_\_\_\_\_

Any others \_\_\_\_\_

TAB President's Signature

cc:

40 FLTS/CC

DOOS

DOOE (Scheduler)