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AIR FORCE RESEARCH LABORATORY
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Supplement

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Safety

THE US AIR FORCE MISHAP
PREVENTION PROGRAM

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(AFRL) This publication supplements Air Force Instruction (AFI) 91-202_AFMCSUP, *The US Air Force Mishap Prevention Program.* This publication applies to all AFRL units; it does not apply to US Air Force Reserve or Air National Guard units. This supplement clarifies or expands mishap prevention program requirements, assigns responsibilities for program elements, and contains program management information for AFRL. This supplement applies to all AFRL personnel. This publication may be supplemented at any level, but all supplements must be routed to the office of primary responsibility (OPR) of this publication for coordination prior to certification and approval. Refer recommended changes and questions about this publication to the OPR using DAF Form 847, *Recommendation for Change of Publication*; route DAF Form 847 through the appropriate functional chain of command. References to the authority to waive requirements in this publication resides with the AFRL Deputy Commander. Submit requests for waivers through the chain of command 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 Air Force Instruction (AFI) 33-322, *Records Management and Information*

Governance Program, and disposed of in accordance with Air Force Records Information Management System (AFRIMS) Records Disposition Schedule (RDS).

SUMMARY OF CHANGES

(AFRL) This document only has minor revisions and correction but should be completely reviewed. This revision primarily aligns this supplement with parent document revisions. **Chapter 10**, Space Safety, adds incorrectly removed requirement of AFRL Det 3 acting as the Center level space safety representatives and Systems Safety Managers for the Center. **Chapter 16**, Test Safety Review Process, has changes regarding lessons learned entries, AFRL/SE's appraisal on AFRL led and shadow SRBs, and removes the SharePoint requirement for tracking of SRB Chair Training. Other minor changes regard punctuation and inconsistencies throughout the supplement.

1.1.4. (Added-AFRL) All Detachments, or Technical Directorate (TD) and 711 Human Performance Wing (HPW) are to validate accomplishments in meeting any of the Safety Management System (SMS) expectation tier levels achieved below which will also be approved by their leadership on an annual basis in conjunction with Annual Program Management Review (APMR) results:

1.1.4.1. (Added-AFRL) COPPER. The most recent APMR reflects the organization mishap prevention program conformance and effectiveness under the systematic processes of the SMS was not effective.

1.1.4.2. (Added – AFRL) BRONZE. The most recent APMR reflects the organization mishap prevention program conformance and effectiveness under the systemic processes of the AFSMS was met but needs significant improvement(s).

1.1.4.3. (Added-AFRL) SILVER. The most recent APMR reflects the organization mishap prevention program conformance and effectiveness under the systemic processes of the AFSMS was met but needs minor improvement.

1.1.4.4. (Added-AFRL) GOLD. The most recent APMR reflects the organization mishap prevention program conformance and effectiveness under the systemic processes of the AFSMS was met and effective.

1.4. (Added-AFRL) AFRL Det/SE offices will ensure their functional areas meet current guidelines based on the receiver's needs and supplier's ability to meet those needs. AFRL Det/SE will provide updated Host Tenant Agreements (HTA) to AFRL/SE whenever safety requirements in the HTA are changed or updated.

1.6. (Added-AFRL) Roles and Responsibilities. Some of the position and organization terms used in this document are not the terms used within AFRL. The equivalent AFRL office or position can be found in **Table 1.1**. See **Chapter 3** for more information about wing, group, and squadron classifications for the purpose of safety assessments.

Table 1.1. AFRL Equivalent Offices and Positions.

Term in Document	AFRL Equivalent
Detachment Safety Office or AFRL Det/SE	All Detachment Safety Offices. This includes Det 3/SE, Det 4/SE, Det 6/SE, Det 7/SE, 15 SPSS/SE, and the Wright Site Safety Office (AFRL/RQY). Note: The Wright Site Safety Office is the Detachment Safety Office for RG, RS, and STO. Unsupported offices shall take immediate action to garner support through an MOA or HTA or from AFRL Det/SE office.
Test Safety Office	Detachment Safety Office

1.6.13.7.1. (Added-AFRL) All AFRL safety professionals are required to use an Air Force Safety Automated System (AFSAS) account (with training tab) to create and document Air Force Continuing Education Unit (CEU) and mandated/recommended AFMC Safety training requirements. This standardized system of record is the only method acceptable to document, determine/resource, plan/program/budget, and manage/track/validate efforts to meet both Air Force and MAJCOM safety career field training compliance.

1.6.13.11. (Added-AFRL) All AFRL TD and 711 HPW, Chiefs of Safety (COS) or assigned safety staff (if no COS) will ensure all their unit personnel who have potential access to privileged safety information will receive annual training on the proper handling procedures and document the training annually. This training shall be uploaded to the HQ AFRL/SE SharePoint. AFRL TD and 711 HPW COS will also provide an annual listing of the training to AFRL/SE at least once per year.

1.6.13.11. 1 (Added-AFRL) AFRL HQ SE staff will periodically check privileged training certificates for currency. If current training is not uploaded on the AFRL HQ SE SharePoint site, SE staff will disable/remove AFSAS accounts accordingly.

1.6.14.11.3.1. (Added-AFRL) This will be accomplished by ensuring safety representation at facility utilization board meetings in order to ensure AFRL equities are addressed.

1.6.14.11.6.4.1. (Added-AFRL) AFRL System Safety managers will review designs and plans for projects and construction and will accompany both trained Occupational Safety reviewers and host installation CE personnel at any preplanning conferences, design reviews, preconstruction conferences and facility acceptance inspections involving AFRL equities. Note this is only required if the construction exceeds federal or state building codes.

1.6.14.11.6.4.2. (Added-AFRL) DDESB approves design and drawings for facilities that are explosive sited.

1.6.16.3.1. (Added-AFRL) The PM has the overall responsibility for program system safety, included as a part of the safety release. The System Safety Managers are assigned to the supporting AFRL/Det SE office.

1.6.24.8. (Added-AFRL) 711 HPW will appoint an administrator under the HQ AFMC AFSAS hierarchy to specifically approve, track, and manage any account request, investigation, or report related to and for the Occupational Illness Module.

1.6.27.14. (Added-AFRL) All TDs and 711 HPW with supporting safety professionals are to have an annual documented APMR, as outlined in AFI 91-202, 13.2. A copy of all completed, accepted, and signed APMRs will be up channeled by AFRL Det/SE Office to AFRL/SE for consolidation no later than (NLT) 1 November of each calendar year.

1.6.49.1. (Added-AFRL) The AFRL Program Manager has the overall responsibility to leverage their local AFRL Det/SE office and System Safety Managers in order to meet requirements of **Chapter 11**, **Chapter 13**, and **Chapter 16**. The PM has the overall responsibility for program system safety leveraging the System Safety Managers in the detachment safety offices.

1.6.62.4. (Added-AFRL) If required to be used, Chief of Safety and appropriate subordinate safety discipline personnel will manage their own AFMC Wing (equivalent) Tenant Safety Office inspection/assessment processes to include subordinate organizational account appointments within the AFSAS Inspection Module.

2.1. (Added-AFRL) Safety Staff. The AFRL/SE and AFRL Det/SE offices will have personnel authorizations to cover the Chief of Safety (COS) and core disciplines as applicable to each organization's mission, e.g., Occupational Safety (SEG), Flight Safety (SEF), Weapons Safety (SEW), System Safety (SES), and Space Safety (SEK). Due to AFRL's unique roles and responsibilities, CoS and the core disciplines are filled by civilian personnel for the Safety staff as denoted in this supplement **paragraph 3.4.8** and subsequent paragraphs.

3.4.8. (Added-AFRL) AFRL Safety program assessments will be completed in the following manner:

3.4.8.1. (Added-AFRL) AFRL Det/SE offices will assess the Safety program of each division and stand-alone branch of any TD once within every two year period.

3.4.8.2. (Added-AFRL) Air Force Office of Scientific Research (AFOSR) is the only occupational safety-related direct report to AFRL that does not have a safety staff and will be assessed by the Center Occupational Manager at least once every 24 months.

3.4.8.3. (Added-AFRL) Safety assessments and inspections will be conducted by the responsible detachment or matrixed safety staff as follows:

3.4.8.3.1. (Added-AFRL) Wing Level: 711 HPW and all other AFRL TDs as follows:

3.4.8.3.1.1. (Added-AFRL) 711 HPW: AFRL/RQY Safety staff

3.4.8.3.1.2. (Added-AFRL) AFRL/RY: AFRL/RQY Safety staff

3.4.8.3.1.3. (Added-AFRL) AFRL/RQ: AFRL/RQY Safety staff

3.4.8.3.1.4. (Added-AFRL) AFRL/RX: AFRL/RQY Safety staff

3.4.8.3.1.5. (Added-AFRL) AFRL/RI: Det 4 Safety staff

3.4.8.3.1.6. (Added-AFRL) AFRL/RW: Det 6 Safety staff

3.4.8.3.1.7. (Added-AFRL) AFRL/RQR: Det 7 Safety Staff

3.4.8.3.1.8. (Added-AFRL) AFRL/RD and AFRL/RV: Det 3 Safety staff

3.4.8.3.1.9. (Added-AFRL) AFOSR: AFRL HQ will conduct assessments while Air Force District of Washington (AFDW) will conduct annual inspections

3.4.8.3.1.10. (Added-AFRL*) AFRL/RS: AFRL/RQY Safety staff

3.4.8.3.1.11. (Added-AFRL*) AFRL/RG: AFRL/RQY Safety staff

3.4.8.3.1.12. (Added-AFRL*) STO: AFRL/RQY Safety staff

3.4.8.3.2. (Added-AFRL) Squadron Level: AFRL Divisions subordinate to TDs (including their branches), AOARD, EOARD, SOARD, and 711 HPW/RHD will be inspected every 12 months by host installation Safety offices (US Army Garrison Japan, 501 CSW/RAF Croughton, and 502 ABW Ft Sam) and assessed at least once every two year period as subordinates to AFOSR or 711 HPW.

3.4.8.3.3. (Added-AFRL) Group level inspections will be conducted as follows:

3.4.8.3.3.1. (Added-AFRL) AFRL/RDSM: Assessments and inspections will be conducted by the 15 SPSS Safety staff.

4.3. (Added-AFRL) AFRL TD and 711 HPW leadership . Will ensure an AF Form 457, USAF Hazard Report (HR), or equivalent product is readily available to all personnel. Tenant personnel will send hazard reports involving activities for which the host is responsible to the host base safety office for processing. AFRL Det/SE offices should coordinate (MOA, MOU, or local OI etc.) with host for any notifications for AF Form 457 that affect their operations or units. If not a responsibility of the host, the TD COS will determine appropriate AFRL safety, fire, or health discipline to investigate the HR.

9.11.2.1. (Added-AFRL) TD WSMs will maintain proof of training and training outline or follow installation requirements.

10.2.1.1.2. (Added-AFRL) AFRL Det 3/SE office will have one system safety personnel authorization dedicated to Space Safety. This System Safety Manager (SSM) will act as the AFRL Space Safety Manager (SpSM) and serve as AFRL's focal point and primary advisor to the AFRL/CC on all space safety issues. AFRL/SE will maintain oversight of the space safety program.

10.2.1.1.2. 1 (Added-AFRL) The Det/SE offices will coordinate with the AFRL Det 3/SE SpSM if their TD conducts research on any space programs.

11.1. (Added-AFRL) AFRL test and research programs will follow **Chapter 16**, Test Safety. As part of transition planning and execution, AFRL programs or AFRL-developed capabilities that transition to operational use must comply with this chapter. AFRL System Safety Managers will support the transition from test to operational use by providing users with the hazards documented in the test plan (both General Minimizing Procedures (GMPs) and Test Hazard Analyses (THAs)), mishap information IAW safety privilege restrictions, and by requiring, at a minimum, a Preliminary Hazard List (PHL) as described in MIL-STD-882E.

12.1. (Added-AFRL) AFRL System Safety Managers . Will provide guidance to program managers regarding test safety contract requirements. This will be done via the AFRL Form 4. The AFRL Form 4 is required for all AFRL work units unless exempted by **paragraph 16.5.1.3**. AFRL Form 4 must be completed before contract award.

13.1.3.1.2.2. (Added-AFRL) AFRL Safety Policy (AFRL VA 91-1) is to be communicated to all AFRL workers/employees through its posting to a prominent TD/Wing work location (i.e., at minimum will be at a location where other required notices (AF Form 457's, CA-10 etc.) are already posted.

16.1.1. (Added-AFRL) In this instruction, the term "activities" will include every activity that uses AFRL owned resources (e.g., personnel, equipment, or facilities). See AFRLI 61-103 paragraph 1.2 for definition of when the AFRL test review process will be utilized. Note that other instructions may be more restrictive and may also require safety reviews even if AFRL resources are not used for test. See AFRLI 61-103 Vol 1, *AFRL Flight Test and Evaluation*, for more information about safety review requirements for flight testing. See SEEK EAGLE OFPs and TOs for more information about flights including stores. See AFI 91-205, *Nonnuclear Munitions Safety Board*, for tests of munitions and munitions-related systems. See AFI 91-401, *Directed Energy System Safety*, for more information about testing of directed energy systems. See AFI 91-208, *Hazards of Electromagnetic Radiation to Ordinance (HERO) Certification and Management*, for

more information about tests electrically initiated devices. See DoDI 3100.11, *Management of Laser Illumination of Objects in Space*, for information about laser clearing house approval for tests with lasers. See AFRLI 61-106, *Planning and Management of AFRL Space Experiments*, for more information about safety review requirements for space programs. PAO designation, military-specific application, or data deliverables may also drive a safety review.

16.1.1.1. (Added-AFRL) All activities in AFRL will be categorized into one of two categories: laboratory research or field research.

16.1.1.1.1. (Added-AFRL) Laboratory research is research in which all testing or research occurs within a laboratory in a controlled setting. This includes (but is not limited to) chemistry laboratories, laser tests, clean rooms, and flying unmanned aerial vehicles (UAVs) in approved enclosed structures. These are generally ongoing activities. Laboratory research requires a signed AFRL Form 5 to permit operations within the laboratory. Hazards will be identified on AFRL Form 5. Laboratory research may or may not require a formal Safety Review Board (SRB), depending on the test's scope, complexity, similarity to other (including previous) laboratory research, and anticipated risk level. If an SRB is held for laboratory research, the SRB Chair will sign the AFRL Test Approval Worksheet (TAW). The TAW will be referenced on the laboratory's AFRL Form 5. Some laboratory research may be complex enough that hazards cannot be properly described on a Form 5. In this case, hazards may be documented on AFRL Form 12 instead, then referenced on AFRL Form 5.

16.1.1.1.2. (Added-AFRL) Field research is any research that does not fall into the laboratory research category. This includes (but is not limited to) any research that involves flying in the National Airspace (NAS), explosives testing, rocket engines, performing research on ranges, etc. The SRB Chair, the Test Execution Authority (TEA), and other required parties must sign the AFRL Test Approval Worksheet before research is permitted to begin. Test unique hazards will be identified on AFRL Form 12.

16.1.2.1. (Added-AFRL) Government-led safety reviews can be a formal SRB or a non-board review, as outlined in this chapter. Non-board reviews will be referred to as informal SRBs.

16.2.2.1. (Added-AFRL) Depending on the scope, complexity, similarity to previous tests, and anticipated risk level, the Technical Review Board (TRB) Chair and the SRB Chair can decide to hold a combined TRB/SRB. Combined reviews for flight tests must also meet the requirements described in AFRLI 61-103 Vol 1.

16.2.3.1. (Added-AFRL) Tests planned and reviewed by other government safety organizations that possess a mature, well-defined review process may be accepted at the discretion of the AFRL TEA, the Detachment Chief of Safety, and the Center Test Authority (CTA). (Note: The TEA would normally be identified after the SRB recommends the risk level. Therefore, in cases such as this, the anticipated AFRL TEA should be consulted for the decision to accept the alternate safety review.) This review does not assume or transfer mishap accountability or Convening Authority (CA) to the Department of Defense (DoD). Acceptance requires the participation of one person assigned to AFRL safety in the review process to ensure adequate SRB rigor and hazard management for AFRL assets.

16.2.3.1.1. (Added-AFRL) If the Lead Developmental Test Organization (LDTO) decides not to conduct the safety review, then AFRL must conduct one.

16.2.3.1.2. (Added-AFRL) The following items are the comprehensive safety requirements when AFRL participates in another organization's SRB (i.e., a "shadow SRB"):

16.2.3.1.2.1. (Added-AFRL) The AFRL Test Approval Worksheet must be signed by a person assigned to AFRL Safety who participated in the SRB. This person is the AFRL shadow SRB chair and will sign the TAW as the SRB Chair. The TEA must also sign the worksheet to document risk acceptance.

16.2.3.1.2.2. (Added-AFRL) AFRL shadow SRB Chair will provide a summary of the SRB in lieu of SRB minutes to document SRB competency, to include references to hazard and mishap discussions. A template can be found on the AFRL SRB SharePoint. This can be provided in the comment section on the TAW.

16.2.3.1.2.3. (Added-AFRL) THAs do not need to be documented on AFRL Form 12, but they must include the criteria listed in **paragraph 16.5.4.2.2.1**. If those criteria are not included, AFRL must supplement the hazard analysis to include the necessary information.

16.3.3. (Added-AFRL) AFRL TD Directors/711 HPW Commander will:

16.3.3.4. (Added-AFRL) On behalf of the AFRL/CC, AFRL COS will inform HQ AFMC/SE of high risk tests. AFRL/DO will notify AFMC A3/6 of high risk tests.

16.3.3.5. (Added-AFRL) Coordinate on high risk activities within their organization that involve AFRL personnel or facilities for which they are responsible.

16.3.4.4.1. (Added-AFRL) Test Directors will coordinate with the SRB chair to provide independent technical and operations experts for SRB membership. Due to the requirement for board member independence, it may be necessary to utilize staff from other commands to include TD, Center, and MAJCOM level cross orgs. Test Directors are responsible for independent board membership coordination to the SRB Chair's satisfaction no later than 5 duty days prior to the SRB.

16.3.5. (Added-AFRL) The Detachment Safety Office will:

16.3.5.2.1. (Added-AFRL) Local procedures will determine the renewal period for AFRL Form 5 Laboratory Permits.

16.3.5.2.2. (Added-AFRL) Coordinate local procedures with AFRL/SE and their detachment chain of command.

16.3.5.2.2.1. (Added-AFRL) Because Wright Site does not have a Detachment chain of command, their local procedures will be coordinated through AFRL/SE.

16.3.5.4.1. (Added-AFRL) The AFRL Det/SE COS will act as the SRB Chair. The Det/SE COS can delegate this responsibility to any qualified personnel assigned to AFRL Safety. If the Det/SE COS elects to delegate this responsibility to personnel outside AFRL safety, it will require AFRL COS approval.

16.3.5.9. (Added-AFRL) Notify AFRL/SE of mishaps per timelines in AFI 91-204, regardless of mishap class. Note that this is in addition to OPREP-3/CCIR requirements, not in place of.

16.3.5.10. (Added-AFRL) Provide assistance to scientists, engineers, and PMs completing AFRL Form 4 and complete assigned sections of AFRL Form 4.

16.3.5.11. (Added-AFRL) Submit lessons learned to AFRL/SE by the end of each calendar year. These will be available on AFRL Lessons Learned from Science & Technology Advanced Research (ALLSTAR). This database is found on the AFRL/SE SharePoint. AFRL/SE can provide the most up to date website address. A lesson learned is any element of knowledge that might assist a future AFRL PM, researcher, or other AFRL Det/SE Office in successful project completion. This could be a strength or something that "went wrong" such as an unexpected event (Do not include privileged safety information). The goal is to learn methods of conducting activities more efficiently, effectively, and safely.

16.3.5.12. (Added-AFRL) Ensure, as appropriate, contracts include requirements for the contractor to support the AFRL test safety review process and mishap investigations.

16.3.6. (Added-AFRL) The Program Manager will:

16.3.6.1. (Added-AFRL) Submit AFRL Form 4 to AFRL Det/SE prior to the start of an activity to ensure safety requirements are identified and efficiently integrated into execution. For contracted efforts, this must be done before contract award. Contact the AFRL Det/SE SSM for assistance to complete AFRL Form 4. AFRL Form 4 shall be submitted using the Work Unit (WU) App.

16.3.6.2. (Added-AFRL) Ensure test plans are submitted to the SRB Chair IAW the timeline outlined in **paragraph 16.6.2.3**.

16.3.6.3. (Added-AFRL) Ensure the SRB Chair has the most current version of the test plan.

16.3.6.4. (Added-AFRL) Ensure an independent airworthiness assessment has been initiated prior to the SRB for flight activities. The airworthiness assessment informs the safety risk assessment. NOTE: The Independent Assessment documentation (e.g., Military Flight Release (MFR), Civil Aircraft Operations (CAO) Letter, etc.) is not required to be signed prior to the SRB.

16.3.6.5. (Added-AFRL) Coordinate with SRB Chair prior to resumption of testing following a HQ AFRL-directed stand down. This may include notifying the SRB Chair the stand down has been lifted or having the SRB Chair sign an amended AFRL Test Approval Worksheet if necessary. SRB Chair will determine if delta SRB is required.

16.3.6.6. (Added-AFRL) Notify the AFRL Det/SE SSM when changes are made to a laboratory. The Det/SE SSM will make the appropriate changes to the AFRL Form 5.

16.3.6.7. (Added-AFRL) Coordinate with the SRB Chair when changes are made to a test plan.

16.3.6.8. (Added-AFRL) Notify the AFRL Det/SE Office upon completion of testing and ensure any lessons learned are documented on ALLSTARS (see **paragraph 16.3.5.11** for more information).

16.3.6.9. (Added-AFRL) Ensure all involved personnel clearly understand their mishap response, investigation, and reporting roles and responsibilities prior to the start of an activity IAW **paragraph 16.9** for all types of test activities and AFRLI 61-103 Vol 1 paragraph 6.17 for flight activities.

16.3.7. (Added-AFRL) The AFRL COS will:

16.3.7.1. (Added-AFRL) Approve SRB Chairs if the Chair is not assigned to AFRL Safety.

16.3.7.2. (Added-AFRL) Coordinate on high risk AFRL review packages prior to presentation to the AFRL Commander.

16.3.7.3. (Added-AFRL) Develop and maintain the AFRL safety review policy contained in this instruction providing overarching guidance, processes, and training.

16.3.7.4. (Added-AFRL) Inform HQ AFMC Safety of high risk activities prior to execution.

16.3.7.5. (Added-AFRL) Inform HQ AFMC/A3/6 of high risk non-flight activities prior to execution.

16.3.8. (Added-AFRL) AFRL Detachment COS will:

16.3.8.1. (Added-AFRL) Recommend to the TEA whether to accept an SRB equivalent review conducted by another government safety office.

16.3.8.2. (Added-AFRL) Coordinate with AFRL/SE on approval of high-risk activities.

16.3.8.3. (Added-AFRL) Maintain a list of approved SRB Chairs within their Detachment.

16.3.8.4. (Added-AFRL) Assign an SRB Chair to each test. If the SRB Chair is not assigned to AFRL Safety, selection of the chair requires AFRL COS approval.

16.3.8.5. (Added-AFRL) Ensure AFRL/SE is apprised of AFRL Det/SE-led or -shadowed SRBs.

16.3.9. (Added-AFRL) AFRL/DO will:

16.3.9.1. (Added-AFRL) Ensure this process is integrated or referenced in other test publications, as applicable.

16.3.9.2. (Added-AFRL) Notify AFMC A3/6 of high risk flight tests.

16.3.10. (Added-AFRL) The SRB Chair will:

16.3.10.1. (Added-AFRL) Determine SRB scope and membership requirements IAW paragraph 16.6..

16.3.10.2. (Added-AFRL) Determine the scope of safety review that changes to the test plan should receive if the changes exceed the scope of the approved test plan. Changes will be documented on AFRL Test Approval Worksheet for field research or on an updated AFRL Form 5 for laboratory research. It is at the discretion of the SRB Chair whether changes will require holding an additional SRB.

16.3.10.3. (Added-AFRL) Ensure the SRB timeline is followed IAW paragraph 16.6.2.3..

16.3.10.4. (Added-AFRL) Gather and forward comments and corrections from the SRB Board Members to the test team for reclama or implementation as appropriate.

16.3.10.5. (Added-AFRL) Ensure the test team is aware of SRB requirements and timelines.

16.3.10.6. (Added-AFRL) Coordinate with the TEA, CTA and AFRL/EN as appropriate on returning to testing following a stand-down of operations. This may include holding an additional SRB and will require signing AFRL Test Approval Worksheet.

16.3.10.7. (Added-AFRL) Receive the appropriate training. Training needs to be accomplished prior to chairing any SRBs. Training must be re-accomplished if the individual has not participated in an SRB within the past 12 months. Training requirements are outlined in **Attachment 6** and may be supplemented by the Det/SE Office. SRB training slides can be found on the HQ AFRL/SE SRB Resource SharePoint.

16.3.10.8. (Added-AFRL) Ensure SRB minutes are produced for each SRB IAW **paragraph 16.6.5.2.**.

16.3.10.9. (Added-AFRL) Notify AFRL COS of high risk tests before they occur.

16.3.10.10. (Added-AFRL) Invite AFRL COS to high risk TEA briefings.

16.4.1. (Added-AFRL) The overall test review process is governed by AFRLI 61-103.

16.4.2. (Added-AFRL) The test safety review will be conducted by AFRL Det/SE. Det/SE offices are defined in **Table 1.1**.

16.4.3. (Added-AFRL) Test Completion Termination (Feedback) will be considered complete when any relevant lessons learned have been submitted to ALLSTAR. The ALLSTAR system can be found on the AFRL/SE SharePoint. AFRL/SE can provide the most up to date website address.

16.5.1. (Added-AFRL) AFRL System Safety Analysis Tools for Test Safety Planning:

16.5.1.1. (Added-AFRL) AFRL Form 4. The purpose of the AFRL Form 4 is communicate safety requirements early in a program's life. AFRL Form 4 is required for every AFRL work unit. Work units are defined in AFRLI 61-201. AFRL Form 4 shall be submitted via the WU app. Note: AFRL Form 4 is first and foremost a mechanism to guide project team's planning to ensure they are aware of safety review expectations. It is recognized that the final manifestation of the project may differ significantly from the initial expectation as the systems engineering and planning process progresses. For Form 4 exemptions, see **paragraphs 16.5.1.3**.

16.5.1.1.1. (Added-AFRL) All work units require an AFRL Form 4 to be completed at project initiation unless the work unit meets exemption criteria listed in paragraph **16.5.1.3 or 16.5.1.4**.

16.5.1.1.1.1. (Added-AFRL) Amendment to AFRL Form 4 for contracted work units. Contract changes may drive an amendment to the AFRL Form 4. Changes to blocks 1-6 on AFRL Form 4 do not require an amended AFRL Form 4 unless they drive changes in blocks 7-29. Changes to blocks 7-29 will require an amended AFRL Form 4 if it will result in new, differing, or removal of safety requirements.

16.5.1.1.1.2. (Added-AFRL) Amendment to AFRL Form 4 for in-house work units. Changes to the work unit can be coordinated directly with the SSM who signed the AFRL Form 4. A new AFRL Form 4 is not required.

16.5.1.2. (Added-AFRL) To determine the safety clauses to include in contracts and safety requirements for a program, the SSM will consider the location of testing, who will execute test, ownership of equipment used for test, deliverables for program, and technical specifics (such as weapon use, flight, animal testing, etc.).

16.5.1.3. (Added-AFRL) The SSM may determine a project is exempt from the AFRL Form 4 if it meets all of the following criteria:

16.5.1.3.1. (Added-AFRL) There is no hardware or software deliverable or development.

16.5.1.3.2. (Added-AFRL) The activity does not meet the definition of Human Subjects Research.

16.5.1.3.3. (Added-AFRL) The activity does not involve flight.

16.5.1.3.4. (Added-AFRL) The activity does not include space equipment, will not launch into orbit, or occur in space.

16.5.1.3.5. (Added-AFRL) The activity does not include munition systems, explosives, or propellants

16.5.1.3.6. (Added-AFRL) The activity does not use or include government personnel, equipment, or facilities.

16.5.1.3.7. (Added-AFRL) The activity does not involve infectious agents and toxins, human derived materials, or recombinant deoxyribonucleic acid (DNA).

16.5.1.3.8. (Added-AFRL) The activity does not involve animal use.

16.5.1.4. (Added-AFRL) All SBIR Phase I work units are categorically exempt from the AFRL Form 4 and its associated requirements. The SSM does not need to verify exemption for each work unit.

16.5.4. (Added-AFRL) Documentation and definition of hazards. There are two types of hazards associated with testing: general hazards (also referred to as routine hazards) and test unique hazards.

16.5.4.1. (Added-AFRL) General hazards are not specific to the test, such as bird strikes. If a test team determines a general hazard is relevant to the test, it will be identified and mitigated (when appropriate) in the test plan. The mitigation measures for general hazards will be labeled as General Minimizing Procedures (GMPs). GMPs are stand-alone phrases/statements and are used to address system under test restrictions, test build-up, critical parameter monitoring, go/no-go criteria, weather or environmental criteria, range unique hazards, and flight test chase requirements among other items of test safety concern. An example of a GMP is checking a range for wildlife hazards before starting testing. GMPs can also address minimizing conditions, such as using experienced pilots to fly the aircraft.

16.5.4.2. (Added-AFRL) Test unique hazards are hazards that are either introduced or exacerbated by the test or are associated with the initial testing of a new system. If the nature of the test increases the probability or severity of non-unique hazards, they should also be documented. Test unique hazards will be documented on AFRL Form 5 or AFRL Form 12, as described in paragraphs **16.5.4.2.1 and 16.5.4.2.2**, respectively.

16.5.4.2.1. (Added-AFRL) AFRL Form 5. Test hazards for laboratory research will be documented on AFRL Form 5.

16.5.4.2.1.1. (Added-AFRL) All facilities with an AFRL Form 5 permit require at least one spot inspection per calendar year, to be conducted by AFRL Det/SES. These spot inspections will be documented. Documentation of spot inspection in the Det/SE office's spot inspection log is acceptable but not required. Alternate methods of documentation may be used.

16.5.4.2.1.1.1. (Added-AFRL) AFRL Form 5 permits will be renewed when changes are made to the laboratory, and as determined by local guidance. See **paragraph 16.9.1** for more information.

16.5.4.2.1.1.2. (Added-AFRL) When there is a new risk acceptance authority in place, they will need to be made aware of all AFRL Form 5 permits in their portfolio within 60 days of starting in their position. The risk acceptance authority will re-sign AFRL Form 5s in their portfolio within one year of being in their position.

16.5.4.2.1.2. (Added-AFRL) Alternates to AFRL Form 5 that are used to complete and document lab reviews shall only be granted by AFRL/SE. Alternate methods must meet the requirements listed in paragraphs **16.3.10.2, 16.5.4.2.1.1, 16.5.4.2.1.1.1, 16.5.4.2.1.1.2, 16.6.2.2.1, 16.6.2.4, 16.6.4.3, 16.6.5.1, and 16.9.1**. Use of alternates to AFRL Form 5 will begin after AFRL/SE issues an MFR stating formal approval.

16.5.4.2.2. (Added-AFRL) AFRL Form 12. Hazards for field research will be documented on AFRL Form 12. An identical Microsoft Word version (found on the HQ AFRL/SE SRB Resource SharePoint) can be used for ease. For version control, the SRB Chair should convert the final version to PDF, if not already using PDF, then lock and sign the document with the embedded common access card signature before sending the final out to the test team.

16.5.4.2.2.1. (Added-AFRL) The following items will be included on the form:

16.5.4.2.2.1.1. (Added-AFRL) Hazard risk level

16.5.4.2.2.1.2. (Added-AFRL) Hazard description

16.5.4.2.2.1.3. (Added-AFRL) Hazard causes and effects

16.5.4.2.2.1.4. (Added-AFRL) Mitigations

16.5.4.2.2.1.5. (Added-AFRL) Corrective actions. These are the actions that will occur if the cause is realized. These include ways to correct the cause and the response if a mishap occurs.

16.6.1. (Added-AFRL) Purpose. The Purpose of a Test Safety Review is to ensure hazards are identified, appropriate risk controls are applied, and residual risk is clearly communicated for decision by the appropriate TEA. The Test Safety Review is an objective, independent, and unbiased review process. The final safety review takes place after the technical adequacy of the test plan is determined. Depending on the scope, complexity, similarity to previous tests, and anticipated risk level, the TRB Chair and the SRB Chair can decide to hold a combined TRB/SRB. Combined reviews for flight tests must also meet the requirements described in AFRLI 61-103 Vol 1.

16.6.2. (Added-AFRL) The SRB Chair will determine what type of review is required for any test or research activity. For all field research, AFRL Test Approval Worksheet must be completed and signed regardless of whether a formal board was held. For laboratory research, a signed and completed AFRL Test Approval Worksheet is only required if a formal SRB was held.

16.6.2.1.2.1. (Added-AFRL) At a minimum, the following topics will be identified and considered prior to the SRB:

16.6.2.1.2.1.1. (Added-AFRL) Review of operating environment (e.g., indoor, outdoor, restricted area, airfield, public area, population density, how personnel not associated with test will be kept out of test area, etc.).

16.6.2.1.2.1.2. (Added-AFRL) Location and activity of personnel during test.

16.6.2.1.2.1.3. (Added-AFRL) Personal Protective Equipment (PPE) requirements.

16.6.2.1.2.1.4. (Added-AFRL) Review of operational documents (e.g., Standard Operating Procedures (SOPs), range safety procedures, applicable range risk assessments for test (ground and flight), etc.).

16.6.2.1.2.1.5. (Added-AFRL) Bird/Wildlife Aircraft Strike Hazard (BASH) and Midair Collision Avoidance (MACA) plans (flight tests only).

16.6.2.1.2.1.6. (Added-AFRL) Legal agreements (e.g., Federal Aviation Administration (FAA) Certificate of Authorization (COAs), Memorandum of Agreement (MOAs), State/County/City approvals).

16.6.2.1.2.1.7. (Added-AFRL) Mishap Convening Authority (CA). Take into consideration who owns the equipment being used for testing, who will be operating/conducting the test, who will likely have the preponderance of loss, and who is initiating the test activity. Final CA determination will be made IAW current DoD and 91-series guidance, and consultation with Air Force Safety Center (AFSEC), as applicable.

16.6.2.1.2.1.8. (Added-AFRL) Unexpected event response. This includes hazards associated with emergency services responding to an event, PPE required for responding to unexpected event, and what procedures to take to preserve the scene for an ISB. All wildlife strikes must be reported to the program's AFRL Det/SE office.

16.6.2.1.2.1.9. (Added-AFRL) For UAV testing:

16.6.2.1.2.1.9.1. (Added-AFRL) Range Safety and Containment. Safety planning for unmanned flight operations shall include range safety planning. This may consist of establishment of caution and kill boundaries, quantitative risk analysis, and/or other planning to appropriately protect mission- essential and non-essential personnel and assets.

16.6.2.1.2.1.9.1.1. (Added-AFRL) Caution and kill boundaries. The caution boundaries should provide sufficient airspace to safely conduct the test. The distance between the caution and kill boundaries should be separated enough to provide sufficient reaction time to identify problems and recover the aircraft before transiting the kill boundary. The kill boundary is the outer acceptable limit to initiate flight termination without the aircraft exiting the airspace boundary. Caution and kill boundaries will not be established at the airspace boundary.

16.6.2.1.2.1.9.2. (Added-AFRL) Flight Termination System (FTS). An FTS terminates the flight of a vehicle for the purpose of range safety.

16.6.2.1.2.1.9.3. (Added-AFRL) Lost link, lost communication, and lost Global Positioning System (GPS) procedures as applicable.

16.6.2.1.2.2. (Added-AFRL) The following topics are mandatory discussion items at the SRB:

16.6.2.1.2.2.1. (Added-AFRL) THAs

16.6.2.1.2.2.2. (Added-AFRL) GMPs

16.6.2.1.2.2.3. (Added-AFRL) CA designation

16.6.2.1.2.2.4. (Added-AFRL) Unexpected event notification process and procedures

16.6.2.1.2.2.5. (Added-AFRL) Risk level, as determined by the SRB Chair and board members

16.6.2.1.2.2.5.1. (Added-AFRL) Airworthiness risk will be briefed as it may affect risk assessment

16.6.2.1.2.2.6. (Added-AFRL) Determination of what constitutes a mishap for tests in which damage is a planned and desired result

16.6.2.1.2.3. (Added-AFRL) An SRB checklist can be found in **Attachment 5**.

16.6.2.1.4. (Added-AFRL) An SRB will not be held unless all board members have had sufficient time to review the test plan and provide comments. The SRB Chair will identify the required board members of the SRB. Note that board membership must be compliant with **paragraph 16.6.1**.

16.6.2.1.5. (Added-AFRL) The following are the required and recommended attendees for an SRB:

16.6.2.1.5.1. (Added-AFRL) SRB Chair. Required for all SRBs. The SRB Chair must meet the requirements of **paragraph 16.6.3**.

16.6.2.1.5.2. (Added-AFRL) PM, test lead, test director, or appropriate representative from the program. Required for all SRBs. PM will ensure appropriate representation from the test team attends the SRB, to include test contractors and operators. Not a voting member of the board.

16.6.2.1.5.3. (Added-AFRL) Operations representative. Required board member for all SRBs. Must have experience operating the system under test, the aircraft being used for the test, or similar systems.

16.6.2.1.5.4. (Added-AFRL) Technical representative. Required board member for all SRBs. Must have experience with weapon system used for test, technology under test, or similar systems.

16.6.2.1.5.4.1. (Added-AFRL) If technology under test is adequately unique that there are no technical experts outside the program office, a member of the program not involved with day-to-day planning of the test under SRB review may serve as board member. If no such member of the program office exists, a representative from the program may serve as the technical representative.

16.6.2.1.5.4.2. (Added-AFRL) For a low complexity test, the Technical representative may also serve as the Test & Evaluation or Operations representative. High complexity or high risk tests will have a dedicated technical expert to serve as board member.

16.6.2.1.5.5. (Added-AFRL) System Safety. Recommended board member. Must have received AFMC-approved System Safety training.

16.6.2.1.5.6. (Added-AFRL) Flight Safety. Required for flight tests. Must be a Flight Safety Officer, Flight Safety Manager, or have received Aircraft Mishap Investigation Course (AMIC) training.

16.6.2.1.5.7. (Added-AFRL) Weapon Safety. Required for tests involving explosives, weapons, munitions (live or inert), or DEW. Must have completed Weapon Safety Managers Course.

16.6.2.1.5.8. (Added-AFRL) Test & Evaluation representative. Recommended board member. Must have two years' experience in test & evaluation.

16.6.2.1.5.9. (Added-AFRL) Host, wing, and/or range safety officer, weapons safety manager, or civilian equivalent (e.g., airfield manager) for the test location, as applicable. The safety office must be invited but it is at their discretion whether they will attend the SRB. Host safety office must notified for elevated risk or high-visibility tests per **paragraph 16.3.3.3**.

16.6.2.1.5.10. (Added-AFRL) Airworthiness representative. Required for flight tests. An airworthiness representative must be invited but it is at their discretion whether they will attend the SRB. If an airworthiness representative is not able to attend, they will send the SRB Chair a summary of the airworthiness status on their behalf prior to the SRB.

16.6.2.1.5.11. (Added-AFRL) Any other experts that the SRB Chair has determined are required to conduct a successful SRB. May serve as voting board members.

16.6.2.1.5.12. (Added-AFRL) At a minimum, at least one person assigned to AFRL Safety must be on the board or assigned as Chair for an SRB.

16.6.2.1.6. (Added-AFRL) If the TRB and SRB were not combined, all action items from the TRB that may have an impact on the safety of the test must be briefed by the PM during the SRB.

16.6.2.2.1. (Added-AFRL) Informal reviews in AFRL can include Negligible Risk Reviews (NRRs), as described in AFRLI 61-103 Vol 1.The SRB chair may decide to not hold a formal SRB based on the test's scope, complexity, similarity to previous tests, and anticipated risk level. If an informal board is held, the SRB chair will ensure all test-unique hazards have been identified, documented, and have a risk level assigned to them. Informal SRBs are conducted as electronic/serial reviews but must include required members as defined in the formal SRB requirement. For laboratory research, AFRL Form 5 will be used to document hazards and will be signed by all necessary signatories. The use of AFRL Form 12 is also authorized for expanded clarification of the AFRL Form 5. For field research, the SRB Chair will sign the AFRL Test Approval Worksheet. Test unique hazards will be identified on AFRL Form 12. The SRB Chair and board members will consider all topics listed in paragraph **16.6.2.1.2.1** and **16.6.2.1.2.2** as part of their review.

16.6.2.3. (Added-AFRL) The following timeline will be followed for the safety review process when a formal SRB is held:

16.6.2.3.1. (Added-AFRL) The SRB Chair will schedule the SRB to occur no earlier than five working days from the day of receiving the draft test plan. The SRB Chair may request more time to review the test plan based on complexity and risk level of test. The SRB Chair will send the test plan to SRB Board Members.

16.6.2.3.2. (Added-AFRL) Two working days prior to SRB: Comments on the test plan will be collected by the SRB Chair and submitted to the test team for adjudication.

16.6.2.3.3. (Added-AFRL) If the above timeline cannot be met, the Detachment COS will need to approve the shortened timeline. If the shortened timeline is not approved, the SRB will be rescheduled.

16.6.2.4. (Added-AFRL) Flying UAVs in Enclosed Spaces. An enclosed space that is to be used for flight operations must go through a formal SRB and have a signed AFRL Test Approval Worksheet and AFRL Form 5. The AFRL Form 5 will be the safety permit for the enclosed space. The AFRL Test Approval Worksheet will be used to document the SRB that was conducted to review the enclosed space. Once the facility has been approved for use, any flight operation can be conducted in the space as long as the UAV falls within the defined limits listed on the AFRL Form 5 and in the enclosed space's approved user manual and within the bounds of the facility MFR.

16.6.2.4.1. (Added-AFRL) An enclosed space is defined as any place where it can be reasonably expected that anything flying will not leave the structure and enter the airspace. This includes (but is not limited to): buildings, facilities, and nets.

16.6.2.4.2. (Added-AFRL) The AFRL Form 5 will specify the following criteria for UAVs that are permitted to fly in the enclosed space: group of UAVs, weight restrictions, size restrictions, maximum allowable speed, and any other restrictions specified in the local operating manual(s).

16.6.3.1.1. (Added-AFRL) AFRL COS approval is required if the SRB Chair is not full-time AFRL safety staff.

16.6.3.5.1. (Added-AFRL) SRB Chair training requirements can be found in **Attachment 6**. Det/SE Offices may add requirements as applicable.

16.6.3.5.2. (Added-AFRL) Training must be documented using Attachment 6 and tracked.

16.6.4.1. (Added-AFRL) The SRB Chair will have the final decision on risk level for each hazard and the overall risk level of the test.

16.6.4.2. (Added-AFRL) Attachment 4 includes quantitative and qualitative descriptions for probability. The SRB will use quantitative determinations for probability when possible. If data does not exist for quantitative probability, refer to the qualitative descriptions of probability.

16.6.4.3. (Added-AFRL) The risk level of test hazards will be indicated on AFRL Form 5 for laboratory research or AFRL Form 12 for field research test unique hazards.

16.6.5.1. (Added-AFRL) Laboratory research will use AFRL Form 5 to document hazards. AFRL field research will use AFRL Form 12.

16.6.5.2. (Added-AFRL) SRB minutes will serve as a historical documentation of the SRB. The minutes may list changes made to the test plan during the SRB, but the final test plan must incorporate the changes before being approved. See **Attachment 7** for required SRB minute format when AFRL chairs the SRB or when AFRL is FOA. SRB minutes, THAs, TAW, and other pertinent documents shall be maintained as official documentation of the safety review process.

16.6.5.2.12. (Added-AFRL) Documentation of mishap convening authority.

16.6.5.2.13. (Added-AFRL) Signature of SRB Chair and program manager on the overall minutes.

16.6.5.3.1. (Added-AFRL) Refer to DoDI 4000.19, *Support Agreements,* and AFRLI 25-201, *Formulation and Oversight of Domestic Alliances,* for more information regarding Memorandum of Understandings (MOU), MOAs, Letter of Authorizations (LOA), and suggested formats.

16.6.5.4. (Added-AFRL) All AFRL field research will follow AFRL/DO guidance for unexpected event notification. The test team's AFRL Det/SE office will coordinate with AFRL/SE to determine if further mishap response is required IAW AFI 91-204, Safety Investigations and Reports.

16.7.1.1. (Added-AFRL) The TEA for High risk tests is the AFRL Commander.

16.7.1.2. (Added-AFRL) The TEA for Medium risk tests is the TD Director/711 HPW Commander. For ground tests, this may be delegated to the Division Chief (minimum O-6 or civilian equivalent grade).

16.7.1.3. (Added-AFRL) The TEA for Low risk tests is Division Chief (minimum O-6 or civilian equivalent grade). For ground tests, this may be delegated to the Branch Chief.

16.7.4. (Added-AFRL) TEA Approval briefing.

16.7.4.1. (Added-AFRL) For high risk activities, the SRB Chair is required to brief the AFRL Commander concerning the results of the SRB.

16.7.4.2. (Added-AFRL) For medium and low risk activities, if an approval briefing is requested by the TEA, the SRB Chair will brief the results of the SRB.

16.7.5. (Added-AFRL) Tests with multiple government organization.

16.7.5.1. (Added-AFRL) The TEA will reside in the LDTO's chain of command.

16.7.5.2. (Added-AFRL) If AFRL is not the LTO, the TEA-equivalent in the AFRL chain of command will sign the TAW to document approval of use of AFRL resources in the test. It does NOT signify acceptance of technical and safety risk for the overall test.

16.8.3. (Added-AFRL) Unexpected Event Notification. Following an unexpected event, pause testing and make notifications per Unexpected Event Worksheet within eight hours IAW AFRLI 61-103. AFRL Det/SE will coordinate with AFRL/SE to determine whether the event was a mishap IAW 91-204 and conduct the appropriate level of investigation.

16.8.3.1. (Added-AFRL) An unexpected event is any unexpected occurrence, or series of occurrences, during test that results in (or has the potential to cause) injury or death, damage to systems (excluding normal wear and tear), property damage, anomalous performance, or departure from the airspace. An unexpected event may or may not be classified as a mishap.

16.8.3.2. (Added-AFRL) All wildlife strikes that occur during flight testing must be reported to their AFRL Det/SE office. This is done via the Unexpected Event Worksheet. The AFRL Det/SE office will complete Form 853. If the team makes notification via FAA processes the team will note this on the Unexpected Event Worksheet.

16.9.1. (Added-AFRL) Changes to laboratory research. If a change is made to laboratory research (e.g., new chemicals will be used, new equipment will be added, etc.), the test director, principal investigator, or PM will inform the AFRL Det/SE SSM of the changes. The SSM will update AFRL Form 5, if necessary, based on the changes. It is at the discretion of the SSM whether the changes warrant holding a formal SRB. When the updated AFRL Form 5 is completed, the laboratory is permitted to operate under the new conditions.

16.9.2. (Added-AFRL) Changes to field research. If changes are made to field research for any reason, the SRB chair will decide whether to hold a new SRB. All approved changes will be annotated on AFRL Test Approval Worksheet and be incorporated into version-controlled test documentation. Note that AFRL/DO will make the determination of whether changes are administrative, major, or minor regarding flight tests.

16.10.1. (Added-AFRL) Lessons learned will be submitted to the ALLSTAR system. See **paragraph 16.3.5.11** for more information.

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Attachment 1

GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION

References

AFI 10-1202, *Space Test Program Management,* 15 November 2010

AFMAN 91-222, *Space Safety Investigation and Reports,* 17 June 2019

AFRLI 61-106, *Planning and Management of AFRL Space Experiments*, 16 Jun 2023

AFRLI 25-201, *Formulation and Oversight of Domestic Alliances*, 21 July 2020

AFRLI 40-402, *Protection of Human Subjects in Research*, 21 April 2016

AFRLI 61-103, *AFRL Research Test Review, Approval, and Oversight*, 5 October 2020

AFRLI 61-103 Vo1 1, *AFRL Flight Test and Evaluation*, 5 October 2020

AFRLI 61-103 Vo1 2, *AFRL Test Activity Involving Human Participants*, 6 October 2020

AFRLI 61-201, *AFRL Research and Development (R&D) Work Unit Records and Scientific and Technical (S&T) Reporting*, 9 February 2016

AFRL Test Approval Worksheet

AFRL Unexpected Event Worksheet

AF Form 813, *Request for Environmental Impact Analysis*, 1 Sept 1999

DoDI 3100.11, *Management of Laser Illumination of Objects in Space*, 24 October 2016

DoDI 4000.19, *Support Agreements,* 16 December 2020

Worksheet for Assessing Applicability Of Human Subjects Research Regulation

Prescribed Forms

AFRL Form 4, Safety Planning Form

AFRL Form 5, Lab Safety Permit

AFRL Form 12, Test Hazard Analysis

Abbreviations And Acronyms

AFOSR—Air Force Office of Scientific Research

AFRL—Air Force Research Laboratory

ALLSTAR—AFRL Lessons Learned from Science & Technology Advanced Research

AOARD—Asian Office of Aerospace Research and Development

APMR—Annual Program Management Report

BASH—Bird/Wildlife Aircraft Strike Hazard

C2—Command and Control

CA—Convening Authority

CAO—Civil Aircraft Operations

CDR—Critical Design Review

COA—Certificate of Authorization

CRADA—Cooperative Research and Development Agreement

CTA—Center Test Authority

DNA—Deoxyribonucleic Acid

DTA—Delegated Technical Authority

EOARD—European Office of Aerospace Research and Development

EPA—Educational Partnership Agreement

FTS—Flight Termination System

FOA—Flight Operations Authority

GSU—Geographically Separated Unit

GMP—General Minimizing Procedure

GPS—Global Positioning System

HPW—Human Performance Wing

HR—Hazard Report

HTA—Host Tenant Agreement

LDTO—Lead Developmental Test Organization

LTO—Lead Test Organization

LOA—Letter of Authorization

MACA—Mid Air Collision Avoidance

MFR—Military Flight Release

NAS—National Airspace

NLT—No Later Than

NRR—Negligible Risk Review

NTSB—National Transportation Safety Board

OI—Operating Instruction

OL—Operating Location

PAO—Public Aircraft Operations

PDR—Preliminary Design Review

PHL—Preliminary Hazard List

SDPE—Strategic Development Planning and Experimentation

SBIR—Small Business Innovation Research

SEF—Flight Safety

SEG—Occupational Safety

SES—System Safety

SEW—Weapon Safety

SOARD—Southern Office of Aerospace Research and Development

SOP—Standard Operating Procedures

SpSM—Space Safety Manager

SRB—Safety Review Board

STP—Space Test Program

TAW—Test Approval Worksheet

TD—Technical Directorate

THA—Test Hazard Analysis

TRB—Technical Review Board

UAV—Unmanned Aerial Vehicle

WU—Work Unit

Terms

Caution Boundary—A designated boundary at which the test team needs to initiate a corrective action to recover the aircraft before it reaches the kill boundary. The distance between the caution and kill boundaries should be separated enough to provide sufficient reaction time to identify problems and recover the aircraft before transiting the kill boundary. The distance between the caution and kill boundary should be calculated based on worst case altitude, airspeed, winds, and aircraft configuration.

Enclosed Space—Any place where it can be reasonably expected that anything flying will not leave the structure and enter the airspace. This includes (but is not limited to): buildings, facilities, and nets.

Field Research—Any research that does not fall into the laboratory research category. This includes (but is not limited to) any research that involves flying in the National Airspace (NAS), explosives testing, testing rocket engines, testing on ranges, etc.

General Minimizing Procedures—A mitigation measure for general (i.e., not test-unique) hazards. GMPs are stand-alone phrases/statements and are used to address system under test restrictions, test build-up, critical parameter monitoring, go/no-go criteria, weather or environmental criteria, range unique hazards, and flight test chase requirements among other items of test safety concern.

Kill Boundary—The kill boundary is the outer acceptable limit to initiate flight termination without the aircraft exiting the airspace boundary. The distance between the kill boundary and the approved airspace boundary should be calculated based on worst case altitude, airspeed, winds, and aircraft configuration.

Laboratory—A clearly defined space (indoor or outdoor) used for scientific experiments, testing, analysis, or research activities that may involve the use of, but is not limited to, chemicals, ionizing and non-ionizing radiation, remote vehicles, clean rooms, pathology, or entomology. This research can occur in computer labs, chemistry labs, anechoic chambers, laser labs, wind tunnels, clean rooms, approved enclosed structures for UAV flights, etc.

Laboratory Research—Research in which testing or research occurs within a laboratory. This includes (but is not limited to) chemistry labs, indoor laser tests, clean rooms, and flying UAVs in approved enclosed structures. These are generally ongoing activities.

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

Attachment 3 (AFRL)

MANDATORY (M) AND RECOMMENDED (R) TRAINING COURSES

Table A3.2. (Added-AFRL) Mandatory (M) and Recommended (R) Training Courses.

	Weapon	Occupational	Flight	System	Range	Test
Facility System Safety Training				M		

Attachment 5

SAFETY REVIEW BOARD CHECKLISTS

Table A5.1. Safety Review Board Checklists.

A5.1. Purpose. This checklist is to serve as a quick-look guide for formal SRBs conducted by AFRL. For more information on each topic, see the paragraph referenced. SRB resources can be found on the AFRL/SE SharePoint.

A5.2. Order of events and requirements.

- The overall safety review process for all SRBs conducted by AFRL can be found in Figure A5.1.
- For more information on the safety review for field research, see Figure A5.2.
- For more information on the safety review for enclosed spaces, see Figure A5.3.
- For more information on the safety review for laboratory research, excluding enclosed spaces, see Figure A5.4.

A5.3. Test Timeline (see paragraph 16.6.2.3.):

- SRB will be scheduled to occur at least five working days after the test plan was sent to the SRB Board members.
- Board members will send comments on test plan to the SRB Chair two working days prior to the SRB.
- Det/SE Chief of Safety can waive timeline requirement if necessary and appropriate.
- SRB Chair may require more time between receiving test plan and holding SRB depending on complexity and risk level of test.

A5.4. Documentation

- AFRL Test Approval Worksheet is required for all formal and informal SRBs for field research (see paragraphs 16.6.2. and 16.6.2.2.).
- All test unique hazards for field research must be documented on AFRL Form 12 (see paragraph 16.5.4.2. and 16.5.4.2.2.).
- All test unique hazards for laboratory research must be documented on AFRL Form 5 (see paragraph 16.5.4.2. and 16.5.4.2.1.)
- SRB minutes must be in the format provided in Attachment 7 for all tests in which AFRL chairs the SRB or AFRL is FOA.
- SRB minutes must include the minimum requirements listed in paragraph 16.6.5.2.

A5.5. Required and Recommended SRB board members (see paragraph 16.6.2.1.5.):

- SRB Chair (required)
- Operations representative (required)
- Technical representative (required)
- System Safety
- Flight Safety (required for tests involving flight)
- Weapon Safety (required for tests involving explosives or directed energy)
- Test & Evaluation representative
- Any other experts required by the SRB Chair

- Note: at least one person assigned to AFRL Safety must participate in the SRB

A5.6. Topics to consider BEFORE the SRB (see paragraph 16.6.2.1.2.1.):

- Review of operating environment
- Location and activity of personnel during test
- Personal Protective Equipment (PPE) requirements
- Review of operational documents (e.g., Standard Operating Procedures (SOPs))
- BASH and MACA plans (flight tests only)
- Legal agreements (e.g., FAA COAs, MOAs, State/County/City approvals)
- Mishap Convening Authority (CA)
- For UAV testing:
    - Range safety and containment, to include caution and kill boundaries
    - Flight termination system
    - Lost link, lost communication, and lost GPS procedures as applicable

A5.7. Mandatory topics DURING the SRB (see paragraph 16.6.2.1.2.2.):

- THAs
- GMPs
- Convening Authority designation
- Unexpected event notification
- Risk level(s)
    - Airworthiness risk will be briefed as it may affect risk assessment
- Define what will constitute a mishap

A5.8. Guidelines for determining whether a hazard is general or test unique (see paragraph 16.5.4.1. and 16.5.4.2.):

- General hazards include hazards that are:
    - Present in normal operation of equipment/system/vehicle
    - Typical in operating environment
    - Not exacerbated by test
    - Required to be documented but can be in team-determined format
- Test unique hazards include hazards that are:
    - Not present in normal operation of equipment/system/vehicle
    - Associated with initial testing of new system
    - Exacerbated by test
    - Introduced by testing being conducted
    - Required to be documented on AFRL Form 12 (.pdf or .doc version) for field tests

A5.9. The following topics are considered outside the scope of the SRB:

- Test success criteria
- Technical risk determination
- Measures of performance
- Executability of test plan
- Grammar and format of the test plan

A5.10. Other general considerations:

- Are all hazards identified using the test hazard matrix in Attachment 4?

A5.11. If changes are made to field research (see paragraph 16.9.2.):

- Document changes on AFRL Test Approval Worksheet
- SRB Chair will determine if the changes warrant holding a new SRB

A5.12. If changes are made to laboratory research (see paragraph 16.9.1.):

- SSM will update Form 5 as necessary
- Facility will be permitted to operate once new Form 5 is signed
- SSM will decide whether the changes warrant holding an SRB

A5.13. If the SRB is held by an organization outside of AFRL (i.e., shadow SRBs) (see paragraph 16.2.3.)

- The Detachment Chief of Safety must approve the adequacy of the SRB proceedings conducted by the LDTO.
- If the LDTO does not conduct an SRB, then AFRL must conduct one (formal or informal).
- At a minimum, one person assigned to safety within AFRL must participate in the safety review process. This person will sign the AFRL Test Approval Worksheet as SRB Chair.
- The TEA must also sign the AFRL Test Approval Worksheet.
- AFRL shadow SRB Chair will provide a summary of the SRB in lieu of SRB minutes to document SRB competency, to include references to hazard and mishap discussions.
- Hazard documentation must meet the minimum requirements listed in paragraph 16.5.4.2.2.1.

Figure A5.1. (Added-AFRL) Overall Safety Review Process.

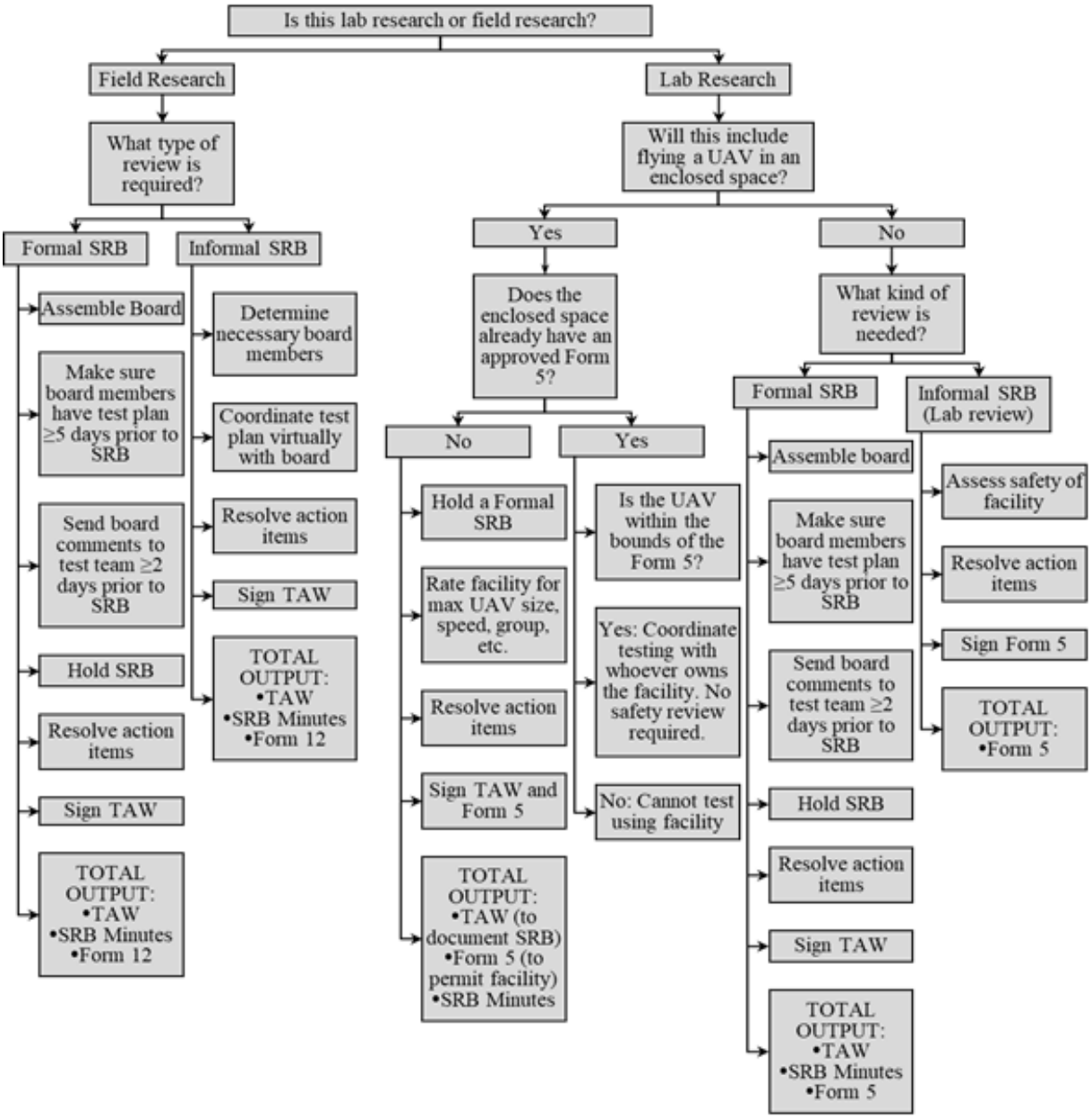


Figure A5.2. (Added-AFRL) Safety Review Process for Field Research.

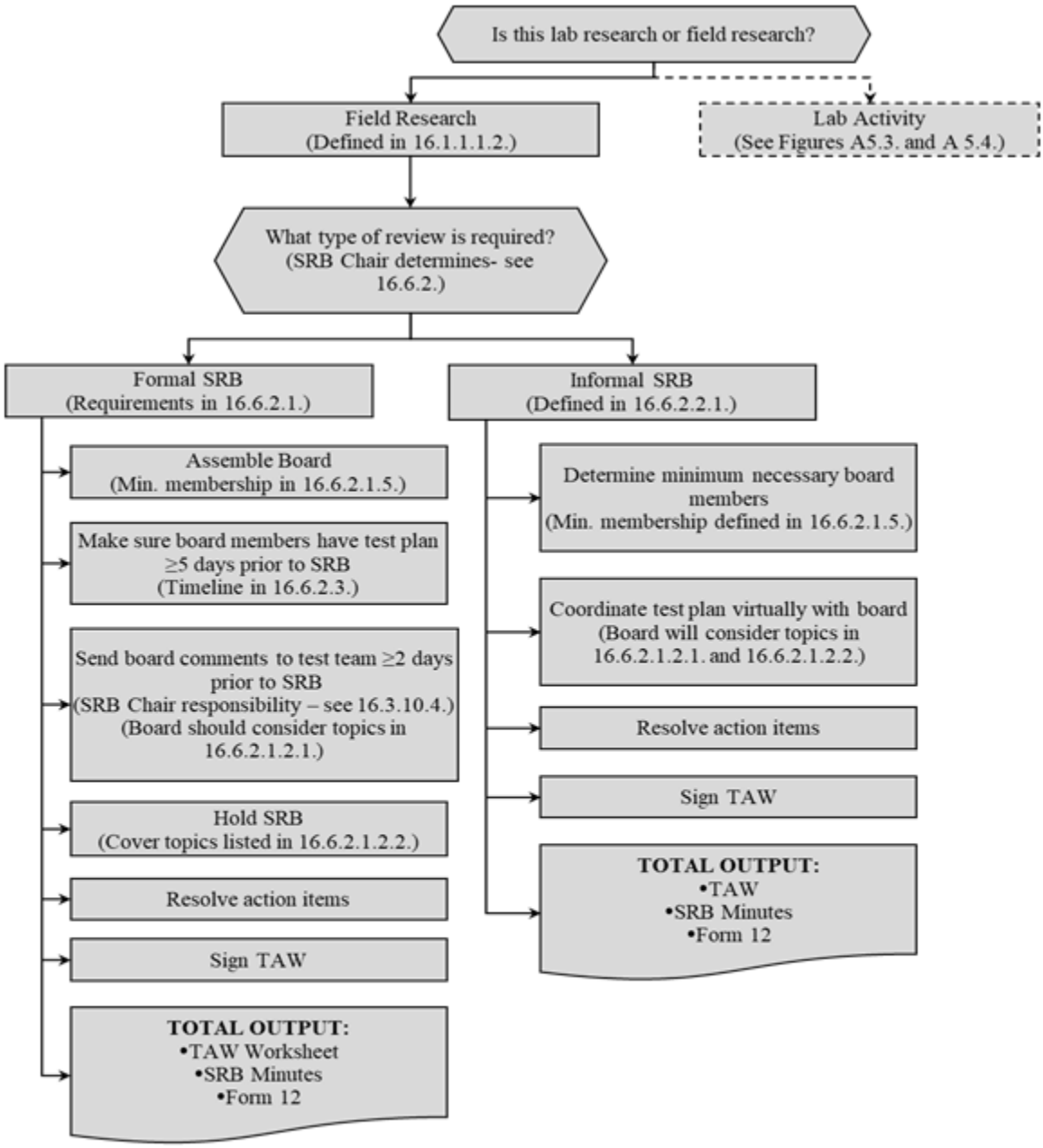


Figure A5.3. (Added-AFRL) Safety Review Process for Flying in Enclosed Spaces.

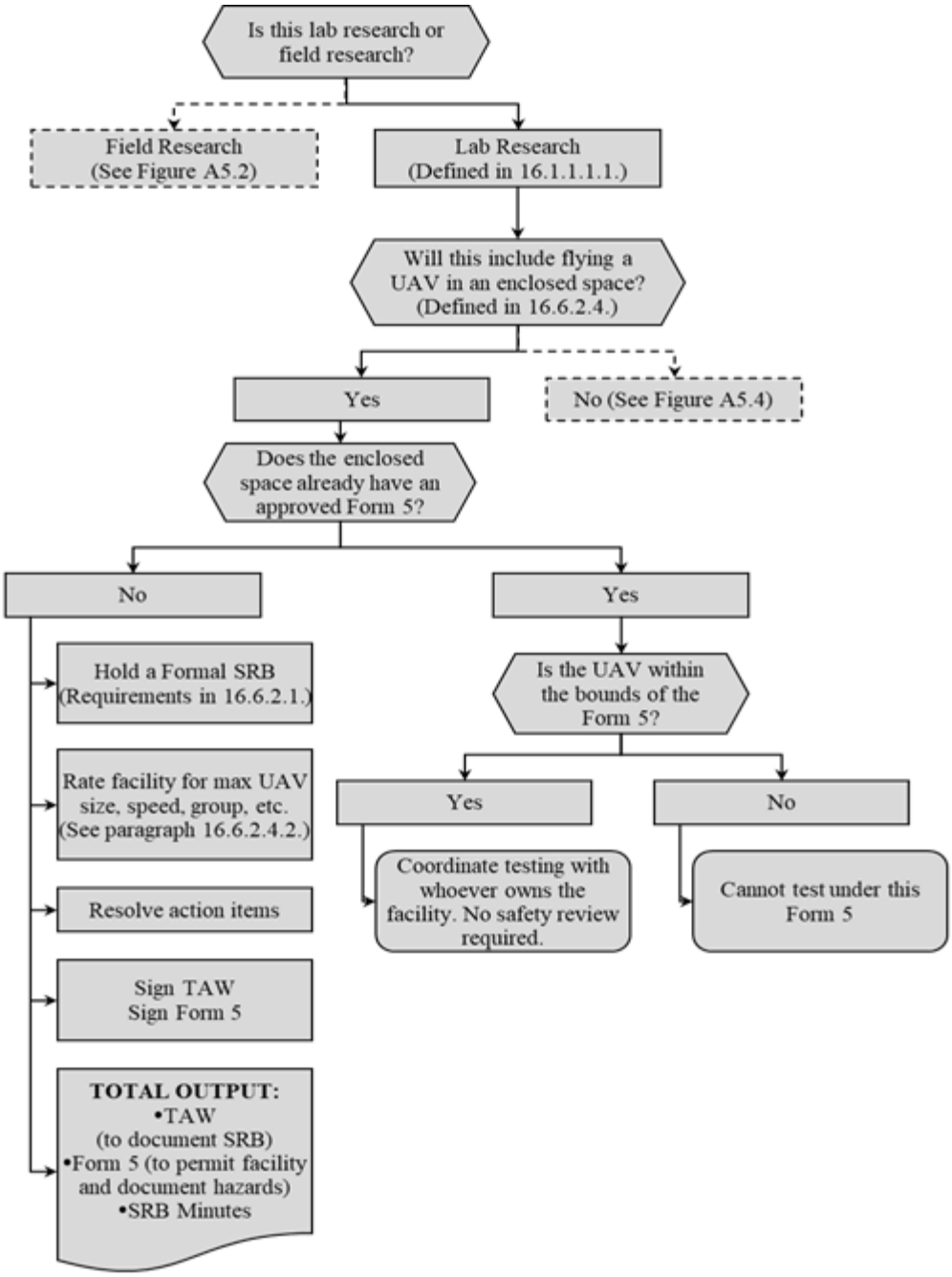
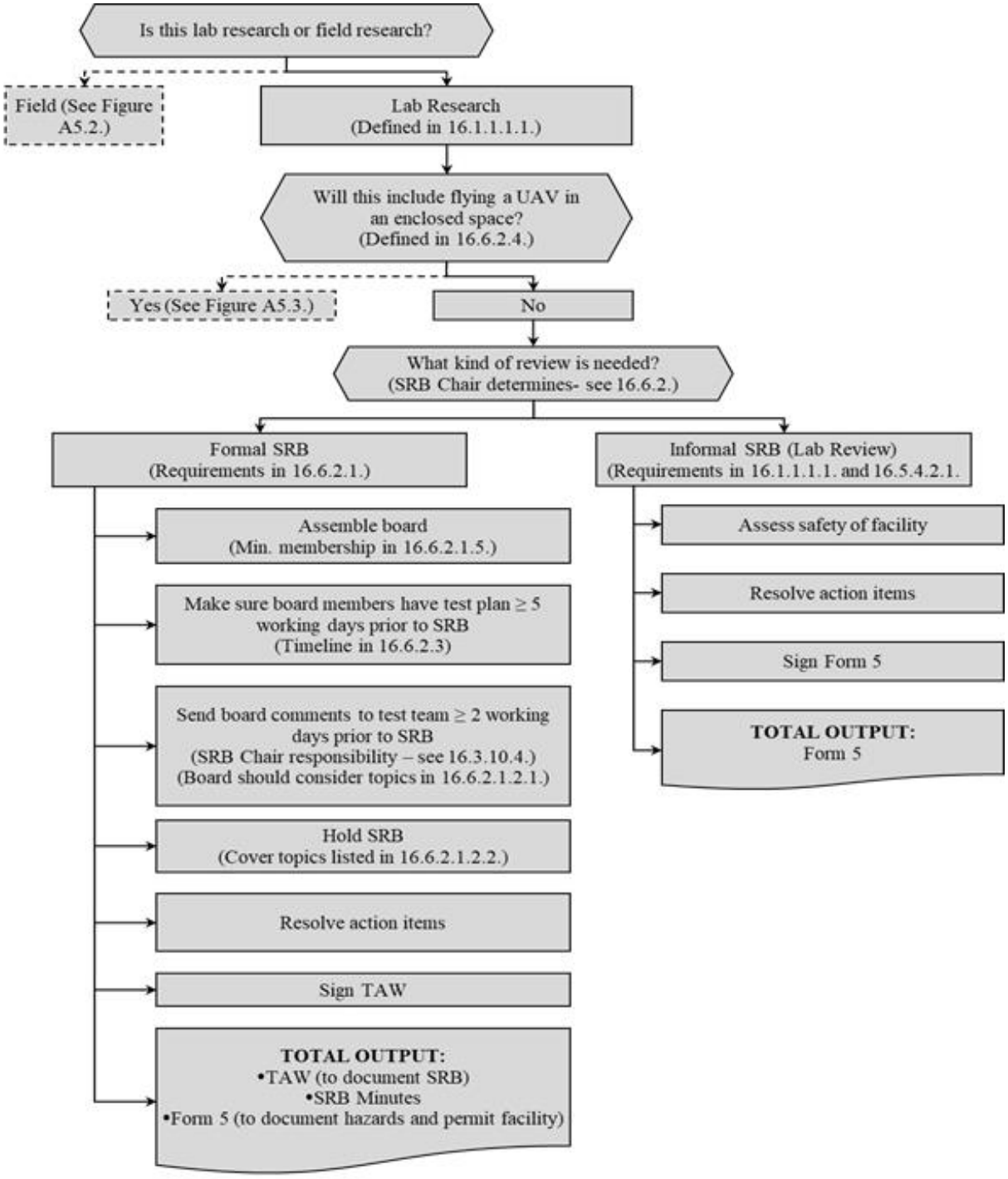


Figure A5.4. (Added-AFRL) Safety Review Process for Laboratory Research, Excluding Flying in Enclosed Spaces.



Attachment 6

SAFETY REVIEW BOARD CHAIR TRAINING

Table A6.1. (Added-AFRL) Safety Review Board Chair Training.

Trainee:			
Trainee Completion Date:			
Task	**Completion Date**	**Trainee's Initials**	**Det/SE Chief of Safety Initials**
REGULATION REVIEW			
Read AFI 91-202, AFMC Supp			
Read AFI 91-202, AFRL Supp			
Read AFRLI 61-103: parent, Vol 1, and Vol 2			
Review mandatory SRB topics (paragraph 16.6.2.1.2.)			
Read AFMAN 91-222 (only required for SRB Chairs when SRB includes space systems)			
SRB EXPERIENCE			
(Before chairing ground SRB) Attend 2 ground SRBs			
(Before chairing flight SRB) Attend 2 flight SRBs			
(Before chairing space SRB) Attend 2 space SRBs			
Act as recorder for 1 SRB			
Chair 1 SRB under mentorship of qualified SRB Chair			
Attend 1 TRB			
OTHER			
Review Lessons Learned on ALLSTARS			
VALIDATION			
Det/SE Chief of Safety signature			
AFRL Chief of Safety signature (if trainee is not assigned to AFRL Safety)			

Attachment 7

SAFETY REVIEW BOARD MINUTE FORMAT

Table A7.1. (Added-AFRL) Safety Review Board Minute Format

(Bolded items are required per paragraph 16.6.5.2.)

[Date] DD MMMYYYY

MEMORANDUM FOR RECORD

SUBJECT: Safety Review Board (SRB) for **Test or project identifier**. Include test plan version number and date.

1. Attendees:

a. SRB Chair: [List name and office symbol]

b. List other attendees and other members as applicable. **If a formal board was not convened list individuals who coordinated on the plan/solution.**

2. Safety Risk Level: [Sample verbiage] Once all of the changes mandated by these minutes are accomplished and the final administrative edits are completed to the satisfaction of the Safety `Review Board, the SRB Chair will recommend a Safety Risk Level of XXX to the AFRL Test Execution Authority.

3. Safety Discussion: List specific: (Note that this section may reference paragraphs in test plan that cover this information)

a. Minimizing procedures (i.e., GMPs):

b. Controls:

c. Restrictions:

d. Go/no-go lists:

e. Concur/non-concurs on risk level, hazards, etc.

f. Convening Authority

4. Airworthiness: [Sample verbiage] The airworthiness representative indicated the operation will be declared [CAO, PAO] and the airworthiness risk level is [High, Medium, Low].

5. Special Considerations: [Sample verbiage for a. thru d. is below. List other special considerations as applicable.]

a. The Technical Review Board (TRB) was conducted on XX XXX XX and assessed [test or project identifier] as an XXX technical risk.

b. AFRL is the [LTO, PTO] for this test.

c. The test team is anticipating test/test start dates of XX XXX XXXX.

d. This test [will/will not] include the participation of AFRLMESPs.

6. Test Hazard Analysis (THA): List any THAs by title only; refer to the test plan for specifics.

a. THA title

b. THA title

c. OR No Test Specific Hazards were identified.

7. Action Items:

a. Indicate the test plan/form/etc. section and what action needs to be taken.

8. Other Agency Coordination: Examples include host installation, range, or non-DoD or N/A

9. Required Waivers: If required or N/A

10. Signatures. Signatures denote minutes are accurate and all action items are complete

_____

SRB Chair and office symbol

_____

PM and office symbol

_____

SRB Recorder and office symbol

X Attachments:
1. AFRL Form 12
2. Test Plan
3. Other supporting documentation, as necessary (specify)