This instruction implements Air Force Policy Directive (AFPD) 61-1, Management of Science and Technology, Air Force Instruction (AFI) 61-101, Applied Technology Council, AFMCI 61-102, Advanced Technology Demonstration Technology Transition Planning, and AFRLI 61-205, AFRL Science and Technology (S&T) Investment Hierarchy and Data Requirements. This instruction sets forth policy, responsibilities, and procedures for all AFRL S&T program baselines, execution and management reviews. This instruction applies to all AFRL personnel involved with the planning, management, or execution of S&T programs (internally and externally funded). The overall objective is to ensure the appropriate management levels have accurate, timely, and pertinent information upon which to make sound and timely decisions. Ensure that all records created as a result of processes prescribed in this publication are maintained IAW AFMAN 37-123 (will convert to AFMAN 33-363, Management of Records), and disposed of IAW the Air Force Records Disposition Schedule (RDS) located at http://static.e-publishing.af.mil/production/1/afisra/publication/afman33-363_afisrasup_i/afman33-363_afisrasup_i.pdf. Refer recommended changes and questions about this publication to the Office of Primary Responsibility (OPR) using the AF IMT 847, Recommendation for Change of Publication; route AF IMT 847 through the appropriate functional chain of command.
SUMMARY OF CHANGES

This document has been substantially revised and must be completely reviewed. Key changes include the following: All AFRL S&T research efforts will be designated as a particular S&T program type (Section 3); S&T program baselines, tailored appropriately, will be required for all S&T programs; AFRL/CC or CA will approve Flagship Capability Concepts (FCCs) and Joint Capability Technology Demonstrations (JCTDs) S&T program baselines; Advanced Technology Demonstrations will be approved by the Capability Lead; Technology Directorate (TD) directors will tailor program management for Technology Programs (TPs) and Science and Knowledge Programs (SKPs). The term Program Baseline Review (PBR) is being retired in favor of a more descriptive term: Program Management Review (PMR). High Visibility Programs (HVPs) have been replaced by Capability Concepts (CCs).

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1. Introduction. This AFRL instruction provides definitions and guidance pertaining to the management of S&T programs, to include program initiation, planning, execution, monitoring and close-out. Guidance on S&T program baseline development, assessment and approval is also included.
2. Roles & Responsibilities  The following are the roles and responsibilities of key participants in the development, approval, and reporting of Science & Knowledge (SKPs, TPs, CCs, ATDs, JCTDs, and FCCs.

2.1. AFRL/CC:

2.1.1. Ensures existence of policy and guidance for the implementation and application of the AFRL PM process.

2.1.2. Recommends candidate FCC S&T programs for validation by Air Force Requirements Oversight Council (AFROC).

2.1.3. Recommends candidate JCTD S&T programs for validation by OSD.

2.1.4. Commissions candidate ATD S&T programs at the appropriate MAJCOM/CFLI ATC.

2.1.5. Approves FCC and JCTD baselines and re-baselines.

2.1.6. Chairs the Program Management Reviews for FCCs and JCTDs.

2.2. AFRL Plans and Programs Directorate (AFRL/XP)

2.2.1. AFRL/XP Director, as Capability Council Chairperson, designates candidate S&T programs as Capability Concepts.

2.2.2. Administers corporate-level Program Management Reviews for ATDs, JCTDs and FCCs.

2.2.3. Coordinates on baseline documents for CCs, ATDs, JCTDs and FCCs.

2.3. AFRL Engineering & Technical Management Directorate (AFRL/EN)

2.3.1. Serves as AFRL Center Senior Functional (CSF) for Program Management IAW HQ AFRL Functional Management Implementation Guidance dated 29 June 2010. The CSF for Program Management provides program management policies, processes and guidance at the corporate AFRL level. This includes guidance on PM functional training.

2.3.2. Ensures the corporate central data repository contains current approved baseline documents for CCs, ATDs, JCTDs, and FCCs.

2.3.3. Ensures that the Systems Engineering and Program Management Council (SEPMC) promotes S&T program management within AFRL.

2.3.4. Serves as approval authority for and maintains configuration control of the S&T Program Baseline template, baseline assessment criteria and the Program Management Review template.

2.3.5. Assists S&T Program Managers in developing S&T Program baselines

2.3.6. Participates in PMRs of FCCs, JCTDs, and ATDs.

2.3.7. Participates in PMRs of CCs as noted in paragraph 2.2.4.5.1.

2.3.8. Reviews and coordinates on baseline documents for ATDs, JCTDs, and FCCs.

2.3.9. Conducts Integrated Baseline Reviews (IBRs) and provides IBR report to AFRL/CC.
2.3.10. Maintains configuration control over technology transition definitions and metrics.

2.4. **AFRL Systems Engineering and Program Management Council (SEPMC)**

2.4.1. In addition to the roles and responsibilities outlined in AFRLI 61-104, the SEPMC creates, promotes and updates S&T program management policy, process, tools, and training for the AFRL S&E workforce.

2.5. **AFRL Capability Lead**

2.5.1. Approves ATD and CC baselines and re-baselines.

2.5.2. Chairs ATD Program Review, Co-chairs with the Lead TD Director CC Program Review

2.5.3. Member of AFRL Capability Council

2.5.4. Recommends Candidate ATDs to the appropriate MAJCOM/CFLI

2.6. **Technology Directorate Director:**

2.6.1. Ensures divisions, branches, and S&T program managers implement this instruction.

2.6.2. Supports the TD Chief Engineer’s role as the S&T Program Management focal point for the directorate.

2.6.3. Ensures S&T Program Management Reviews are conducted for directorate SKPs, and TPs. Also, relevant CC, ATD, FCC, and JCTD PMRs are ready for presentation at higher levels.

2.6.4. Approves designation or deletion of SKPs and TPs, consistent with AFRL investment strategy.

2.6.5. Ensures allocation of appropriate resources per approved S&T program baseline in accordance with documented AFRL priorities.

2.6.6. Approves or coordinates S&T program acquisition strategy.

2.6.7. Reviews, coordinates, or approves S&T Program baselines and re-baselines of SKPs, TPs, CCs, ATD, JCTDs and FCCs to document the resource commitment (people, dollars, laboratory space, and equipment) required to achieve the baseline. Ensures S&T program baselines and re-baselines are coordinated through AFRL/EN and AFRL/XP prior to AFRL HQ front office signature according to attachments 2 & 3.

2.6.8. Ensures all information for assigned SKPs, TPs, CCs, ATDs, JCTDs, and FCCs are populated and kept current in the AFRL enterprise central database (Integrated, Project and Portfolio Management, IPPM), in accordance with AFRLI 61-205.

2.7. **Lead TD Director**

2.7.1. Ensures close coordination on all cross-directorate S&T program activities with participating TDs.

2.7.2. Serves as the first-line supervisor of all Lead S&T PMs for cross-directorate FCCs. NOTE: This implies that the Lead S&T PM for FCCs resides in the Lead TD.
2.7.3. Notifies AFRL/CC, AFRL/CA, AFRL/XP, and AFRL/EN concerning baseline breaches or rebaselines for cross-directorate ATDs, JCTDs, or FCCs.

2.8. Participating TD Director or Designee:
2.8.1. Ensures coordination on all cross-directorate S&T program activities with lead and other participating TDs.
2.8.2. Serves as a member of the review panel at semi-annual or annual PMRs as available.
2.8.3. Recommends to Lead TD Director additions or deletions of S&T programs consistent with AFRL investment strategy.
2.8.4. Signs applicable TD baselines and re-baselines to document the necessary resource commitment (people, dollars, laboratory space, and equipment) needed to achieve the baseline.
2.8.5. Ensures all information for S&T programs, including SKPs, TPs, CCs, ATDs, JCTDs, and FCCs, provided to the lead TD is current and is populated within AFRL Enterprise Business System.

2.9. TD Chief Engineer:
2.9.1. Serves as the TD Senior Engineering and Program Management focal point and member of the AFRL Systems Engineering and Program Management Council (SEPMC).
2.9.2. Reviews and coordinates on TP2, CC, ATDs, JCTDs and FCC S&T baselines.
2.9.3. Participates in TD PMRs and LMRs.

2.10. TD Chief Scientist:
2.10.1. Serves as the TD chair and member of the directorate technology council in accordance with AFRL 61-105, *Directorate Technology Councils*.
2.10.2. Reviews and coordinates on all AFRL TD programs and applicable cross-TD programs.
2.10.3. Participates in TD PMRs and LMRs

2.11. TD Branch Chiefs and Division Chiefs:
2.11.1. Ensure S&T program managers follow this instruction or AFRL 61-202 Lab Management Review (LMR) guidance for program reviews of all S&T programs.
2.11.2. Support allocation of sufficient resources to meet program objectives.

2.12. S&T Program Managers:
2.12.1. General responsibilities:
2.12.1.1. Create and advocate the S&T program through collaboration with the customer and appropriate Capabilities/Tech Base portfolio management personnel.
2.12.1.2. Form a multi-functional S&T program team, as required.
2.12.1.3. Create and advocate a detailed S&T program plan through collaboration with the customer and appropriate Capabilities/Tech Base portfolio management personnel.

2.12.1.4. Execute tasks in the approved S&T program plan.

2.12.1.5. Monitor and control S&T program cost, schedule, performance, and risk.

2.12.1.6. Report S&T program status to appropriate management and in IPPM.

2.12.1.7. Work collaboratively with customers to execute all SE processes and transition technology.

2.12.1.8. Invite customers, in coordination with TD leadership, to S&T program reviews.

2.12.1.9. Recommend cost, schedule, and performance baseline changes in accordance with paragraph 5.1.3.

2.12.1.10. Deliver technology options to the customer or documented body of scientific knowledge.

2.12.1.11. Ensure R&D case files and contractual obligations are properly closed, in conjunction with work unit managers, records managers and functional area managers.

2.12.1.12. Ensure documentation of the final report and capture lessons learned, in conjunction with work unit managers (if appropriate).

2.12.1.13. Manage storage and retrieval of S&T program documentation charter, program proposal, program plan, transition documents, etc.

2.12.1.14. Ensure personnel from multiple TDs are collaborating on cross-directorate S&T programs.

2.13. **Lead S&T Program Managers:**

2.13.1.1. Manage cost, schedule, and performance execution of assigned TPs, CCs, ATDs, JCTDs and FCCs and report status at PMRs.

2.13.1.2. Ensure coordination of all S&T program activities with all participating TDs and participating PMs.

2.13.1.3. Develop baselines and re-baselines in coordination with the appropriate AFRL/XP and AFRL/EN Leads, and participating TDs. Manage program baseline breaches IAW paragraph 5.1.

2.13.1.4. Ensure assigned ATD and FCC programs have an approved and updated Technology Transition Plan (TTP) IAW AFMCI 61-102, Advanced Technology Demonstration Technology Transition Planning, TTP template. All FCC programs will use the same TTP as ATD programs. JCTD transition planning is governed by OSD and is not addressed in this document.

2.13.1.5. Ensure all other programs with strong transition potential have an appropriately tailored transition plans documenting roles, responsibilities, and

2.13.1.6. Identify any proposed baseline changes (described in paragraph 5.1.3.), including reallocation of funding, to the lead TD director and assigned AFRL/XP and AFRL/EN leads.

2.13.1.7. Populate and maintain program data in accordance with AFRLI 61-205 for assigned S&T Programs, such as, but not limited to, SKPs, TPs, CCs, ATDs, JCTDs, and FCCs programs.

2.14. Participating S&T Program Managers:


2.14.1.2. Assist the lead program manager in communicating the S&T program strategy to customers.

2.14.1.3. Assist the lead S&T program manager as required to support transition document development.

2.14.1.4. Identify related or supporting efforts that would accelerate the execution of the program or its subtasks.

2.14.1.5. Ensure close coordination of supporting efforts for SKP, TP, CC, ATD, JCTDs, and FCC activities with the lead TD.

2.14.1.6. Assist the Lead PM in the development of baselines and re-baselines.

2.14.1.7. Monitor the execution of the supporting S&T programs, and report any changes in performance, cost, schedule or risk to the lead program manager.

2.15. Lead TD Business Operations Focal Point or Senior Planner:

2.15.1. Ensures proper implementation of new or existing Program Baseline policies with the TD.

2.15.2. Ensures assigned TD programs populate and are maintained in the enterprise central database (IPPM), in accordance with AFRLI 61-205.

3. S&T Program Management S&T program management is the art and science of planning and executing S&T programs, and monitoring and reporting their status, for the purpose of timely delivery of specific knowledge and/or technology solutions.

3.1. S&T Programs. A S&T Program is a product, program, or work unit in the AFRL hierarchy as defined in AFRLI 61-205. S&T programs are S&T efforts with specific scope, deliverables, and resource requirements (funds, manpower, facilities, eg.). S&T programs have cost, schedule and performance objectives and can serve a number of different purposes. They can provide a technology solution or combination of solutions to mitigate a warfighter capability shortfall. They can also deliver technology options to a system manager, or they can focus on increasing the body of knowledge or “state-of-the-art” in a scientific field.

3.2. Types of S&T Programs
3.2.1. Flagship Capability Concept (FCC)

3.2.1.1. Definition: A FCC is a collaborative endeavor by a MAJCOM/Core Function Lead Integrator (CFLI), Air Force Centers and AFRL to close a prioritized Capability Gap. A FCC includes: a) an Advanced Technology Demonstration (ATD)-like S&T program comprised of technology investments that enables a prioritized capability and that has well-defined S&T Key Performance Parameters (KPPs), Cost and Schedule (this is the FCC’s S&T Baseline); b) a credible transition plan with an assigned transition agent; and, c) commitment and appropriate action by a sponsoring MAJCOM/CFLI to fully fund the transition plan. FCCs are sponsored by a MAJCOM/CFLI, vetted through the AF Corporate Process, and validated by the Air Force Requirements Oversight Council (AFROC).

3.2.1.2. FCC Designation in accordance with current AFRL Portfolio management:

3.2.1.2.1. Purpose of FCC Designation: To garner Air Force level support to develop and transition S&T technologies to close a prioritized capability gap.

3.2.1.2.2. FCC Designation Authority: Vice Chief of Staff of the Air Force approves after AFROC validates.

3.2.1.3. FCC S&T Baseline Coordination: The following individuals or organization are required to coordinate on the S&T baseline approval package.

3.2.1.3.1. AFRL/XP

3.2.1.3.2. The AFRL Capability Lead of the associated Service Core Function (SCF)

3.2.1.3.3. AFRL/EN

3.2.1.3.4. Lead TD Chief Engineer and Chief Scientist

3.2.1.4. FCC S&T Baseline Approval: The following individuals are required to approve the S&T baseline

3.2.1.4.1. AFRL/CC

3.2.1.4.2. Lead TD Director

3.2.1.4.3. Participating TD Director(s)

3.2.1.4.4. FCC Program Manager

3.2.1.5. FCC Program Management Review

3.2.1.5.1. Although PMRs are required semi-annually, FCCs will be reviewed at least annually at the AFRL enterprise level, chaired by AFRL/CC or his/her designee utilizing the AFRL-approved PMR template https://org2.eis.afmc.af.mil/sites/afrlhq/en/Docs/PBR_Templates

3.2.1.6. Additional guidance for FCCs may be found in AFI 61-101.

3.2.2. Joint Capability Technology Demonstrations (JCTD)

3.2.2.1. Definition: The Joint Capability Technology Demonstration (JCTD), previously called Advanced Concept Technology Demonstration (ACTD), process is
a pre-acquisition activity, spanning from two to four years. It provides the user an opportunity to assess innovative technologically mature capabilities and determine the military utility before deciding to acquire additional units. The concept falls between the Joint Rapid Acquisition Cell (JRAC) urgent needs process of fewer than two years with little or no development and the traditional, more deliberate, formal acquisition process that can stretch five to ten years. JCTDs focus on four areas: Joint, Transformational, Coalition, and Inter-agency capabilities.

3.2.2.2. JCTD Designation:

3.2.2.2.1. Purpose of JCTD Designation: To garner DoD-level support to develop and transition S&T technologies to close a COCOM-endorsed capability gap.

3.2.2.2.2. JCTD Designation Authority: DoD-level Candidate Decision Board validates, USD/AT&L approves.

3.2.2.3. JCTD S&T Baseline Coordination: The following individuals or organizations are required to coordinate on the S&T baseline approval package.

3.2.2.3.1. AFRL/XP

3.2.2.3.2. The AFRL Capability Lead of the associated Service Core Function (SCF)

3.2.2.3.3. AFRL/EN

3.2.2.3.4. Lead TD Chief Engineer and Chief Scientist

3.2.2.4. JCTD S&T Baseline Approval: The following individuals are required to approve the S&T baseline.

3.2.2.4.1. AFRL/CC

3.2.2.4.2. Lead TD Director

3.2.2.4.3. Participating TD Director(s)

3.2.2.4.4. JCTD Program Manager

3.2.2.5. JCTD Program Management Review

3.2.2.5.1. JCTDs will be reviewed at least annually at the AFRL enterprise level, chaired by AFRL/CC or his/her designee utilizing the AFRL-approved PMR template https://org2.eis.afmc.af.mil/sites/afrlhq/en/Docs/PBR_Templates or the OSD approved JCTD PMR template.

3.2.2.6. Additional guidance on JCTDs may be found at the following Link: http://www.acq.osd.mil/rfd/.

3.2.3. Advanced Technology Demonstration (ATD)

3.2.3.1. Definition: An AFRL S&T program endorsed at the MAJCOM/CFLI-level with well-defined scope and objectives that address MAJCOM/CFLI capability needs or Center tech needs, with the intent to transition matured technologies to the acquisition, sustainment, test communities and/or be deployed to an end user.

3.2.3.2. ATD Designation:
3.2.3.2.1. Purpose of ATD Designation: To garner MAJCOM/CFLI-level support to develop and transition S&T technologies to close a MAJCOM/CFLI-endorsed capability gap.

3.2.3.2.2. ATD Designation Authority: MAJCOM/CFLI Applied Technology Council (ATC).

3.2.3.3. ATD S&T Baseline Coordination: The following individuals or organizations are required to coordinate on the S&T baseline approval package.

- 3.2.3.3.1. AFRL/XP
- 3.2.3.3.2. AFRL/EN
- 3.2.3.3.3. Lead TD Chief Engineer and Chief Scientist

3.2.3.4. ATD S&T Baseline Approval: The following individuals are required to approve the S&T baseline.

- 3.2.3.4.1. AFRL Capability Lead
- 3.2.3.4.2. Lead TD Director
- 3.2.3.4.3. Participating TD Director(s)
- 3.2.3.4.4. ATD Program Manager

3.2.3.5. ATD Program Management Review

- 3.2.3.5.1. ATDs will be reviewed at least annually with the members of the AFRL Capability Council, chaired by the pertinent Capability Lead or his/her designee utilizing the AFRL-approved PMR template [https://org2.eis.afmc.af.mil/sites/afrlhq/en/Docs/PBR_Templates](https://org2.eis.afmc.af.mil/sites/afrlhq/en/Docs/PBR_Templates)

3.2.3.6. Additional guidance for ATDs may be found in AFI 61-101 and AFMCI 61-102

3.2.4. Capability Concept (CC)

3.2.4.1. Capability Concept (CC): A CC is an AFRL S&T program with specific scope, deliverables, technical objectives, cost, and schedule that addresses a warfighter capability need. The warfighter capability need can be either specifically stated by the warfighter (requirements pull), or contemplated by AFRL (technology push).

3.2.4.2. CC Designation:

- 3.2.4.2.1. Purpose of CC Designation: To enable a Capability Lead to have greater oversight of an S&T Program that the Capability Lead is advocating as a major demonstration to their MAJCOM/CFLI.

- 3.2.4.2.2. CC Designation Authority: Chair of the AFRL Capability Council.

3.2.4.3. CC S&T Baseline Coordination: The following individuals or organizations are required to coordinate on the S&T baseline approval package.

- 3.2.4.3.1. Deputy Capability Lead
3.2.4.3.2. TD Chief Engineer
3.2.4.3.3. AFRL/XPO
3.2.4.3.4. AFRL/XPR

3.2.4.4. CC S&T Baseline Approval: The following individuals are required to approve the S&T baseline.

3.2.4.4.1. Capability Lead
3.2.4.4.2. Lead TD Director
3.2.4.4.3. Participating TD Director(s)
3.2.4.4.4. CC Program Manager

3.2.4.5. CC Program Management Review

3.2.4.5.1. Although PMRs are required semi-annually, CCs will be reviewed at least annually at the AFRL level, co-chaired by the Capability Lead and lead TD or his/her designee utilizing the AFRL-approved PMR template https://org2.eis.afmc.af.mil/sites/afrlhq/en/Docs/PBR_Templates.

3.2.5. Technology Program (TP): A TP is an AFRL S&T program with specific scope, deliverables, technical objectives, cost, and schedule that is intended to mature and apply technology to a specific opportunity or need, and result in an enduring piece of hardware and software.

3.2.5.1. TP Designation:

3.2.5.1.1. Purpose of TP Designation: To acknowledge the TD Director’s endorsement that the technologies encompassed in this S&T program are mature enough to commit to further development toward a specific military application.

3.2.5.1.2. TP Designation Authority: TD Director or designee.

3.2.5.2. TPs are categorized as 2 or 1 in reference to the projected Technology Readiness Level (TRL) at the completion of the S&T Program.

3.2.5.2.1. TP 2 is an undesignated S&T program with a projected notional final TRL 5 or greater. For this purpose “undesignated” means an S&T program that is not a FCC, JCTD, ATD or CC.

3.2.5.2.2. TP 1 is an undesignated S&T program with a projected notional final TRL of less than five (5), but not a Science and Knowledge Program (SKP).

3.2.5.3. TP S&T Baseline Coordination: Defined by TD Director.

3.2.5.4. TP S&T Baseline Approval: TD Director or designee.

3.2.5.5. TP Program Management Review

3.2.5.5.1. Although PMRs are required semi-annually, TP2s will be reviewed at least annually at the TD Director level, chaired by the lead TD Director or his/her designee utilizing the AFRL-approved PMR template https://org2.eis.afmc.af.mil/sites/afrlhq/en/Docs/PBR_Templates as tailored by the TD Director.
3.2.5.5.2. TP1s will be reviewed at least annually IAW AFRLI 61-202, AFRL Laboratory Management Review (LMR) process.

3.2.6. Science and Knowledge Program (SKP).

3.2.6.1. Definition: An AFRL S&T program with scope, deliverables, technical objectives, cost, and schedule that is intended to advance scientific knowledge for the purpose of applying technology to a potential opportunity or need

3.2.6.2. SKP Designation:

3.2.6.2.1. Purpose of SKP Designation: To identify those S&T programs designed to advance basic scientific knowledge, or analyze a problem, and/or conduct a study/test in response to user requests.

3.2.6.2.2. SKP Designation Authority: TD Director or designee

3.2.6.3. SKP S&T Baseline Coordination: TD Director or designee

3.2.6.4. SKP S&T Baseline Approval: TD Director or designee

3.2.6.5. SKP Program Review will be reviewed at least annually IAW AFRLI 61-202, AFRL Laboratory Management Review (LMR) process.

3.3. Cross-Directorate Considerations

3.3.1. Cross-Directorate S&T Programs: Any S&T program involving more than one TD.

3.3.2. Lead vs. Participating TD: If the S&T program involves more than one TD, a Lead TD is determined by concurrence between the TDs involved or a higher authority (AFRL/CC) if needed. The remaining TD(s) are designated participating TDs.

3.3.3. Lead vs. Participating S&T Program Manager: The Lead TD Director designates a Lead PM, and Participating TD Directors designate Participating PMs. AFRL/CC designated cross-directorate S&T programs will be reviewed by AFRL/CC. If appropriate, participating PM(s) will be detailed to the Lead PM supervisory chain but this is subject to agreement by participating TD Directors.

3.4. Relationship to AFRL LMR Process

3.4.1. This instruction does not intend to supersede AFRLI 61-202 (AFRL Laboratory Management Review Process). In particular, LMRs are required for applicable Work Units (WUs) and Form 2913s are mandatory for R&D case files.

3.4.1.1. At the TD Director’s discretion, PMRs conducted on S&T programs can satisfy the requirement for LMRs for the work units that are elements of the S&T program.

3.4.2. The S&T Program Manager manages the integration of applicable Work Units (WUs) into his/her S&T Program (See Attachment 4 and AFRLI 61-201).

3.4.2.1. Regarding LMRs at the WU level, the S&T Program Manager should be involved in the review of his/her associated WUs or have access to WU information.

3.5. Relationship to S&T Systems Engineering
3.5.1. Systems Engineering (SE) and Program Management (PM) are essential processes to ensure successful planning and execution of any program. Both are required. Figure 1 provides a top-level representation of the common and unique aspects of each process. Systems engineering processes provide the framework for technical management, while program management processes focus on cost, schedule and technical performances with associated risk as an integrated whole.

3.5.2. See AFRLI 61-104, *Science & Technology (S&T) Systems Engineering (SE) and Technical Management*, and AFRL Systems Engineering (SE) Guidebook for detailed information on applying SE to S&T programs.

Figure 1. PM/Se Relationship

4. S & T Program Management Processes

4.1. S&T Program Initiation

4.1.1. When establishing a new S&T program PMs should: set up a planning folder, define program requirements, conduct a literature search with AFMC Form 14, build a top level strategy, develop schedule (for example, by decomposing objectives into WBS), build a cost estimate, envision a technology transition plan, and conduct an initial review of the draft baseline using appropriate documents (AFRL Form 2913, AFRL Laboratory Management Review and S&T Baseline Document).

4.1.2. S&T Program Manager recommends S&T program type (SKP, TP, CC, ATD, JCTD, FCC). Figure 2 provides a guide for the designation of S&T Program types.
4.2. S&T Program Planning

4.2.1. Program Planning is the upfront work required for a successful S&T program execution and control. The S&T program manager shall use the S&T systems engineering process to establish the technical content and build the S&T baseline (See section 5). Program planning assures a broader understanding of ongoing work to avoid duplication, as well as ensures adequate understanding of the scope of work required (cost, schedule, and performance). It includes finalization of a spend plan and approval of baseline. Given the importance of integration/interface management to successful technology transition, S&T programs must address level of integration and/or integration approach in their S&T program baselines and/or technology transition (See Attachment 3).

4.3. S&T Program Execution and Control

4.3.1. Program execution involves expending program resources (funds, manpower, facilities, etc.) to fulfill the S&T program baseline. In this phase, the PM manages the integrated set of cost, schedule and performance objectives. Execution responsibilities include financial execution, risk management, change control and integration management.

4.3.1.1. Follow Air Force guidelines on obligations and expenditures. S&T Program Managers must track obligations and expenditures of contracted efforts. Of special
note, IDIQ contracts shall contain a clause specifying that Earned Value Management (EVM) will need to be applied if any individual task order is over $20M.

4.3.1.2. Risk Management is addressed in AFRLI 61-104. In addition, AFRL SKPs, TPs, CCs, ATDs, JCTDs, and FCC programs have specific risk management reporting requirements. PMR reporting templates provide guidance on risk identification, risk mitigation and risk analysis. Risk management reporting formats are prescribed in PMR briefing template at the following link https://org2.eis.afmc.af.mil/sites/afrlhq/en/Docs/PBR_Templates discussed in section 5. SKP and TP risk management reporting format may be tailored by the TD director.

4.3.1.3. Part of the execution process is managing change to the S&T program baseline. (See paragraph 5.1.3. ).

4.3.2. Control (Monitoring and Reporting) is described in the PMR section (see section 6. ) and Data and Metrics section (see paragraph 7.6. ).

4.4. S&T Program Close-Out.

4.4.1. When the customer and S&T program team agree on program completion, TD leadership will make the decision to proceed with close-out activities. S&T program manager will ensure the completion of all required documentation in the Research & Development (R&D) case file(s), including technical reports, contractual and financial documents, etc. The S&T program manager will verify that contractual commitments have been met, payments were made, and records were prepared for retirement. The S&T PM will support the Contracting Officer during close out the contract(s) in accordance with appropriate regulations. S&T Program manager will ensure documentation of lessons learned and dispose of property as appropriate. S&T Program manager will also survey customers for lessons learned and potential post-effort support by AFRL. (See AFRLI 61-201, Research & Development Case Files).

5. S&T Program Baseline

5.1. S&T Program Baseline. A program baseline is the currently approved scope, resources (funds, manpower, and infrastructure), schedule, technical performance requirements, and deliverables IAW with procedures in paragraph 5.1.1. . An approved (signed) baseline is required for all AFRL S&T programs at the aggregated highest level including, but not limited to SKPs, TPs, CCs, ATDs, JCTDs, and FCCs. Refer to Attachment 5 for S&T program baseline completion matrix.

5.1.1. S&T Program Baseline Approval, Signatures, and Coordination. The program baselines are routed and approved in accordance with Attachments 2 &3. In addition, the program review is chaired at the highest signature level in accordance with Attachments 2 & 3. Program baselines are submitted for formal approval and signature via an electronic staff summary sheet (eSSS) with the exception of SKPs and TPs1. Program Baseline Documents shall be completed in accordance with the AFRL Program baseline at the following link: https://org2.eis.afmc.af.mil/sites/afrlhq/en/Docs/Flagship_CC_Baseline_Info. Baselines for SKPs and TPs are tailorable by the TD director or designee.
5.1.2. S&T Program Re-baselining—breaches and other major changes.

5.1.2.1. Breach: All baseline breaches require S&T program re-baselining. A baseline breach is defined by any of the criteria listed below.

5.1.2.2. Funding: The difference in required versus approved funding is greater than 15 percent. Program budgets must reflect burdened costs.

5.1.2.3. Technical Performance.

5.1.2.3.1. Any S&T KPP expected value that does not meet the established threshold or equivalent S&T goals for SKPs and TP1s.

5.1.2.3.2. A diminished approach (an approach that will give less confidence) to demonstrating S&T KPPs.

5.1.2.4. Schedule: A three month or longer schedule slip in the individual Technology Availability Date (TAD).

5.1.2.5. Other Major Changes. In addition to breaches, all other major changes require S&T program re-baselining. A major change is a significant change to the S&T program that either does not meet breach criteria, or if it does meet the breach criteria, it does so for customer-driven reasons. Note that a major change versus a minor change (described in paragraph 5.1.2.1. ) will be a judgment call by the S&T program manager. Examples of other major changes include significant changes to: S&T program scope, deliverables, funding, documented technical requirements, or technology need dates:

5.1.2.5.1. Technical Performance. A major change in technical approach, additional S&T KPPs (increase in scope), or customer-driven changes to S&T KPPs, either tightening or relaxing.

5.1.2.5.2. Schedule. A 3-month or longer slip in the individual TAD driven by significant changes to S&T program scope, deliverables, funding, documented technical requirements, or technology need dates. Slips of two months or more in a key milestone, without a corresponding TAD slip, are “watch items” for every PM and may or may not be a reason to re-baseline.

5.1.2.5.3. Funding. A 15 percent or more increase in required funding (burdened cost) of the total S&T program to cover customer-driven increases in scope or customer-driven changes to milestones (such as accelerations or delays to technology need dates). Examples include increased funding from a customer or a Congressional add.

5.1.2.6. Minor Changes. Minor changes do not require re-baselining. Minor changes are changes that do not meet breach thresholds or do not meet criteria for other major changes (paragraph 5.1.2.5. ). Minor adjustments do not require a re-baseline. Minor changes include changes in all the categories above in paragraph 5.1.2.1. that do not meet paragraph 5.1.2.5. criteria and are not deemed significant by the PM.

5.1.2.6.1. Examples of such changes include application of additional funds from a customer, partner or Congressional add, transformation driven change in AF strategy leading to deletion of the technology’s targeted weapon system, or a
relaxation in the customer’s documented technical requirements. While minor changes do not require a re-baseline, it is imperative that the PM describe these changes against the original baseline during program reviews. It is always the prerogative of the PM to propose a re-baseline if it is viewed as beneficial or appropriate to do so.

5.1.3. Re-baselining Procedures. Re-baselines shall be initiated and documented by the lead program manager.

5.1.3.1. Notification. When a S&T PM determines a re-baseline is required, an initial notification shall be sent to the TD chain of command (branch or division as appropriate), explaining the reason for the re-baseline. Reasons would typically be described as breach, major change or accumulated minor changes. S&T PMs will notify customers and other stakeholders as appropriate. It is the Lead TD Director’s responsibility to notify AFRL/XP, AFRL/EN, AFRL/CC, and AFRL/CA if appropriate.

5.1.3.2. Re-baseline Package Content. The re-baseline package will include a description of all changes, the reasons for the change, and a clear description of the new baseline.

5.1.3.3. Re-baseline Package Staffing. Follow baseline coordination process.

5.1.3.4. Approvals. Follow baseline approval process (see paragraph 5.1.1. ).

6. S&T Program Management Reviews (PMR)

6.1. The PMR is a periodic review of one or more S&T Programs. The aggregation of work units is an important aspect of PMRs. PMRs should be arranged to review all work units within S&T activities or group activities by division, branch, integrated product team, technical thrust, technical area and program, ATDs, FCCs, etc.). PMRs are performed at director level and division or branch level (Attachment 2). The AFRL PMRs are designed to permit decision making at the lowest practical level while rapidly surfacing potential problems or adverse trend data to senior management, all with a mutual goal of maximizing the return on invested resources.

6.1.1. PMRs are required for all S&T programs. Approved S&T Templates are at the following link: https://org2.eis.afmc.af.mil/sites/afrlhq/en/Docs/PBR_Templates. SKPs, TP1s and TP2s (without strong transition potential or strong transition potential and < $500K) PMR requirements are covered by the LMR and are tailorable at the TD director level.

6.1.1.1. PMR Minutes: PMR minutes are required for FCCs, JCTDs, ATDs, CCs, and TP2s (with strong transition potential >$500K). The appropriate reviewer will be responsible for taking minutes and distributing them to all PMR attendees, at a minimum, no later than 10 business days after the PMR.

6.2. Integrated Baseline Reviews (IBRs)

6.2.1. AFRL conducts IBRs on all FCCs and ATDs and candidate FCCs and ATDs prior to finalizing their baselines and staffing them for coordination and approval by the AFRL Commander. Upon completion, FCC and ATD Program Managers will be primed for
success and AFRL leadership will have confidence the FCCs and ATDs are well-baselined and executable.

6.2.2. The purpose of the IBR is to review the S&T program baseline and ensure it is a well-integrated and “executable” S&T program. Early identification of problems or potential problems provides more time for resolution and/or mitigation. The IBR verifies that:

   6.2.2.1. The technical objectives are traceable to customer requirements.

   6.2.2.2. The schedule and cost estimates (including all resources) are credible and sufficient to successfully execute the FCC and ATDs as baselined.

   6.2.2.3. The technical objectives (S&T KPPs, TRL/MRL goals), level of integration, and planned demonstrations are achievable.

   6.2.2.4. The program risks have been identified.

6.2.3. An IBR report, written by the IBR team within 5 days of the IBR, documents the IBR members’ findings, concerns, and any recommendation that would improve the completeness, or “integrity” of the S&T program baseline. This includes any changes needed to get the baseline document “all-green”. The IBR report is intended to provide the AFRL Commander, Capability Lead (as appropriate), the Lead TD Director, and the Program Manager the highest possible confidence in the executability of the program.

7. Technology Transition and Transfer

7.1. Technology transition is the process of moving AFRL investments from S&T through development to end-use. More specifically, the objective of technology transition is the application of technology to military systems to create effective weapons and support systems.

7.2. FCCs, ATDs, and JCTDs must follow the technology transition guidance from higher headquarters, AFI 61-101.

7.3. CCs, TP2s with a projected TRL of 5 or greater and a strong transition potential should include a technology transition strategy in their S&T program baseline document. The strategy should address the proposed transition path, target platform(s) and organizations involved.

7.4. TP1s with a projected TRL below 5 do not require a technology transition strategy unless they are part of a larger program aggregation such as a Capability Concept. In that case the CC Technology Transition Plan will incorporate the constituent TP elements. PMs of TPs with projected TRLs below 5 are encouraged to consider the benefits of a documented technology transition strategy.

7.5. S&T PMs should facilitate technology transition by documenting team roles and responsibilities. PMs are encouraged to document AFRL, transition agent, and user roles and responsibilities through Memoranda of Agreement (MOA) or Memoranda of Understanding (MOU). ATDs and FCCs meet this requirement through their TTPs and team charters. A MOA or MOU is not mandatory for TPs but are highly encouraged for documentation purposes.
7.6. The primary purpose of technology transfer is to move DoD-owned or developed technologies and technical infrastructure to industry for commercial purposes. The technology transfer process is governed by AFI 61-301, *The Domestic Technology Transfer Process and the Offices of Research and Technology Applications*.

8. Data and Metrics

8.1.1. All personnel involved in SKP, TP, CC, ATD, JCTD, and FCC programs must maintain accurate and current records. AFRL’s Integrated Project and Portfolio Management (IPPM) system shall be the system of record for maintaining and archiving data for these programs.

8.1.2. IPPM data supports PMRs, S&T program and portfolio metrics and higher headquarters taskings. In order to ensure accurate and current records, PMs must review IPPM data monthly and update as required. Attachment 6 illustrates the relationship between this instruction and AFRL taxonomy as implemented in Clarity.

8.1.3. Transition Progress Events (TPEs) will be the primary method for evaluating progress of technology through the transition process. (See Figure 3).

Figure 3. Technology Transition
THOMAS J. MASIELLO, Major General, USAF
Commander
GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION

Terms

**Advanced Technology Demonstration (ATD)**—ATD is an S&T program that seeks to demonstrate the maturity and potential of advanced technologies for enhanced military operational capability or cost-effectiveness. ATDs can be characterized by four parameters: (1) Large scale, both in resources and complexity; (2) Operator/user involvement from planning to final documentation; (3) Established cost, schedule, and performance metrics; and (4) Contain a clearly defined transition target. (see AFI 61-101, Air Force Science and Technology Management).

**Air Force Requirements Oversight Council (AFROC)**—Entity conducting an Air Force-level requirements review.

**Applied Technology Council (ATC)**—Annual senior-level forums to facilitate the transition of technologies from AFRL and its research partners to Air Force agencies for operational use through ATDs. ATCs are comprised of senior leaders from AFRL, a MAJCOM/CFLI, and a Product Center who jointly commission, graduate, or decommission ATDs (see AFI 61-101).

**Capability Concept (CC)**—An AFRL S&T program with specific scope, deliverables, technical objectives, cost, and schedule, that addresses a warfighter capability need. The warfighter capability need can be either specifically stated by the warfighter (requirements pull), or contemplated by AFRL (technology push).

**Core Function Lead Integrator (CFLI) SECAF/CSAF**—designated leader who serves as the principal integrators for their assigned SCFs and the corresponding Air Force CFMPs. CFLIs guide SCF process and SCF-related appropriation priorities by orchestrating the development of SCF in collaboration with key stakeholders across the Air Force, including MAJCOMs, the Air Reserve Components, and functional authorities.

**Flagship Capability Concept (FCC)**—A FCC is collaborative endeavor by a MAJCOM/CFLI, Centers and AFRL to close a prioritized Capability Gap. A FCC is comprised of: a) An ATD-like S&T program comprised of technology investments that enables a prioritized capability and that has well-defined S&T KPPs, Cost and Schedule (this is the FCC’s S&T Baseline); b) A credible transition plan with an assigned transition agent; and c) Commitment and Appropriate action by a sponsoring MAJCOM/CFLI to fully fund the transition plan. FCCs are sponsored by a MAJCOM/CFLI, vetted through the AF Corporate Process, and validated by the Air Force Requirements Oversight Council (AFROC). (See paragraph 3.2.1. )

**Lab Management Review (LMR)**—A periodic review of laboratory portfolio via work units or aggregation of work units. The aggregation of work units is an important aspect of LMRs. LMRs should be arranged to review all work units within R&D efforts and projects that fit an area of interest (i.e., by division, branch, integrated product team, technical thrust, technical area and program, etc.). LMRs are performed at director level and division or branch level.

**Integrated Baseline Review (IBR)**—AFRL/CC directed, AFRL/EN led review of executability and reasonableness of AFRL S&T programs with strong user transition commitments.
Integrated Project and Portfolio Management (IPPM)—AFRL enterprise system for planning, managing, and reporting on S&T programs. All program information on FCCs, ATDs, JCTDs, CCs, TPs, and SKPs must be entered and maintained current in IPPM.

Joint Capability Technology Demonstration (JCTD)—The Joint Capability Technology Demonstration (JCTD), previously called Advanced Concept Technology Demonstration (ACTD), is a pre-acquisition activity, spanning from two to four years. It provides the user an opportunity to assess innovative technologically mature capabilities and determine the military utility before deciding to acquire additional units. The concept falls between the Joint Rapid Acquisition Cell (JRAC) urgent needs process of fewer than two years with little or no development and the traditional, more deliberate, formal acquisition process that can stretch five to ten years. JCTDs focus on four areas: Joint, Transformational, Coalition, and Inter-agency capabilities.

Lead Program Manager (PM)—The designated individual with overall responsibility and authority to plan and execute program objectives. Lead PMs are responsible for integrating all contributing program efforts. Lead PMs do not have direct control or authority over individual TD program or project resources.

Lead Technology Directorate (TD)—The AFRL TD with primary technical program execution and management responsibilities.

Manufacturing Readiness Level (MRL)—A measure of how well a technology can be manufactured. Specifics are outlined in DoD Manufacturing Readiness Level (MRL) Deskbook at www.dodmrl.com.

Participating Technology Directorate (TD)—AFRL TDs that jointly participate with a lead TD on the development of a S&T program

Portfolios—The Portfolio is the highest level of the investment hierarchy and is a collection of products, programs, and/or work units. (See AFRLI 61-205 for a complete definition)

Program Baseline—The resources (funds, manpower, and infrastructure), schedule, and deliverable agreement between parties in a technology development, transition, acquisition, and application project. A signed baseline document is required for all S&T Programs. LMR Form 2913 may meet the requirement for SKPs, TP1s and TP2s (without strong transition potential or strong transition potential and < $500K)

Program Baseline Document—The signed funding, schedule, and deliverable agreement between the lead technology directorate (TD), participating TDs, and applicable AFRL/XP divisions.

Program Management Review (PMR)—A periodic review of an S&T program via work units or aggregation of work units. The aggregation of work units is an important aspect of PMRs. PMRs should be arranged to review all work units within R&D efforts and projects that fit an area of interest (by division, branch, integrated product team, technical thrust, technical area and program, etc.). PMRs are performed at the director, division or branch level.

Program—Intermediate level of technology works generally supporting larger S&T programs but made up of Work Units.

Re-baseline—Any S&T program that has a breach or needs to be realigned will be rebaselined with TD Director approval prior to the PMR. Rebaselining documentation will include a
description of what was changed and why. Written customer concurrence on new/changed customer commitments should be included as appropriate.

Science and Knowledge Program (SKP)—An AFRL technical effort that advances a concept or technology beyond the applied research phase into component testing in a relevant environment. It can be a simulation or the initial phase of a technology demonstration and can include concept studies.

Science and Technology (S&T) Key Performance Parameters (KPPs)—Critical technical parameters which establish the boundaries of the technology performance trade space. S&T KPPs are essential exit criteria for successful S&T program completion. S&T KPPs are expressed in terms of thresholds, objectives and expected values. S&T KPPs are defined in collaboration with MAJCOM/CFLIs and Centers or appropriate DoD customer.

Science and Technology (S&T) Programs—S&T efforts with specific scope, deliverables, and resource requirements (funds, manpower, facilities, etc.). S&T Programs have cost, schedule and performance objectives and can serve a number of different purposes. They can provide a technology solution or combination of solutions to mitigate a warfighter capability short fall. They can also deliver technology options to a system manager, or they can focus on increasing the body of knowledge or “state-of-the-art” in a scientific field.

Science and Technology (S&T) Program Manager (PM)—The individual responsible to plan and execute the S&T program, to include credible cost, schedule, and performance reporting through their management chain.

Service Core Function (SCF)—SCFs delineate the appropriate and assigned core duties, missions, and tasks of the Air Force as an organization, responsibility for each of which is assigned to a CFLI. SCFs express the ways in which the Air Force is particularly and appropriately suited to contribute to national security. SCFs are an integral aspect of the AFSPS, and provide the framework for Air Force organizing, training, and equipping efforts.

Technology Program (TP)—An AFRL S&T Program, more mature than a SKP, that does not meet the criteria of a CC, ATD, JCTD or FCC. TP 1 is generally characterized by final TRL 3 or TRL 4. TP 2 is generally characterized by final TRL 5-6. TP 2 with annual unburden budgets greater than $500K require PMRs.

Technology Readiness Level (TRL)—A measure of technology maturity. Specifics are outlined in DoD Manager’s Guide to Technology Transition in an Evolutionary Acquisition Environment (June 2005).

Technology Transition—Process of inserting critical technology into military systems to provide effective weapons and support system needed by the warfighter to carry out assigned missions.

Technology Transition Plan—A plan that documents the specific tasks and achievements required to demonstrate that the risk associated with a technology transition is within acceptable bounds. A TTP is an agreement between AFRL, the operational MAJCOM/CFLI or Agency, and the appropriate Product, Test, or Air Logistics Center(s) (source AFI 61-101). The TTP process is governed by AFMCI 61-102.

Work Unit—The smallest segment into which RDT&E efforts are divided for local administration or control. Each work unit has a specific objective, definite duration, and results
in an end product. It is technically distinct in scope, objective, and duration from other RDT&E efforts with which it may be aggregated for financial, administrative, or contracting purposes. Work units are intended to provide deliverables that directly contribute to the S&T program, for example, contracts that have a final report as a deliverable, SBIRs, CRADAs, grants and in-house work. Tasks that perform indirect/overhead activities, or Advisory and Assistance contracts are not work units.
NOTE: Each diamond illustrates the program approval level and the program review level for each AFRL activity. For example, if you are a TP with TRL projected greater than 4, the lead TD is both the approval and the PMR reviewing official.
## Attachment 3

### S&T PROGRAM MANAGEMENT INITIATION AND APPROVALS

Table A3.1. S&T Program Management Initiation and Approvals

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**Note:** The table above outlines the initiation and approval processes for S&T program management, detailing the roles and responsibilities involved in each stage from baseline coordination to integrated baseline review and beyond.
Attachment 4

AFRL PROGRAM REVIEW GUIDANCE

Figure A4.1. AFRL Program Review Guidance

AFRL PROGRAM REVIEW GUIDANCE

AFRL 61-202
LMR PROCESS

WORK UNITS (WU)

AFRL 61-108
S&T PM PROCESS

S&T PROGRAMS

S&T PROGRAM MANAGERS "MANAGE" THE INTEGRATION

S&T BASELINE + PMR

TD1

2913

2913

TD2

2913

2913

2913
Attachment 5

BASELINE REQUIREMENTS MATRIX

Table A5.1. Baseline Requirements Matrix

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**Note 1** Final TRL less than 5
**Note 2** Final TRL equal to or greater than 5
**Note 3** Final TRL equal to or greater than 5, Annual Funding >$500k with strong transition potential
**Note 4** May include TTP
**Note 5** Recommended not required

D = Division Chief (recommended)
T = Technical Director
CL = Capability Lead
C = AFRL/CC or CA
Attachment 6

AFRL S&T PROGRAM EBS RELATIONSHIP

Figure A6.1. AFRL S&T Program EBS Relationship