BY ORDER OF THE COMMANDER
AIR FORCE TEST CENTER

AIR FORCE TEST CENTER INSTRUCTION
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Acquisition

LIFE CYCLE SYSTEMS ENGINEERING OF TEST CAPABILITIES AND INFRASTRUCTURE

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This Air Force Test Center Instruction (AFTCI) implements Air Force Materiel Command Instruction (AFMCI) 63-1201, *Implementing Operational Safety, Suitability and Effectiveness (OSS&E) and Life Cycle Systems Engineering (LCSE).* This AFTCI outlines policy and provides guidance for the AFTC Systems Engineering (SE) process. This Instruction may not be supplemented at any level. This Instruction is applicable to all AFTC organizations executing programs/projects intended to develop and field test and evaluation (T&E) capabilities for the purpose of supporting U.S. Air Force and other Department of Defense (DoD) T&E requirements. T&E capabilities include the tools, equipment, and facilities that are directly and primarily used to support test operations; it does not include general purpose facilities and infrastructure. Refer recommended changes and questions about this publication to the Office of Primary Responsibility (OPR) using the AF Form 847, *Recommendation for Change of Publication*; route AF Forms 847 from the field through the appropriate functional chain of command. Requests for waivers must be submitted through chain of command to the OPR listed above for consideration and approval. Ensure that all records created as a result of processes prescribed in this publication are maintained in accordance with (IAW) Air Force Manual (AFMAN) 33-363, *Management of Records*, and disposed of IAW Air Force Records Information Management System (AFRIMS) Records Disposition Schedule (RDS). This instruction does not require tiers at or below the Wing level.

1. Purpose. The purpose of this AFTCI is to establish standard AFTC T&E Enterprise systems engineering (SE) processes. This AFTCI provides the framework within which each organization shall develop and implement an organization-level SE Operating Instruction (OI). This AFTCI

outlines the SE technical management oversight required to ensure that the T&E capabilities developed and delivered satisfy customer and user requirements. All "shall" statements in this Instruction are mandatory unless waived by the AFTC Center-level Technical Authority (CLTA). All requests for waivers to this AFTCI should be submitted to the OPR, AFTC/XPR.

2. Roles and Responsibilities

2.1. **AFTC Commander (AFTC/CC) shall:**

2.1.1. Appoint a Center-level Technical Authority.

2.1.2. Advocate for resources necessary to conduct and sustain effective and efficient SE processes, tools, and procedures.

2.2. **Center-Level Technical Authority (CLTA) shall:**

2.2.1. Ensure each AFTC organization follows this AFTCI; review this AFTCI annually and update as necessary; approve all changes to this AFTCI.

2.2.2. Ensure AFTC Wing/Complex organizations implement Organizational SE OIs, Supplements or other systems engineering documents; coordinate on the Wing/Complex Organizational SE OI prior to it being approved by the Wing/Complex Commander.

2.2.3. Develop and implement a mechanism that encourages continuous organizational and engineering process improvement and seeks best practices consistent with AF policy and procedures.

2.2.4. Concur on the appointment selection of the Wing/Complex-level Technical Authority (TA).

2.3. **Wing/Complex Commander shall:**

2.3.1. Appoint a Wing/Complex-level TA.

2.3.2. Advocate for resources necessary to conduct and sustain effective and efficient SE processes, tools, and procedures.

2.3.3. Implement an Organizational SE OI consistent with this, AFMC, and other AF Instructions; approve the Organizational SE OI.

2.4. Wing/Complex-level Technical Authority shall:

2.4.1. Establish a governing body to administer implementation of organizational SE processes; approve SE process tailoring criteria as necessary.

2.4.2. Ensure organizational SE process documents (instructions and procedures) are reviewed annually and updated as required.

2.4.3. Keep the Wing/Complex workforce current with respect to evolving SE policies and guidance.

3. AFTC SE Framework. The AFTC systems engineering approach is based on the Defense Acquisition Guidebook (DAG). The AFTC employs the eight technical management processes listed below, which can be tailored depending on the cost, risk, and complexity of the project/program. These processes provide a framework for managing technical activities and identifying the technical information and events critical to the success of the program. Each Wing/Complex shall implement and document these processes in an organizational SE OI.

3.1. **Configuration Management.** A good configuration management process ensures that designs are traceable to requirements, that change is controlled and documented, that interfaces are defined and understood, and that there is consistency between the product and its supporting documentation.

3.2. **Decision Analysis.** The decision analysis process involves a comprehensive and thorough assessment of the project/program in terms of development (to include technological risks), operation and sustainment, disposal, and cost. The process should also take into consideration personnel training or special skills required. The process should identify metrics which can be used to assess the capability health and status and aid in the decision making process concerning investment planning.

3.3. **Requirements Management.** The requirements management process is an iterative process which begins with identification of the user's needs, followed by the development of the necessary functional capability, and then the validation of that capability to ensure the user's requirements are met. Requirements should be managed and maintained with discipline so that changes are not executed without recognizing the impact to the project/program.

3.4. **Data Management.** Data management refers to the identification, acquisition, maintenance, and access to technical information, including computer software required to manage and support a system throughout its life cycle. Data Management considerations should include understanding and protecting Government intellectual property and data rights.

3.5. **Project Planning.** Project Planning is a multi-disciplined process used to establish and maintain plans that define project activities. Planning extends over the life cycle of the capability, beginning with development, through fielding and sustainment, and ending finally in disposal. The Wing/Complex-level TA shall ensure that for all projects/programs amounting to or exceeding $500,000 in total development costs project/program planning is properly documented in a Program/Project Management Plan (PMP) or equivalent document. The PMP, or equivalent document, shall be reviewed at least annually by the Wing/Complex-level TA, or whenever a change to the project/program execution baseline is necessary. Typical content for a PMP is provided in **Attachment 2**.

3.6. **Risk Management.** Risk management is a continuous process that is accomplished throughout the life cycle of a system. Each undesirable event that might affect the success of the project/program (performance, schedule, and cost) should be identified and assessed as to the likelihood and consequence of occurrence. The AFTC uses the Risk Reporting Matrix standard format for evaluation and reporting of program risk assessment findings (see **Attachment 3**).

3.7. **Technical Management and Control.** The Technical Management and Control (TM&C) process is utilized to provide an understanding of the project's technical progress so that appropriate corrective actions can be taken when the project's performance deviates significantly from the plan. Typical TM&C activities include formal technical reviews (e.g., Preliminary Design Review [PDR] and Critical Design Review [CDR], Program/Project Management Review [PMR]), and Program Protection Planning (PPP). The Wing/Complex-level TA should conduct periodic reviews of their projects/projects at least annually, or whenever a change to the project/program baseline is necessary.

3.8. **Design.** The design of Enterprise-wide T&E capabilities must leverage existing capabilities and infrastructure, to include utilization across multiple facilities/bases; consideration should be given to operation and sustainment, with special attention to personnel training and special skills.

4. General Guidance

4.1. **Systems Engineering Process Self-Assessment.** The Wing/Complex-level TA shall ensure that a self-assessment of the Organizational SE processes is conducted at least annually using the AF Systems Engineering Assessment Model (AF SEAM) as a guide. A combined assessment of a subset of the organization's projects/programs is acceptable, IAW AFMCI 63-1201. The assessment should be conducted on no less than three (3) projects/programs, to include at least one project/program amounting to at least $500,000 in total development costs. The combined assessment shall not be any lower than the Group level.

4.2. **Tailoring.** Tailoring is intended to ensure that the appropriate Life Cycle Systems Engineering approach is being implemented and that the decision authority is assigned at the proper level of management, with consideration of the projected cost, complexity, and technical risk associated with the program/project. The Wing/Complex-level TA shall establish tailoring criteria to be applied in administering the organizational SE OI.

4.3. **Program Protection Planning.** The Wing/Complex-level TA shall ensure that Critical Program Information (CPI) is identified and protected IAW AF and local CPI policy and procedures. Plans to protect CPI shall be documented in the PMP or equivalent document.

ARNOLD W. BUNCH , JR., Major General, USAF
Commander

Attachment 1

GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION

References

AFI 63-101/20-101, *Integrated Life Cycle Management, 7 Mar 13*

AFPAM 63-113, *Program Protection Planning for Life Cycle Management, 17 Oct 13*

AFMC Instruction 63-1201, *Implementing Operational Safety, Suitability and Effectiveness (OSS&E) and Life Cycle Systems Engineering (LCSE), 14 Oct 09*

Department of Defense, *Risk Management Guide for DoD Acquisition, Aug 06*

MIL-HDBK-61A, *Configuration Management Guide, 7 Feb 01*

Abbreviations and Acronyms

AFMAN—Air Force Manual

AFMCI—Air Force Materiel Command Instruction

AFRIMS—Air Force Records Information Management System

AF SEAM—Air Force Systems Engineering Assessment Model

AFTC/CC—Air Force Test Center Commander

AFTCI—Air Force Test Center Instruction

CLTA—Center-level Technical Authority

CDR—Critical Design Review

CPI—Critical Program Information

DAG—Defense Acquisition Guidebook

DoD—Department of Defense

IAW—in accordance with

LCSE—Life Cycle Systems Engineering

OI—Operating Instruction

OPR—Office of Primary Responsibility

OSS&E—Operational Safety, Suitability and Effectiveness

PDR—Preliminary Design Review

PMP—Program/Project Management Plan

PPP—Program Protection Planning

RDS—Records Disposition Schedule

SE—Systems Engineering

TA—Technical Authority

T&E—test and evaluation

TM&C—Technical Management and Control

Attachment 2

PROJECT/PROGRAM MANAGEMENT PLAN (PMP) DESCRIPTION

Project/Program Management Plan (PMP) Description

The following items are the major parts of the PMP:

a. Project Description provides a short narrative describing the overall project and an illustration portraying the concept of operations for the required T&E capability, the mission need, and key technical requirements and performance characteristics, e.g., Key Performance parameters (KPPs) for the T&E capability.

b. Technical Approach addresses the design and development strategy and plans, the system engineering approach; technology maturity levels; technical, cost, and schedule risk identification; assessment and plans to mitigate and monitor; and configuration management.

c. Critical and Key Issues describe the limitations, constraints, and external factors that can impact development and fielding.

d. Project Status describes current project status and accomplishments in terms of technical progress, cost, and schedule.

e. Management Approach describes the project organization and technical management approach.

f. Acquisition Strategy includes who will be responsible for system integration; the contracts by type, contractor, cost, period of performance and rationale for selection; and the approach to contract management, oversight, and reporting.

g. Cost Control identifies the mechanisms, in place, to manage and control costs.

h. Activation and Test describes the plan to test, demonstrate, and validate that the capability meets technical and performance requirements.

i. Transition provides the plan for transitioning the capability from any life cycle phase to another including development, acquisition, operations/maintenance, sustainment, and decommission/disposal.

j. Funding identifies the approved funding and other required sources of funding. This part of the PMP contains a spend plan that shows how the funds are allocated across all funded fiscal years, consistent with the milestone schedule for each of the major components and subcomponents of the project. It also identifies shared funding required by the project, as well as obligation and expenditure plans for the current and following fiscal year funding.

k. Schedule provides the significant milestones for development of the major subcomponents for each of the major components undertaken by the lead and participating Services/DoD Agencies. Significant technical milestones may include design, development, prototype fabrication, testing, validation/verification, activation, and integration of the test capability into the location where support of the system will be provided. Significant programmatic milestones include conduct of such things as Systems Requirements Reviews, Preliminary Design Reviews, Critical Design Reviews, major contract awards, major decision reviews, and the planned transition date to the user organization for long-term sustainment. For projects without significant major subcomponents, the milestone schedule should be at the major component level. A major subcomponent or component is defined as a significant hardware, software or capability deliverable.

Attachment 3

RISK ANALYSIS

Figure A3.1. Levels of Likelihood Criteria

Likelihood

Level	Likelihood	Probability of Occurrence
1	Not Likely	~10%
2	Low Likelihood	~30%
3	Likely	~50%
4	Highly Likely	~70%
5	Near Certainty	~90%

Figure A3.2. Risk Reporting Matrix

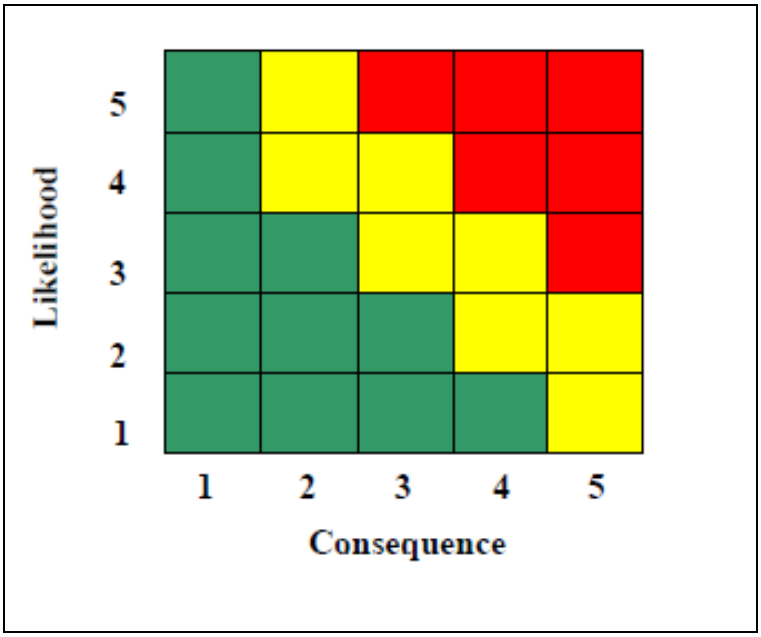

Figure A3.3. Levels and Types of Consequence Criteria

Consequence

Level	Technical Performance	Schedule	Cost
1	Minimal or no consequence to technical performance	Minimal or no impact	Minimal or no impact
2	Minor reduction in technical performance or supportability, can be tolerated with little or no impact on program	Able to meet key dates. **Slip < * month(s)**	Budget increase or unit production cost increases. **< ** (1% of Budget)**
3	Moderate reduction in technical performance or supportability with limited impact on program objectives	Minor schedule slip. Able to meet key milestones with no schedule float. **Slip < * month(s)** **Sub-system slip > * month(s) plus available float.**	Budget increase or unit production cost increase **< ** (5% of Budget)**
4	Significant degradation in technical performance or major shortfall in supportability; may jeopardize program success	Program critical path affected. **Slip < * months**	Budget increase or unit production cost increase **< ** (10% of Budget)**
5	Severe degradation in technical performance; Cannot meet KPP or key technical/supportability threshold; will jeopardize program success	Cannot meet key program milestones. **Slip > * months**	Exceeds APB threshold **> ** (10% of Budget)**

Note: */ -** Consequence criteria should be set separately for each project.