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Acquisition

AIR SYSTEM DEVELOPMENT AND SUSTAINMENT ENGINEERING PROCESSES AND PROCEDURES

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This Air Force Pamphlet (AFPAM) complements Air Force Policy Directive (AFPD) 63-1/20-1, *Integrated Life Cycle Management* and Air Force Instruction (AFI) 63-101/20-101, *Integrated Life Cycle Management*. This AFPAM provides non-directive processes and procedures that complement the mandatory policies for implementing Air System Development and Sustainment Engineering Processes and Procedures under AFI 63-101/20-101 as it supersedes AFI 63-104, *The SEEK EAGLE Program*, AFI 63-112, *Cockpit Working Groups;* AFI 63-137, *Assurance of Communications, Navigation, Surveillance/Air Traffic Management (CNS/ATM), Navigation Safety, and Next Generation Air Transportation System (NextGen) Performance*, and AFI 63-133, *Aircraft Information Program*. This AFPAM also supports Department of Defense Directive (DoDD) 5000.01, *The Defense Acquisition System* and DoD Instruction (DoDI) 5000.02, *Operation of the Defense Acquisition System* (collectively called the DoD 5000 acquisition series). Additional non-mandatory guidance on best practices, lessons learned, and expectations are available in the Defense Acquisition Guidebook that can be found at **https://www.dau.edu/tools/dag**.

Mission, safety, performance, and sustainability remain the standards of excellence for aircraft. Safety and the ability to perform its mission are important priorities for an aircraft throughout its lifecycle. This requires modifications to an aircraft to extend its service life and its ability to perform its mission safely. The guidance in this document supports this process to ensure that all personnel working to support an aircraft have current and accurate procedures regardless of where the aircraft is operating. This AFPAM provides recommended processes, procedures, and best practices for four lines of effort that are essential to Air Force aircraft development and sustaining engineering.

To ensure standardization, any organization supplementing this publication will send the implementing publication to SAF/AQX for review and coordination before publishing. In accordance with AFI 63-101/20-101, this publication applies to all military and civilian AF personnel, including Air Force Reserve and the Air National Guard, other individuals or organizations as required by binding agreement or obligation with the Department of the Air Force (DAF). For nuclear systems or related components ensure the appropriate nuclear regulations are applied as specified in AFI 63-101/20-101.

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

Refer recommended changes and questions about this publication to SAF/AQXS using the AF Form 847, *Recommendation for Change of Publication*; route AF Form 847s from the field through Major Command (MAJCOM) publications/forms managers. Forward all comments regarding this AFPAM to: **usaf.pentagon.saf-aq.mbx.saf-aqxs-policy-workflow@mail.mil**.

Chapter 1

SEEK EAGLE

1.1. SEEK EAGLE Program Overview.

1.1.1. SEEK EAGLE is the Air Force aircraft-store certification process for determining safe and acceptable carriage and release (employment and jettison), safe escape, and ballistics accuracy (when applicable) for all stores (weapons, pods, tanks, etc.) in specific loading configuration on Air Force test and combat coded aircraft.

1.1.2. SEEK EAGLE is used (as required) in support of Foreign Military Sales (FMS) and Direct Commercial Sales (DCS) aircraft-store certification for use on foreign-owned or leased U.S.-origin aircraft. In accordance with AFI 63-101/20-101, use of the process applies to all U.S. Regular Air Force, Air National Guard, and Air Force Reserve Command operational units; and to aircraft acquired as FMS or DCS cases when customers request SEEK EAGLE support from the USAF in the SEEK EAGLE certification process.

1.2. Applicability.

1.2.1. The SEEK EAGLE process assures aircraft-store compatibility in store loading and unloading, carriage, release, and ballistic weapon delivery accuracy verification.

1.2.2. By incorporating appropriate engineering analyses, computer modeling and simulations, ground testing and flight-testing to obtain the data needed to verify accuracy of and/or update of Operational Flight Programs and Technical Orders, the SEEK EAGLE process assures aircraft-store compatibility.

1.3. Recommended Roles and Responsibilities.

1.3.1. The following roles and responsibilities are provided as background to better understand the SEEK EAGLE process. Reference AFI 63-101/20-101 for the directive requirements.

1.3.2. Assistant Secretary of the Air Force for Acquisition, Technology, and Logistics (SAF/AQ):

1.3.2.1. Designates SAF/AQP as the SEEK EAGLE (SE) focal point for SAF/AQ. When resolutions cannot be reached on SEEK EAGLE priority within a timely manner at the lowest level, SAF/AQP is the final authority.

1.3.2.2. Reviews aircraft and store program requirement documents, such as the Initial Capabilities Document (ICD) and Capability Development Document (CDD), to include draft documents, and Test and Evaluation Master Plans (TEMPs) for SE requirements.

1.3.2.3. Serves as the final approval authority to deviate from Air Force SEEK EAGLE Office (AFSEO) resources for SEEK EAGLE Certification. The Program Executive Officer (PEO) presents justification addressing associated compatibility analysis cost and requirements to SAF/AQ to confirm that it is in the best interest of and value to the Air Force to deviate from use of AFSEO as the primary source for SEEK EAGLE certification support.

1.3.3. Deputy Under Secretary of the Air Force, International Affairs (SAF/IA):

1.3.3.1. Validates and negotiates foreign SEEK EAGLE Requests (SER) to establish funding lines for FMS cases as required. Validation includes verification that the foreign requestor possesses or will possess the requested aircraft-store combination, and that cybersecurity concerns (primarily, related to foreign-origin weapons or stores) are addressed prior to issuance of any SE clearance.

1.3.3.2. Includes the Program Office estimates as part of the planning, review, pricing, and availability processes.

1.3.3.3. Submits SERs to ACC/A5T for negotiated and validated FMS or DCS international programs, providing funding through Air Force Security Assistance and Cooperation Directorate (AFSAC) for any required FMS efforts. See Attachment 5.

1.3.3.4. Coordinates integration of FMS SERs through ACC/A5T for placement on the SE Priority List and for submission to the AFSEO.

1.3.3.5. Provides a Certification Data Package (CDP) and storage handling instructions to include explosive safety data as required by AFMAN 91-201, *Explosive Safety Standards*, to the compatibility agency in support of test and analysis for certification of foreign-origin stores, not in US inventory, on US-origin aircraft. See Attachment 9.

1.3.4. AF/A5R:

1.3.4.1. Notifies ACC/A5T, Lead Commands/Agents and SAF/IA when decertifying an inventory store.

1.3.4.2. Coordinates new store development with ACC/A5T and Lead Commands/Agents.

1.3.5. ACC/A5T:

1.3.5.1. As Lead Command and requirements owner for the Combat Air Forces (CAF), serves as the Air Force focal point for all SE requirements, to include foreign military SERs, and provides the coordination and leadership required to resolve prioritization issues.

1.3.5.2. Advocates for and submits the integrated SE Program Objective Memorandum (POM) to SAF/AQP.

1.3.5.3. In collaboration with AFGSC and Air Force SEEK EAGLE Office Director, serves as the final authority for competing SEEK EAGLE prioritization issues.

1.3.5.4. Leads an annual SE priority list review.

1.3.5.5. Validates submitted SEEK EAGLE Requests and assigns a SEEK EAGLE priority.

1.3.5.6. Combines MAJCOMs and SAF/IA SEEK EAGLE Requests whenever possible to optimize resources.

1.3.5.7. Monitors and validates technical order updates/changes inclusions for AFSEO submitted certification recommendations.

1.3.5.8. Coordinates and collects AFSEO unfunded requirements.

1.3.6. Lead Command:

1.3.6.1. Maintains a command focal point for SEEK EAGLE activities (unless ACC fills this role).

1.3.6.2. Submits SEEK EAGLE Requests on behalf of assigned weapon systems to ACC/A5T for consolidation and prioritization. For nuclear weapons, the SEEK EAGLE Request is also submitted to the AFGSC. For FMS cases, the MAJCOM focal point forwards the SER to SAF/IA for review and approval.

1.3.6.3. AFMC forecasts for SEEK EAGLE munitions per AFMAN 21-201, *Munitions Management*, through the 96th Test Wing Munitions User Functional Manager (96 TW MUFM) for Munitions.

1.3.7. Lead Agent.

1.3.7.1. Using commands/agents and the Air Force Operational Test and Evaluation Center submit draft SEEK EAGLE Requests to ACC/A5T for consolidation and prioritization.

1.3.7.2. The Air National Guard and Air Force Reserve Command submit all draft SEEK EAGLE Requests to ACC/A5T for consolidation and prioritization.

1.3.7.3. Maintains a command focal point for SEEK EAGLE activities (unless Lead Command fills both roles).

1.3.8. Aircraft Program Manager:

1.3.8.1. Serves as the final certification authority for operational use of aircraft-store configurations.

1.3.8.2. Maintains an aircraft program office focal point for SEEK EAGLE activities.

1.3.8.3. Ensures aircraft-store compatibility engineering activities and requirements are stated and planned as early as possible during the acquisition process (i.e. program funding for wind tunnel, store separations, and electromagnetic interference and compatibility, etc.), preferably during the Technology Maturation and Risk Reduction phase.

1.3.8.4. Coordinates with AFSEO on the development of a Memorandum of Agreement (MOA). The MOA formally defines the AFSEO engineering disciplines and services necessary to support aircraft-store compatibility efforts. The MOA is coordinated no later than Milestone B for developmental programs.

1.3.8.5. Tasks contractors for dedicated aircraft-store compatibility activities requiring their support, in accordance with the applicable System Program Office-SEEK EAGLE Program Office MOA.

1.3.8.6. Provides funding to the AFSEO or other compatibility agency for aircraft modification as applicable.

1.3.8.7. Co-chairs meetings with the AFSEO Aircraft SEEK EAGLE Working Group (SEWG) in accordance with the MOA.

1.3.8.8. Coordinates nuclear aircraft-store compatibility requirements and plans as described in AFI 63-125, *Nuclear Certification Program*, with the AAC/NW and the AFSEO.

1.3.8.9. Facilitates transfer or access to data, information, knowledge, and modeling and simulation tools gained during developmental or operational test programs to the AFSEO.

1.3.8.10. Provides flight algorithms to be included in aircraft operations flight programs to display real-time technical order updated/changed limits as well as provide technical order updates/changes inclusion per certification recommendations.

1.3.8.11. Coordinates with the Integrated Test Team lead as established under AFI 99-103, *Capabilities-Based Test and Evaluation*, for the planning and execution of all aircraft-store compatibility testing.

1.3.8.12. Provides Certification Completion Notification to ACC/A5T, AFSEO, and Lead Commands/Agents. For Nuclear certification completion, include AFNWC and Air Force Safety Center (AFSEC) in the distribution. See Attachment 8.

1.3.9. Store Program Manager:

1.3.9.1. Provides a current Certification Data Package for the store to the AFSEO or designated compatibility agency prior to releasing a new or modified store for test or operation. See Attachment 9.

1.3.9.2. Plans for aircraft-store compatibility efforts in the acquisition program, prior to Engineering & Manufacturing Development (EMD), which includes requirements for flight clearances, certifications, and/or compatibility assessment products required to support test asset variants of the planned production store.

1.3.9.3. Notifies the Lead Commands/Agents, Aircraft Program Managers, and AFSEO of store characteristic changes that require recertification. See Attachment 7.

1.3.9.4. Supports the AFSEO in the development of the SEEK EAGLE Project Plan (including initial operational configurations) when required.

1.3.9.5. Facilitates transfer or access to data, information, knowledge, and modeling and simulation tools gained in a developmental or to the appropriate participants.

1.3.9.6. Coordinates with the Integrated Test Team lead as established under AFI 99-103 for planning and execution of all aircraft store compatibility testing.

1.3.9.7. Maintains an aircraft store office focal point for SEEK EAGLE activities.

1.3.10. Air Force Nuclear Weapons Center (AFNWC):

1.3.10.1. Notifies the lead using commands, aircraft PMs and Air Force SEEK EAGLE Office of store service life changes that require certification.

1.3.10.2. Identifies nuclear weapon requirements for SEEK EAGLE Certification.

1.3.10.3. Manages, plans, and coordinates for aircraft-store compatibility efforts during the nuclear store acquisition program prior to EMD.

1.3.10.4. Develops and manages nuclear safe escape data for all nuclear capable aircraft and incorporates the information in weapons delivery technical orders.

1.3.10.5. Manages and updates applicable nuclear weapons loading manuals.

1.3.10.6. Coordinates nuclear weapons certification activities and requirements with AFSEC/SEW.

1.3.11. Air Force Safety Center (AFSEC):

1.3.11.1. Coordinates on nuclear weapon system certification activities and requirements.

1.3.11.2. Air Force Safety Center, Weapon Safety Division supports the role of certification of aircraft using nuclear weapons.

1.3.12. Air Force SEEK EAGLE Office (AFSEO):

1.3.12.1. Leads Air Force post-EMD aircraft-store compatibility activities, including capability improvement initiatives, and represents the Air Force in aircraft-store compatibility activities with other Department of Defense (DoD) and government agencies, industry and academia.

1.3.12.2. Plans, programs, and budgets for aircraft-store compatibility activities. See Attachment 6.

1.3.12.3. Reports funding requirements to ACC/A5T and AFMC.

1.3.12.4. Coordinates SEEK EAGLE program and process sustainability requirements through ACC/A5T as part of the annual POM process and supports submissions for funding by ACC to those Office of the Secretary of Defense-sponsored programs that provide resources towards test and evaluation specific requirements such as Central Test & Evaluation Investment Program.

1.3.12.5. Leads and supports the development and maintenance of the MOA with each aircraft Program Manager.

1.3.12.6. Leads and supports aircraft-stores compatibility efforts for developmental and inventory aircraft in accordance with the MOA.

1.3.12.7. Provides aircraft-store compatibility recommendations to the Aircraft PM, ACC/A5T, and Lead Commands/Agents for publication, and when able, provides a format capable of real-time display of current conditions to weapon systems operators.

1.3.12.8. Provides technical expertise, tools, techniques, resources, and management support to aircraft and store program offices for aircraft-store compatibility activities.

1.3.12.9. Supports and ensures availability of modeling and simulation for each weapon system throughout their full acquisition life cycle, in accordance with the MOA.

1.3.12.10. Obtains Lead Command acceptance of results for configurations requiring ballistics accuracy verification.

1.3.12.11. Manages all Air Force aircraft-store compatibility activities using a computer/web based system that provides, at minimum, project management functions for cost, schedule, and project status.

1.3.12.12. Provides reports on all aircraft-store compatibility efforts to USAF Aircraft PM, Store PM, and ACC/A5T as requested.

1.3.12.13. Manages the Air Force’s SEEK EAGLE data repository for all aircraft-store compatibility efforts.

1.3.12.14. Hosts the annual SEEK EAGLE Planning Summit.

1.3.12.15. Co-chairs Aircraft SEWG meetings IAW the MOA.

1.3.12.16. Coordinates with the Integrated Test Team lead as established under AFI 99-103 for the planning and execution of all aircraft-store compatibility testing.

1.3.12.17. Compiles store procurement and expenditure forecasts required for AFSEO led efforts and submits the forecasted requirements through the 96TW MUFM.

1.3.12.18. Monitors, controls, and coordinates the use of AFSEO allocated stores with the 96TW MUFM.

1.3.12.19. Supports aircraft Program Managers and store Item Managers, the AFNWC, and Air Force Test Center as required with: modeling and simulation tool development, aircraft and store model development, and ground and flight test planning, support, and execution.

1.3.12.20. Coordinates with SAF/IA, via AFSAC, on FMS aircraft-store compatibility activities and requests for technical data, including Certification Data Packages and Interface Control.

1.3.12.21. Documents necessary for aircraft-store certification of foreign-origin stores on foreign-owned, US-origin aircraft.

1.3.12.22. Coordinates with ACC/A5T and Lead Commands when competing SER project plan requirements cause delays or impact to projected completion times.

1.3.13. Compatibility Agency (Non-AFSEO). Compatibility Agency (Non-AFSEO). Facilitates transfer or access to data, information, knowledge, and modeling and simulation tools gained during developmental test programs to the AFSEO.

1.3.14. Other Agencies:

1.3.14.1. DoD agencies (e.g. Army, Navy, Defense Advanced Research Projects Agency, etc.) and U.S. government agencies (Dept. of Energy, National Aeronautics and Space Administration, U.S. Homeland Security, etc.) who require Air Force aircraft-store compatibility support will follow AFI 63-101/20-101, reference this pamphlet for additional guidance, and coordinate with the aircraft or store program office (as applicable). All parties will strive to reduce duplicative analysis when other services' aircraft-store certification processes have previously conducted similar assessments. In situations where earlier certification analysis can still be considered valid under the new certification effort, the previous analysis is used in lieu of a redundant assessment.

1.3.14.2. Non-DoD agencies (e.g. DoD contractors) who desire aircraft-store compatibility engineering support will coordinate with the aircraft or store program office (as applicable) and coordinate contractual efforts with AFSEO for all aircraft-store compatibility activities.

1.4. SEEK EAGLE Processes and Procedures.

1.4.1. Process overview. This section provides guidance and procedures on how Program Managers, Major Command, and other Air Force customers obtain support from the AFSEO.

1.4.2. Types of SEEK EAGLE Requests.

1.4.2.1. Quick Reaction Capability. Requires the completion of all aircraft-store compatibility activities necessary to certify the requested aircraft-store configuration. This

is an accelerated certification and includes ballistics accuracy verification, if required. When an urgent operational need date for combat capability exists and the normal SEEK EAGLE Certification process will not meet the user need date, the SEEK EAGLE Request will be issued or amended as a Quick Reaction Capability SEEK EAGLE Request.

1.4.2.2. Flight Clearance Recommendation. A flight clearance recommendation for developmental or operational flight-testing of specific aircraft-store configurations with supporting engineering rationale from all SEEK EAGLE engineering disciplines is needed. The Flight Clearance Recommendation identifies, as appropriate, the aircraft loading configuration, carriage, jettison and employment limitations, information needed to make drag and stability computations, cartridge and orifice combinations or settings, reference to loading procedures and delivery information, store mass and physical properties, and any other information that affects personnel or flight safety and mission capability.

1.4.2.3. Limited Flight Clearance Recommendation. Recommends the developmental or operational flight-testing of specific aircraft-store configurations with supporting engineering rationale from a subset of the required SEEK EAGLE engineering disciplines. If the AFSEO provides a Limited Flight Clearance Recommendation, the aircraft program manager addresses the remaining engineering disciplines to support the flight clearance.

1.4.2.4. Certification Recommendation. Requires the completion of all activities required to certify the aircraft- store configurations requested in the SEEK EAGLE request. These activities include planning; analysis; tests; documentation; development; publication and fielding of pertinent technical manuals applicable to loading, carriage, and employment, which include the verified ballistics data in the -34 and -25 Technical Orders; and the incorporation of the appropriate software changes, resulting from ballistics accuracy verification of the Operational Flight Program.

1.4.2.5. Limited Certification Recommendation. Recommends fielding of aircraft-store configuration(s) with supporting engineering rationale from a subset of the required SEEK EAGLE engineering disciplines. A capability provided to the warfighter while a routine certification and ballistics accuracy verification tasks are being accomplished. Publication of technical data is required.

1.4.2.6. Compatibility Assessment. An engineering product that recommends aircraft-store configurations with supporting engineering rationale to satisfy SEEK EAGLE Requests from SAF/IA for FMS, U.S. industry customer for Direct Commercial Sale, and foreign owned or leased US-origin aircraft customers. The assessment documents and provides customers with results of any analyses and/or tests performed by the compatibility agency in support of the customer's requirements, but does not formally recommend a certification or flight clearance to the aircraft program manager. The compatibility assessment may address all engineering disciplines, or it may only address a subset of disciplines.

1.4.2.7. Modification Assessment. A SEEK EAGLE product that formally documents a determination that a proposed incremental modification to the aircraft and/or store does not diminish established aircraft-store compatibility capability and do not require re-certification (or revised Flight Clearance Recommendation). Engineering rationale supporting the modification assessment is captured to support future determinations and/or follow-on products that may be required.

1.4.2.8. Risk Assessment. An evaluation of the risk associated with a given test event, a test series, or the intent to field an aircraft-store compatibility capability (by another organization). The evaluation is based on the available engineering justification, identified deficiencies in the supporting justification, and established legacy or associated precedent.

1.4.3. SEEK EAGLE Priorities Definitions and Procedures.

1.4.3.1. High Priority – Aircraft Safety issue, mission critical (e.g. Urgent Operational Need (UON), Joint Urgent Operational Need (JUON), Joint Emergent Operational Need (JEON), Immediate Warfighter Need), Nuclear Weapon fielding/deterrence, or Top-Down direction.

1.4.3.2. Medium Priority – Supports a scheduled flight test or a known deployment.

1.4.3.3. Low (Routine) Priority – All others.

1.5. SEEK EAGLE Request (SER) Procedures.

1.5.1. Step 1. User submits a SER to ACC/A5T/Lead Command Focal Point.

1.5.1.1. Validates SERs justification.

1.5.1.2. Forwards to AFSEO for initial review.

1.5.2. Step 2. AFSEO assigns SER number; records draft SER information and reviews requirements.

1.5.2.1. Submits SER to ACC/A5T for prioritization.

1.5.3. Step 3. ACC/A5T assigns priority and routes SER to weapons system team for review and signature as applicable.

1.5.3.1. A5T forwards SER to AFSEO for planning and execution.

1.5.3.2. AFSEO begins initial planning (i.e. secures funding and engineering technical data if required).

1.5.3.3. AFSEO develops a Project Plan and forwards it to the requesting agency (SER signatory) and ACC/A5T to support a decision to proceed.

1.5.3.4. The requesting entity (SER signatory) submits written response to the Project Plan within 10 business days of receipt of the Project Plan, and confirms or modifies the original requirements or cancels the SEEK EAGLE Request.

1.5.4. Step 4. The AFSEO and the appropriate Mission Design Series developmental test organization execute the Project Plan upon requesting entity's acceptance.

1.5.4.1. Provides project plan to ACC/A5T within 30 days when requirements are received. **Note**: A Project plan is not required for a modification assessment.

1.5.5. Step 5. ACC/A5T reviews and approves/disapproves project plan within 10 days. Justification is provided for disapproved project plans.

1.5.6. Step 6. AFSEO and the appropriate Mission Design Series developmental test organization execute the project plan per schedule and provides recommendations to aircraft or store program office and Lead Commands/Agents (as applicable).

1.6. SEEK EAGLE Funding Management.

1.6.1. Funding Scope. In accordance with AFI 63-101/20-101, the Air Force SEEK EAGLE Office is intended to support a baseline capacity to provide technical expertise, modeling and simulation tools, techniques, resources, limited flight/wind tunnel testing, developmental and operational test aircrew and engineers, and management support. The intent is to provide the Air Force SEEK EAGLE program with the ability to execute against all AF validated SEEK EAGLE requirements categorized as post-EMD of an AF Program of Record or considered a record of inventory. It is not intended to fund activities outside of the SEEK EAGLE engineering disciplines, such as hardware or software changes to the aircraft or store that are necessary to satisfy certification requirements.

1.6.2. Funding Responsibilities. It is the responsibility of the aircraft or store program manager to fund AFSEO activities in support of threshold requirements as well as all activities outside the AFSEO baseline budget, such as technical order publication and Operational Flight Program updates. Additionally, aircraft program offices and weapon program offices are responsible for funding and executing efforts to modify a weapon capability that falls outside the provided capabilities of the baseline SEEK EAGLE Program Element (i.e. flight/wind tunnel testing, etc.). The aircraft program offices will plan funding for integration efforts beyond initial certification/qualification and for efforts that fall outside the baseline SEEK EAGLE Program Element (i.e. flight/wind tunnel testing, etc.)

1.6.3. Non-Air Force Agencies. Any Non-Air Force agency requesting SEEK EAGLE support is responsible for all related funding.

1.7. Conferences and Meetings.

1.7.1. SEEK EAGLE Planning Summit (SEPS).

1.7.1.1. The SEPS is an opportunity for warfighters, program managers, aircraft and store program offices, MAJCOMs, lead commands, developmental and operational test aircrew and engineers, and AFSEO to convene and discuss current and future SEEK EAGLE Projects; review SEEK EAGLE Priority list of validated SEEK EAGLE Requests and adjust for future fiscal years; determine funding impacts; and provide an opportunity for open-dialogue feedback.

1.7.1.2. AFSEO schedules and hosts the annual SEPS. AFSEO provides the logistics details for attending the conference 90 days from scheduled date.

1.7.2. SEEK EAGLE Working Group (SEWG).

1.7.2.1. SEWG are determined by the MOA between AFSEO and each aircraft program office.

1.7.2.2. SEWGs provide an opportunity at the working level to discuss plans and efforts to work the assigned projects per the SEEK EAGLE Priority list, review lessons learned, and share knowledge on trends and future opportunities.

1.7.2.3. Attendees include AFSEO Aircraft lead and/or requirements representative, Lead Command SEEK EAGLE Focal Points, Aircraft Program Office and Chief Engineer, specific aircraft prime contractor, -1 Flight Mechanical Model, Prime contractor -1 representative, -33/-34 technical content managers, -33/-34 prime contractor

representative, test wing and unit representatives, and applicable government and prime contractor engineers.

1.7.2.4. SEWG will be co-chaired between AFSEO and Aircraft Program Office, who are responsible to ensure minutes are prepared and disseminated; action items are tracked, monitored, and adjudicated.

1.8. SEEK EAGLE Data Repository.

1.8.1. A SEEK EAGLE data repository refers to an Air Force data storage entity (warehouse), designed for collection, storage, retrieval, and potentially analytical reporting of all aircraft-store compatibility engineering efforts delivered to aircraft programs and/or customers (i.e. Air Force, DoD, Defense Advanced Research Projects Agency, FMS, or other).

1.8.2. Management. AFSEO develops, manages, and maintains the SEEK EAGLE Data Repository.

1.8.3. Data Included. Aircraft and store program offices will provide all Air Force aircraft-store compatibility engineering data to AFSEO and consider providing all external Air Force SEEK EAGLE engineering efforts to ensure a centralized warehouse of aircraft-store compatibility engineering information are collected and stored. This information may provide data synergies (i.e. data mining, machine learning, etc.) for future SEEK EAGLE efforts that minimize costs and schedule, and/or provide the analytical information to decision makers and senior leaders for potential combat capability efforts.

1.9. SEEK EAGLE Request for Information. DoD agencies and contractors may submit a request for information to the AFSEO for government-owned aircraft or stores data and analyses. The AFSEO handles each SEEK EAGLE Request for Information on a case-by-case, availability-only basis. Non-DoD agencies provide appropriate funding to AFSEO for the costs to gather (or generate), and to disseminate the information.

1.10. SEEK EAGLE Process Improvement. Submit process improvement proposals to ACC/A5T and AFSEO.

Chapter 2

RECOMMENDED PROCESSES, PROCEDURES, AND SYSTEM PERFORMANCE FOR COMMUNICATIONS, NAVIGATION, SURVEILLANCE/AIR TRAFFIC MANAGEMENT (CNS/ATM), NAVIGATION SAFETY, AND NEXT GENERATION AIR TRANSPORTATION

2.1. Overview.

2.1.1. CNS/ATM and Navigation Safety compliance in civil airspace is a continuous process as sovereign nations implement new technologies, capabilities, policies, and processes to maximize the efficiency of their airspace. Airspace access is moving away from strict mandates towards a concept of "best-equipped, best-served." Therefore, securing the proper CNS/ATM capabilities is required for operations in civil airspace (driven by statute and international aviation regulations).

2.1.2. In addition, CNS/ATM assessments are required for all Air Force airworthiness approval certifications for systems acquiring, integrating, or modifying a CNS/ATM capability. The CNS/ATM Center of Excellence (COE) serves the AF as the central knowledge source of civil airspace access requirements, recommended equipage strategies, and a source of subject matter expertise to assist AF manned and unmanned aircraft program offices with a subset of their airworthiness certification activities. Finally, as advanced navigation capabilities are implemented on the aircraft, the CNS/ATM COE conducts a required navigation data certification process.

2.2. Applicability.

2.2.1. This chapter provides additional guidance for Communications, Navigation Safety, and Next Generation Air Traffic Management (CNS/ATM) Transportation System Performance (TSP) directive requirements for air system program managers in AFI 63-101/20-101, paragraph 5.4.

2.2.2. This chapter also provides CNS/ATM implementation resources, to include additional explanatory background on the CNS/ATM processes, technical assistance available from the Air Force CNS/ATM Center of Excellence (COE), typical Air Force-wide roles and responsibilities for coordinating CNS/ATM compliance, and procedures on reporting issues affecting CNS/ATM capabilities.

2.3. Background.

2.3.1. The 1944 Chicago Convention of the International Civil Aviation Organization reaffirmed nations' exclusive sovereignty over airspace above their territory and the nation's authority to dictate terms of access. AF policy emphasizes conformance to national and international standards for safe access to global airspace.

2.3.2. Conformance with CNS/ATM capability standards is not to be interpreted as ceding jurisdiction or regulatory authority to civil or foreign regulators. Aircraft not meeting CNS/ATM capability standards may be subjected to ground delays waiting for clearance, directed to operate on less optimum routes, or denied airspace access.

2.4. Intent.

2.4.1. This chapter addresses recommended roles, responsibilities, and processes regarding all acquisition, integration, and modification of CNS/ATM and Navigation Safety capabilities. The intent is not to define the CNS/ATM compliance assessment and airworthiness approval process; *USAF Airworthiness Bulletin* (AWB-325) provides instructions for the assessment and approval/certification of CNS/ATM functionality of AF air systems.

2.4.2. This chapter does not provide authority to deviate from the guidance in AFPD 62-6 or AFI 62-601, *USAF Airworthiness*.

2.5. Navigation Safety.

2.5.1. This chapter supports the AF objective to enhance navigation and safety capabilities. Navigation safety describes a family of technologies that promote aviation safety, increase aircrew situational awareness, increase survivability, improve navigational performance, or gather information needed to evaluate an incident.

2.5.2. The term "CNS/ATM," as used in this chapter, includes navigation safety equipment for AF aircraft.

2.6. Defining CNS/ATM.

2.6.1. CNS/ATM is an all-encompassing term for a set of capabilities to support the interactions between the aircrew and air traffic control. While primarily used in civil airspace, some capabilities may also be employed in AF and Department of Defense (DoD) controlled airspace.

2.6.2. In addition to integration and implementation of these capabilities, there are capabilities that require life-cycle management, ensuring their compliance.

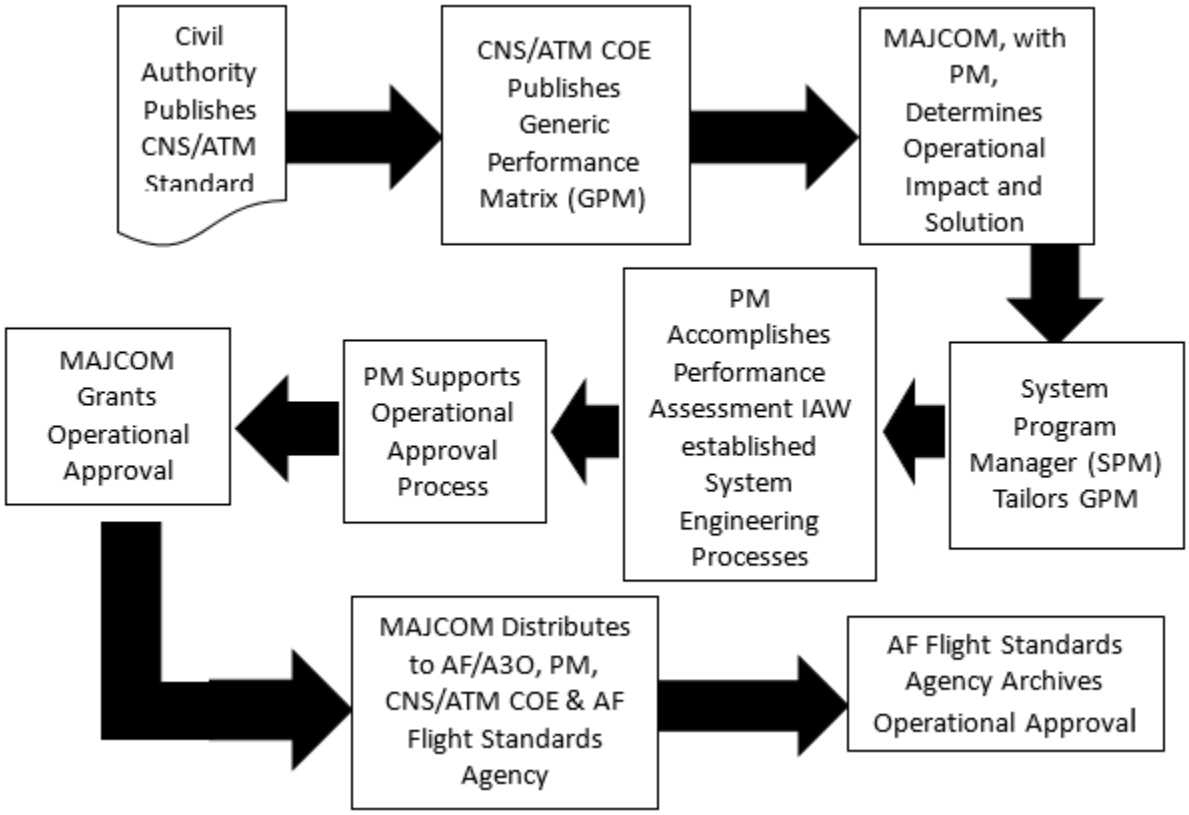
2.7. CNS/ATM Recommended Processes, Resources and Office Procedures.

2.7.1. Publication of a CNS/ATM Capability Standard to Distribution of Operational Approval.

2.7.1.1. This end-to-end process starts with the publication or revision of a CNS/ATM capability standard and produces an operational approval resulting in airspace access for the aircraft (Figure 2.1). This process is used with all aircraft acquiring, integrating, or modifying CNS/ATM capabilities according to the roles and responsibilities defined in AFI 63-101/20-101 or Air Force Guidance Memorandum (AFGM) 2019-63-01 for Rapid Acquisition Activities. The aircraft PM determines when these processes and procedures apply to Commercial Derivative Aircraft (CDA) maintaining Federal Aviation Agency (FAA) type certification.

2.7.1.2. CNS/ATM capability standards are created by national/international civil aviation authorities and recognized standards development organizations. All stakeholders who monitor CNS/ATM capability standards and/or interface with host nation civil aviation authorities, foreign defense ministries, and Air Navigation Service Providers report proposed, pending, or published changes, policy changes, or other CNS/ATM issues to AF/A3O and the CNS/ATM COE upon discovery.

Figure 2.1. CNS/ATM Capability Standard to Operational Approval Process.



2.7.2. Generic Performance Matrix. The CNS/ATM COE monitors CNS/ATM capability standards and converts these standards into a set of generic performance requirements documented in a Generic Performance Matrix. A Generic Performance Matrix does not define performance requirements for specific aircraft. Generic Performance Matrices provide examples of successful CNS/ATM capability standards verification methodologies. A Generic Performance Matrix, created and maintained by the CNS/ATM COE, is prepared for each CNS/ATM capability. The CNS/ATM COE notifies MAJCOMs, PMs, and the Technical Airworthiness Authority (TAA) of an applicable new and/or updated CNS/ATM capability standard published by a civil authority and/or the publication of a new Generic Performance Matrix. The Generic Performance Matrix forms the basis for a Tailored Performance Matrix (TPM).

2.7.2.1. MAJCOMs determine, with PM support, how to address CNS/ATM capability standards for aircraft (materiel or non-materiel solution).

2.7.2.2. CNS/ATM materiel solutions will be accomplished per AFI 63-101/20-101.

2.7.2.3. It is advised that AFLCMC/EZA, Avionics Division-Engineering Directorate, and/or the CNS/ATM COE participate in major design reviews. CNS/ATM COE subject matter expertise may be leveraged by the Technical Airworthiness Authority (TAA) to ensure airworthiness criteria have been satisfied.

2.7.3. CNS/ATM Technical Support Available to Aircraft PMs/Chief Engineer (CEs). In support of CNS/ATM capability airworthiness certification as defined in AFI 62-601 and

augmented by AWB-325, *Communications, Navigation, Surveillance/Air Traffic Management (CNS/ATM) Compliance Assessment Process*, it is highly encouraged that PMs acquiring, integrating, or modifying CNS/ATM capabilities contact AFLCMC/EZA, Avionics Division-Engineering Directorate, and/or the CNS/ATM COE to seek technical guidance. AFLCMC/EZA and/or CNS/ATM COE can assist program management offices with CNS/ATM matrix tailoring, aid in the understanding of compliance requirements, and advise on potential compliance verification methodologies. CNS/ATM COE engineering resources are available to participate in major design reviews in order to ensure CNS/ATM capability at the end of development meets performance requirements and reduces overall program risk.

2.7.4. Performance Assessment (PA). A Performance Assessment validates how each performance requirement within the TPM was addressed in a new or modified aircraft configuration. Performance Assessment results are documented in a Performance Assessment Report, and include CNS/ATM functionality added to an aircraft, and the degree to which the integrated systems perform with respect to applicable CNS/ATM performance requirements.

2.7.4.1. Performance Assessment Report. A Performance Assessment Report documents the outcomes/findings of a Performance Assessment and is one way of showing CNS/ATM capability compliance.

2.7.4.2. The Performance Assessment Report can be submitted as an airworthiness Compliance Report (CR) artifact as described in AFI 62-601 and AWB-325.

2.7.5. Airworthiness Flight Authorization. PMs obtain an Airworthiness Flight Authorization that approves the acquired, integrated, or modified CNS/ATM capabilities. This authorization is acquired either from the designated Technical Airworthiness Authority or the Delegated Technical Authority as determined in accordance with AFI 62-601.

2.7.6. Operational Approval. After obtaining an Airworthiness Flight Authorization, the MAJCOM approves operational use of CNS/ATM and Navigation Safety systems in accordance with any flight authorization limitation and with AFI 11-202V3, *General Flight Rules*. The MAJCOM provides a copy of the signed CNS/ATM operational approval to AF/A3O, Air Force Flight Standards Agency, the appropriate PM, and CNS/ATM COE. Air Force Flight Standards Agency serves as the repository for AF operational approvals.

2.7.7. CNS/ATM Equipment Contract Strategy. The CNS/ATM COE currently maintains multiple Indefinite Delivery/Indefinite Quantity (ID/IQ) contracts for CNS/ATM hardware and software procurement.

2.7.7.1. Where possible, the CNS/ATM COE negotiates extended warranty clauses not usually available through commercial means.

2.7.7.2. Contact the CNS/ATM COE for more information regarding CNS/ATM hardware and software procurement through the internet Global Air Traffic Management (iGATM) catalog.

2.7.8. The PM typically determines whether available products are financially advantageous or technically suitable.

2.8. Analyzing Existing Systems for CNS/ATM Capability.

2.8.1. Performance Assessment Report. A Performance Assessment Report documents the outcomes/findings of a Performance Assessment and is one way of showing CNS/ATM

capability compliance. The Performance Assessment Report can be submitted as an airworthiness Compliance Report artifact as described in AFI 62-601 and AWB-325.

2.8.2. A Performance Assessment can also be accomplished to determine CNS/ATM functionality provided by an existing aircraft configuration or as a gap analysis prior to a materiel/non-materiel solution determination. If the gap analysis is a Program Office engineering activity, then adherence to AWB-325 is not necessary. However, some of the processes described in AWB-325 could be leveraged by the Program Office to support the gap assessment.

2.8.3. Airworthiness Flight Authorization. PMs receive an Airworthiness Flight Authorization that approves the acquired, integrated, or modified CNS/ATM capabilities. The Authorization is acquired from the designated Technical Airworthiness Authority (TAA) as determined in accordance with AFI 62-601.

2.9. Discovery of an Issue Impacting CNS/ATM Capability.

2.9.1. Paragraph 2.7 and Figure 2.1 describe the typical acquisition process regarding a new or modified CNS/ATM capability. This section provides recommended processes for CNS/ATM capability issues that may arise during the aircraft or capability's life cycle.

2.9.1.1. CNS/ATM capabilities typically require life-cycle management.

2.9.1.2. There are several CNS/ATM capability monitoring programs that are managed by civil aviation authorities. These issues may include, but are not limited to, Reduced Vertical Separation Minimum (RVSM) requalifications, Mode-Select (Mode-S) performance compliance and Automatic Dependent Surveillance-Broadcast (ADS-B), and data communication issues.

2.9.2. The CNS/ATM COE notifies the cognizant PM upon discovery of an issue impacting previously certified CNS/ATM capability.

2.9.2.1. In turn, the PM notifies the affected MAJCOMs and Technical Airworthiness Authority or Delegated Technical Authority upon notice of an issue affecting CNS/ATM capability.

2.9.2.2. Stakeholders communicate and collaborate to determine the impact of the CNS/ATM related issue and take actions to mitigate degraded CNS/ATM capabilities.

2.9.3. If the issue is identified by the aircraft program management office, the PM notifies the CNS/ATM COE, MAJCOM, and Technical Airworthiness Authority or Delegated Technical Authority upon discovery of issue discovery. The stakeholders then communicate and collaborate to determine the impact of the CNS/ATM related issue and take actions to mitigate degraded CNS/ATM capabilities.

2.9.4. The Technical Airworthiness Authority or Delegated Technical Authority amends the airworthiness approval and may solicit assistance from the CNS/ATM COE or AFLCMC/EZA.

2.9.5. The PM provides the amended airworthiness flight authorization to the using MAJCOM to facilitate operational approval IAW AFI 11-202V3.

2.10. Supporting Different Types of Data Chain Letter of Acceptance.

2.10.1. Navigation Database Certification. A Radio Technical Commission for Aeronautics (RTCA) Document (DO)-200B, *Standard for Processing Aeronautical Data,* certified navigation data chain is required in order to meet Required Navigation Performance (RNP) or area navigation (RNAV) airspace requirements, with the exception of RNP-10 and basic area navigation (BRNAV) airspace. The purpose of this certification is to verify that the procedures used to process data from its state-supplied source file, through the various intermediate processing steps and into the active flight plan does not induce any errors. Federal Aviation Administration (FAA) guidance concerning navigation data chain certification has been harmonized with International Civil Aviation Organization guidance so that it is a universal requirement for RNAV and/or RNP operations worldwide. The navigation database certification encompasses the following areas:

2.10.1.1. Type 1 Data Chain of Acceptance (LOA). The Type 1 LOA covers the portion of the data chain from an originating Aeronautical Information Provider to the electronic database that is created by the Type 1 LOA holder. This database is then used by the Type 2 LOA holder to create a version of the database that can be loaded into the aircraft. The primary navigational data supplier for the DoD is the National Geospatial Intelligence Agency (NGA). Through a Memorandum of Understanding with the FAA, the FAA grants a Type 1 LOA to NGA and the CNS/ATM COE audits NGA to ensure continued compliance with the terms of the FAA's LOA. The CNS/ATM COE audits and writes Type 1 LOA to other entities providing navigational data to the Air Force (and other DoD offices).

2.10.1.2. Certification for the aircraft specific procedures used to transfer the NGA provided data onto the aircraft data loader cartridge to include a certification of the aircraft/weapons/electronics (A/W/E) that transfers NGA provided data onto a data loader cartridge so that it can be taken to the aircraft. (Type 2 Certification)

2.10.1.3. Type 2 Data Chain LOA, A Type 2 LOA is a required airworthiness artifact for navigation accuracy of Area Navigation Required/Required Navigation Performance (RNAV/RNP) of 4 nautical miles or tighter. The CNS/ATM COE audits the entity responsible for converting the Type 1 LOA approved database into a form that can be loaded into the aircraft avionics. The CNS/ATM COE audits the Type 2 LOA holder to ensure the database is compatible with the aircraft systems to ensure performance requirements are met and the CNS/ATM capability standard is satisfied. The CNS/ATM COE is also responsible for auditing and writing Type 2 LOA approvals for Air Force aircraft using commercial databases.

2.10.1.4. Certification that on aircraft storage and utilization of the navigation database is consistent with the aircraft's mission requirements, and meets RTCA DO-200B requirements.

2.10.2. The CNS/ATM COE is responsible for certifying the navigation data chain process. In accordance with AFI 63-101/20-101, when the CNS/ATM capability standard requires a navigation accuracy of Area Navigation/Required Navigation Performance (RNAV/RNP) of 4 nautical miles or less, the CNS/ATM COE audits the responsible entity for converting and distributing the Type 1 Letter of Acceptance approved electronic database. The approved electronic database is converted to an aircraft-specific electronic database, which is compatible

with the aircraft system to ensure performance requirements are met and the CNS/ATM capability standard is satisfied. The COE audits and writes Type 2 Letter of Acceptance approvals for Air Force aircraft using commercial databases.

2.10.3. Navigation Database Conversion (NavDB) Tool Certification. As part of the Type 2 LOA, the CNS/ATM COE certifies the MAJCOM-approved NavDB conversion tools used to convert the Type 1 LOA approved electronic database into an image that is compatible with the aircraft navigation system. The NavDB conversion tool will conform to applicable CNS/ATM capability standards. The certification is done through an audit of the tool and its development processes, which results in a Type 2 Aeronautical Tool Letter of Certification.

2.11. Typical CNS/ATM Stakeholder Roles and Responsibilities.

2.11.1. The following roles and responsibilities are provided as background to better understand the CNS/ATM process. Reference AFI 63-101/20-101 for the directive requirements. Stakeholders in the CNS/ATM process typically perform the following roles and responsibilities.

2.11.2. Assistant Secretary of the Air Force (Acquisition, Technology and Logistics) (SAF/AQ):

2.11.2.1. Designates SAF/AQQ as the CNS/ATM focal point for SAF/AQ.

2.11.2.2. Provides consistent direction to meet user requirements and need dates.

2.11.2.3. Serves as the final authority for CNS/ATM prioritization issues.

2.11.2.4. Reviews aircraft program requirements documents, such as the Initial Capabilities Document, Capability Development Document, and Test and Evaluation Master Plans for CNS/ATM requirements when they are in draft form.

2.11.3. Capability Directors in the Assistant Secretary of the Air Force (Acquisition, Technology and Logistics) involved in CNS/ATM issues are the Directorate of Information Dominance (SAF/AQI), the Directorate of Global Power (SAF/AQP), and the Directorate of Global Reach Programs (SAF/AQQ). They:

2.11.3.1. Supports and advocates implementation of CNS/ATM capability acquisition, integration, and modification programs for aircraft and systems to ensure the proper level of capability implementation to ensure AF aircraft access to airspace is consistent with mission requirements.

2.11.3.2. Assists the CNS/ATM COE with maintaining a consolidated database of CNS/ATM capabilities and operational approvals.

2.11.4. Air Force Flight Standards Agency:

2.11.4.1. Evaluates and standardizes AF aircraft operational policies and procedures to ensure compatibility with CNS/ATM performance requirements.

2.11.4.2. Serves as AF representative to the National Geospatial-Intelligence Agency (NGA) Safety of Navigation Executive Steering Group.

2.11.4.3. Assists CNS/ATM COE, MAJCOMs, and PMs with application of CNS/ATM capability standards to operational and associated training requirements.

2.11.4.4. Provides updates to the CNS/ATM COE on the consolidated database of CNS/ATM capabilities and operational approvals. Additionally, provides technical oversight of the database to ensure data integrity and its relevance as a decision-making and briefing tool.

2.11.4.5. Coordinates on MAJCOM operational approvals.

2.11.4.6. Serves as AF focal point for CNS/ATM performance monitoring efforts, such as reduced vertical separation minimum recurrent monitoring, automatic dependent surveillance-broadcast monitoring, and Mode S monitoring.

2.11.4.7. Participates in the Aeronautical Safety of Navigation Digital Working Group, AF CNS/ATM Working Group, and other CNS/ATM forums.

2.12. Lead Command Designation and Responsibilities for Weapon Systems.

2.12.1. As outlined in AFPD 10-9, *Lead Command Designation and Responsibilities for Weapon Systems,* Air Mobility Command Commander (AMC)/CC maintains and budgets for the CNS/ATM COE.

2.13. Major Command Commanders (MAJCOM/CCs).

2.13.1. Develop, document, and fund CNS/ATM operational requirements.

2.13.2. Notify the appropriate PM of any issue affecting CNS/ATM capability within 1 week upon discovery.

2.13.3. Request the PM accomplish a CNS/ATM Performance Assessment when required.

2.13.4. Grant aircraft CNS/ATM operational approval IAW AFI 11-202V3 after verification that aircraft conform to host nation CNS/ATM capability standards. Exceptions, restrictions, or use of equivalent safety and performance requirements are documented in the operational approval.

2.13.5. Notify AF Director of Operations (AF/A3O) and appropriate PM when an aircraft CNS/ATM operational approval is signed by the MAJCOM Director of Operations (A3), and provide a copy of the signed operational approval to AF/A3O, Air Force Flight Standards Agency, CNS/ATM COE, and the appropriate PM.

2.13.6. Update weapon system Concept of Operations (CONOPS), Concept of Employment, and maintenance concepts when required. Provide updated documents to the weapon system's PM.

2.13.7. Implement a process for reporting and resolving potential errors in both commercial and government furnished navigation data.

2.13.8. Participate in the Digital Working Group, AF CNS/ATM Working Group, and other CNS/ATM forums.

2.13.9. Provide guidance, timelines, and purpose to platform program offices to support the maintenance and validation of the Air Force Enterprise consolidated database of CNS/ATM capabilities and operational approvals.

2.14. CNS/ATM Center of Excellence (COE).

2.14.1. Participates and advocates for the Air Force in airspace standards forums.

2.14.2. Tracks, monitors, and maintains CNS/ATM capability standards.

2.14.3. Generates Generic Performance Matrices from applicable CNS/ATM capability standards for use by PMs/CEs to create Tailored Performance Matrices (TPMs) specific to a new aircraft development or modification program.

2.14.4. Establishes a technical support Memorandum of Understanding with every PM that requests CNS/ATM COE support.

2.14.5. Supports PMs in preparation of Tailored Performance Matrices (TPMs), when requested.

2.14.5.1. Exercises technical authority and configuration control responsibilities for Generic Performance Matrices.

2.14.5.2. Publishes new/revised Generic Performance Matrices based on publication of a new or updated CNS/ATM capability standard.

2.14.5.3. Ensures Generic Performance Matrices do not direct specific design solutions.

2.14.5.4. Ensures Generic Performance Matrices recommend verification methodologies.

2.14.5.5. Creates and maintains the Performance Assessment Report (PAR) template, and provides the current template to PMs when requested.

2.14.5.6. Provides an analysis of TPMs, prior to publication, for CNS/ATM performance requirements upon request of the PM.

2.14.5.7. Conducts PAs and generates compliance report document (e.g., Performance Assessment Request) when requested by the PM.

2.14.5.8. Reviews compliance report documentation (i.e., required artifacts) submitted by a PM to determine if the PA validates performance requirements documented in the TPM.

2.14.5.9. Conducts airworthiness assessments of CNS/ATM functionality in accordance with AWB-325 upon request of the Technical Airworthiness Authority or Delegated Technical Authority.

2.14.5.10. Is responsible for government furnished navigation data chain certification.

2.14.5.10.1. Provide functional expertise and manpower to maintain Type 1 navigation data chain certification IAW appropriate standards.

2.14.5.10.2. Perform periodic and event driven audits of navigation data processing for compliance with appropriate standards.

2.14.5.10.3. Perform audits on organizations that establish processes to develop Terminal Instrument Procedures (TERPS) and grant these organizations a Type 1 Letter of Acceptance. Provide copies of Type 1 Letter of Acceptances to Air Force Flight Standards Agency and MAJCOMs.

2.14.5.10.4. Perform Type 2 navigation data chain certification audits as required and provide formal documentation of the certification in a Letter of Acceptance to the PM.

2.14.5.11. Develops and maintains contracts to supply CNS/ATM products for AF stakeholders (see paragraph 2.7.7 for details on the CNS/ATM equipment contract

strategy). Ensure equipment on the contracts has approved frequency allocations for CNS/ATM transmitters/receivers IAW AFI 17-220, *Spectrum Management*.

2.14.5.12. Maintains a website for dissemination of CNS/ATM information, such as Generic Performance Matrices and Type 1 Letter of Acceptance through the AF portal.

2.14.5.13. Participates in the Digital Working Group, AF CNS/ATM Working Group, and other CNS/ATM forums.

2.14.5.14. Facilitates recurring communication on CNS/ATM performance requirements, policies, and procedures among CNS/ATM stakeholders.

2.14.5.15. Provides technical assistance to Air Force Flight Standards Agency to conduct CNS/ATM performance monitoring and/or resolve discovered issues.

2.14.6. Program Managers (PMs):

2.14.6.1. Ensure CNS/ATM activities and requirements are stated and planned early in the acquisition process, preferably during the Technology Maturation and Risk Reduction phase.

2.14.6.2. Assess airworthiness of CNS/ATM functionality in accordance with the current version of AWB-325.

2.14.6.3. Ensure CNS/ATM acquisitions, integrations, and modifications meet the applicable performance requirements.

2.14.6.4. Ensure CNS/ATM PAs are accomplished.

2.14.6.5. Notify MAJCOM, Air Force Flight Standards Agency, CNS/ATM COE, and Technical Airworthiness Authority of any issue affecting CNS/ATM capability upon discovery.

2.14.6.6. Obtain CNS/ATM products through the CNS/ATM COE-managed contracts and approved products list unless not financially advantageous, technically suitable, or supportive of program schedule. Decisions to deviate from this direction are documented in the acquisition strategy.

2.14.6.7. Resolve issues impacting implementation of CNS/ATM capability with the CNS/ATM COE and the Technical Airworthiness Authority. Issues affecting platform airworthiness are resolved in accordance with established airworthiness risk acceptance procedures. Unresolved issues affecting platform airworthiness are elevated to the PM's Program Executive Officer (PEO) and the Battle Management PEO responsible for the CNS/ATM COE; final adjudication authority for unresolved issues at the PEO level are accomplished by SAF/AQ.

2.14.6.8. Participate in the Digital Working Group, AF CNS/ATM Working Group, and other CNS/ATM forums.

Chapter 3

RECORDED AIRCRAFT INFORMATION

3.1. Overview.

3.1.1. Recorded Aircraft Information supports mishap investigations, flight data analysis and trending programs, aircraft development programs and operational processes. A systematic approach to integrating all data collection requirements is essential to ensure capture of critical information and optimization of benefit while minimizing overall cost. The primary goal is to balance information needs with program resources and operational considerations. The minimum attributes of crash survivable flight data recorders for AF aircraft are listed in Attachment 4 of this Pamphlet along with a standardized list of optional enhanced flight data requirements. This chapter provides recommended guidance for integrating those data capabilities with other aircraft data requirements.

3.2. Applicability.

3.2.1. AFI 63-101/20-101, Chapter 5, requires all Air Force aircraft systems (manned aircraft or unmanned aircraft systems (UAS) classified as Group 3 or higher in accordance with DoDI 6055.07, *Mishap Notification, Investigations, Reporting, and Record Keeping*) to record crash survivable parametric and acoustic data that meets minimum mandatory requirements to support mishap investigation. Guidance in this AFPAM implements AFI 63-101/20-101 requirements that the PM collaborate with data user stakeholders to conduct a systematic assessment of information needs (including mishap investigation, integrity programs, maintenance and operational analyses) that applies to all air systems: owned, operated, used, designed, or modified by the AF.

3.3. Goals.

3.3.1. Improve quality of mishap investigation and reporting.

3.3.1.1. The Air Force is required to investigate; record; and report aviation mishaps in accordance with AFI 91-204, *Safety Investigation and Hazard Reporting,* and AFMAN 91-223, *Aviation Safety Investigations and Reports*. The Air Force forms boards to investigate and determine the cause(s) of mishaps. While many mishap investigations are straightforward and benefit from surviving crew testimony, the majority require extensive analysis, test and simulation. With modern aircraft employing electronic control systems and video displays, some physical evidence may no longer exist at the mishap scene. Technological advances in flight data recorder (FDR) capabilities will be exploited to facilitate mishap investigations involving these aircraft.

3.3.1.2. Investigations involving aircraft with crash survivable data recorders have provided more conclusive results than those without recorders. This data allows the board to spend less time determining what occurred and more time determining why a mishap occurred and formulating recommendations. Recorded aircraft information is essential for modern mishap investigations, particularly those involving fly-by-wire or glass cockpit aircraft.

3.3.2. Enable data analysis programs.

3.3.2.1. Established data analysis and trending programs such as those prescribed by the Aircraft Structural Integrity Program and the Propulsion Systems Integrity Program have proven their worth through trend identification and cost savings. Additional programs such as Vibration Monitoring System (VMS), Mechanical Equipment and Subsystems Integrity Program (MECSIP), Avionics Integrity Program (AVIP), military Flight Operations Quality Assurance (mFOQA), Reliability-Centered Maintenance, Condition-Based Maintenance (CBM), Joint Advanced Health, and Usage Monitoring System encourage near real-time analysis of recorded data. To maximize use of these programs, it is imperative for the Air Force to improve aircraft data availability to all information stakeholders.

3.3.2.2. Recorded flight data can be analyzed and trended for use in both proactive and reactive operational and maintenance functions. The utility of predicting component wear-out or imminent failure results in extensive cost savings. The ability to remove or repair equipment on an as-needed basis versus scheduled intervals saves costs and circumvents component failures leading to mishaps. The civil aviation industry pioneered the use of recorded aircraft information in a proactive mode, examining non-mishap flight data to identify hazardous procedures and environments. Recording non-safety information (such as takeoff gross weight, center of gravity, fuel loads, etc.) can also assist in determining operational efficiencies.

3.3.3. Ensure an integrated solution.

3.3.3.1. There are many sources of information on an aircraft. Modern aircraft systems have digital data buses with volumes of parametric data readily available for recording. Cockpit voice recorders (CVR) capture valuable acoustic information on many aircraft. Training needs often result in heads-up-display (HUD) and multi-function display (MFD) video recorders.

3.3.3.2. Future weapon systems may have separate acoustic, video, parametric and data-link information sources, or achieve optimization through integration of the technologies. Analyzing the total system requirements provides the best and lowest cost solution to the program.

3.3.4. Enhance training effectiveness.

3.3.4.1. Videotapes of HUD and MFD images are currently used in crew training. The tapes occasionally survive crash dynamics and contribute to mishap investigations. Emerging recording system technologies are capable of integrating acoustic, image and parametric information into crash survivable packages.

3.3.4.2. Integration of these information sources coupled with real time simulators provides higher fidelity training opportunities.

3.3.5. Assist new aircraft development programs.

3.3.5.1. Identification of information customers occurs prior to the EMD phase of a program. Early identification results in the most cost-effective and integrated solution for the program.

3.3.5.2. Establishing a Recorded Aircraft Information Integrated Product Team (IPT) (previously called an Aircraft Information Working Group (AIWG)) prior to the EMD phase of development assists in specifying information recording requirements.

3.4. Recommended Roles and Responsibilities.

3.4.1. The following roles and responsibilities are provided as background to better understand the Recorded Aircraft Information process. Reference AFI 63-101/20-101 for directed requirements.

3.4.2. Milestone Decision Authorities (MDA).

3.4.2.1. Ensure Recorded Aircraft Information requirements are addressed for all acquisition programs.

3.4.2.2. Ensure the status of flight data recorders and cockpit voice recorders is briefed at all aircraft acquisition milestone decision reviews.

3.4.3. Program Executive Officers (PEO).

3.4.3.1. Ensure Recorded Aircraft Information requirements are addressed during all sustainment program reviews.

3.4.3.2. Ensure all aircraft in their portfolios are equipped with an information recording capability meeting the requirements of AFI 63-101/20-101 and user-defined capability documents.

3.4.4. Program Managers (PM).

3.4.4.1. Conduct a systematic assessment of the information needs (including mishap investigation, integrity programs, maintenance and operational analyses) for their aircraft prior to the start of the EMD phase to ensure the most capable and cost-effective data collection systems are employed. If program is past the EMD phase, assessment is conducted within 12 months of issuance of this publication.

3.4.4.2. Ensure representatives from all information user stakeholders (operations, maintenance, acquisition, safety, test & evaluation, and logistics communities) are included in conducting the systematic assessment of information needs.

3.4.4.3. Each aircraft program PM establishes a Recorded Aircraft Information IPT.

3.4.4.4. Provide integrated system solutions that support customer-defined capability needs that include but are not limited to mFOQA, integrity programs, and CBM+/Reliability-Centered Maintenance, for each Mission-Design-Series the AF acquires or uses (including manned and unmanned).

3.4.4.5. Develop and provide documentation of cost, schedule, and technical information to support Lead Command requests for funding of (or waiver to) Recorded Aircraft Information requirements as required.

3.4.4.6. Ensure the Air Force Safety Center Mishap Analysis & Animation Facility has the necessary equipment (hardware and software), documentation and training to download, transcribe and analyze the crash survivable data recorded for mishap investigations. Coordinate closely with Mishap Analysis & Animation Facility personnel during the procurement of this equipment to prevent duplications.

3.4.4.7. Procure, install and test all necessary aircraft data collection hardware and software systems.

3.4.4.7.1. Provide appropriate hardware and software to facilitate integrity and operational analysis processes.

3.4.4.7.2. Collaborate with Air Force Safety Center Mishap Analysis & Animation Facility personnel to establish an optimized data retrieval and preparation capability for mishap investigation data processing, and provide hardware and software when necessary.

3.4.4.7.3. Provide all data users (such as mishap investigation lab or mFOQA and Program Managers for Aircraft Structural Integrity Program) with any changes or modifications to the data recorder memory map(s).

3.4.4.8. Maintain an aircraft system history to track Recorded Aircraft Information issues and design decisions.

3.4.4.9. Ensure platform-specific data is available for user-defined mFOQA analysis.

3.4.5. Program Chief Engineers.

3.4.5.1. Advise the PM on configuration control, test and certification of Recorded Aircraft Information related aircraft systems.

3.4.5.2. Conduct periodic reviews of Recorded Aircraft Information products, data, and user feedback to ensure their currency.

3.4.5.3. Reconcile Recorded Aircraft Information initiatives with policies and objectives of other Air Force initiatives and programs.

3.4.5.4. Evaluate all proposed aircraft modifications for Recorded Aircraft Information applicability.

3.4.5.5. Ensure adequate procedures are in place to periodically validate and report on the content and accuracy of recorded information.

3.4.5.6. Ensure Technical Orders support sustainment of and require periodic inspections of all information-recording devices and their associated support equipment to verify quality and functionality.

3.4.6. Information User Stakeholders.

3.4.6.1. Weapons System Lead Command (as identified in AFPD 10-9).

3.4.6.1.1. Assigns an Office of Primary Responsibility (OPR) to monitor the Recorded Aircraft Information status of assigned aircraft.

3.4.6.1.2. Ensures experienced subject matter expert(s) representing operational, maintenance, communications, logistics and safety information requirements of the command participate in the systematic assessment of information needs and in working groups established to integrate Recorded Aircraft Information requirements.

3.4.6.1.3. Evaluates mission scenarios for information requirements and determine the information recording requirements for each aircrew position.

3.4.6.1.4. Provides direction and Recorded Aircraft Information requirements to the Program Office.

3.4.6.1.5. Ensures Recorded Aircraft Information requirements are included in acquisition documents such as Initial Capabilities Documents (ICDs), Capability Development Documents (CDCs), Systems Requirements Documents (SRDs) and System Specifications as appropriate.

3.4.6.1.6. Budgets and funds Recorded Aircraft Information requirements according to AFPD 10-9.

3.4.6.1.7. Ensures crash survivable information recording equipment necessary for mishap investigation is included on all applicable aircraft's Minimum Essential Subsystem List (MESL).

3.4.6.1.8. Prepares and submits any necessary requests for waiver of Recorded Aircraft Information requirements in accordance with paragraph 3.9 under Program Manager responsibilities in this Chapter.

3.4.7. Air Force Materiel Command (AFMC).

3.4.7.1. Ensures engineers and scientists knowledgeable of aircraft information system design are available to assist PMs and Lead Commands in the systematic assessment of information needs.

3.4.7.2. Assists PMs to identify commands using recorded aircraft information and determine user stakeholders.

3.4.7.3. Evaluates proposed designs for information acquisition processes that capture system performance and operational requirements.

3.4.7.4. Maintains Recorded Aircraft Information databases to store accumulated information, allow various Program Offices to standardize data, and share Recorded Aircraft Information concerning standardization requirements.

3.4.7.5. Supports and evaluates the implementation of Recorded Aircraft Information IPTs to include the documentation of lessons learned and best practices.

3.4.7.6. Maintains Integrity Programs and CBM+/Reliability Centered Maintenance Technical Advisors to provide Mission Design Series Program Offices and Lead Commands information needed to initiate or improve data collection, retrieval, and distribution to support integrity programs and CBM+/ Reliability Centered Maintenance.

3.4.8. Air Force Safety Center, Aviation Safety Division (AFSEC/SE).

3.4.8.1. Ensures an experienced aviation mishap investigator participates as the Air Force Safety Center representative in the systematic assessment of information needs and in working groups established to integrate Recorded Aircraft Information requirements.

3.4.8.2. Provides lessons learned and statistical summaries of safety information systems to support Recorded Aircraft Information IPT assessments of aircraft information needs.

3.4.8.3. Provides guidance to PMs on applicable national and international information recording standards to ensure procurement of equipment that meets data recorder download and mishap analysis requirements.

3.4.8.4. Ensures a procedure is in place to isolate information identified by Safety Investigation Boards for use in a mishap or safety investigation. When the investigation is complete, processes the data through the appropriate analysis and trending programs.

3.4.8.5. Maintains an mFOQA Program Manager to:

3.4.8.5.1. Provide Mission Design Series Program Offices and Lead Commands information needed to initiate or improve data collection, retrieval, and distribution to support mFOQA analyses.

3.4.8.5.2. Assist Mission Design Series Program Offices and Lead Commands in assessing risks and determining mitigation measures when mFOQA data analyses identify new hazards.

3.5. Standardization of Data Parameters.

3.5.1. With the proliferation of digital data buses and computer technology, it is now possible to record hundreds of parameters for many hours. Modern military aircraft demonstrate this ability by recording a plethora of information. Consequently, one of the challenges now becomes assuring critical parameters are captured in crash survivable media and not overlooked while identifying parameters used for other purposes.

3.5.2. The National Transportation Safety Board (NTSB), the European Organization for Civil Aviation Equipment (EUROCAE) and the U.S. military services have periodically recommended specific parameters for mishap investigation. Many of these parameters are required to be recorded, as a minimum allowable, set by various worldwide regulatory agencies such as the Federal Aviation Administration (FAA) and Joint Aviation Authority (JAA).

3.5.3. Performance and functional requirements for information recording systems are determined by exhaustive review of current industry standards and mishap lessons learned. FAA Technical Standard Orders (TSOs) such as C124c and C123c, and Federal Aviation Regulation (FAR) 121.344 Appendix M, is consulted. International standardization efforts by EUROCAE Working Group 50 (WG 50) and the International Civil Aviation Organization will be reviewed along with recommendations of the NTSB and US Air Force Safety Center. Air Force Safety Center/SEF can provide the latest standards and USAF positions relative to these standards.

3.6. Recorded Aircraft Information Recommended Best Practices.

3.6.1. Systematic Assessment of all Information User Needs.

3.6.1.1. The PM will ensure that decisions affecting aircraft system capabilities account for information needs of the operational, maintenance, acquisition, logistics and safety communities.

3.6.1.2. This is accomplished through a systematic assessment of the needs of all data users (to include mishap investigation, integrity programs, maintenance & operational analyses) for each aircraft program.

3.6.2. Establishing a Recorded Aircraft Information IPT.

3.6.2.1. The PM establishes a Recorded Aircraft Information IPT for each aircraft program to accomplish the systematic assessment of all information user needs and determine the most cost effective means to achieve the required recording capability. The Recorded

Aircraft Information IPT will meet as necessary to address compliance issues and capabilities as weapon system technology changes.

3.6.2.2. Recorded Aircraft Information IPT Objectives.

3.6.2.2.1. Provide the PM with technical guidance and a current operational perspective to evaluate the proposed aircraft information collection and management concept.

3.6.2.2.2. Provide the PM with specific recommendations to ensure crash survivable information is recorded for mishap investigations.

3.6.2.2.3. Provide the PM with specific recommendations to ensure data is collected throughout the system lifecycle, to support information-based programs such as system integrity and prognostics programs, mFOQA, CBM, and Joint Advanced Health and Usage Monitoring System.

3.6.2.2.4. Provide formal Lead Command and safety community liaison with the system program office and prime contractor.

3.6.2.2.5. Provide an audit trail for decisions on information management issues.

3.6.2.3. Recorded Aircraft Information IPT Membership. The PM or their designated representative will chair the Recorded Aircraft Information IPT. The Recorded Aircraft Information IPT chairperson solicits appropriate members and advisors who are empowered to represent their organizations and are sufficiently trained and experienced in the subject matter. The Recorded Aircraft Information IPT members are responsible for developing cohesive and integrated information management recommendations, taking into consideration the operational usage, information security, maintenance and system integrity concept of the aircraft system. The Recorded Aircraft Information IPT will be composed of the following members:

3.6.2.3.1. The Recorded Aircraft Information IPT chairperson (i.e., PM or their designated representative).

3.6.2.3.2. The Program Office Chief Engineer or designated representative.

3.6.2.3.3. Experienced subject matter experts from the system requirements, operations, maintenance, logistics, and safety offices of the Lead Command; and from the Using Commands when deemed necessary by the PM to provide mishap investigation and mFOQA analysis requirements, where available.

3.6.2.3.4. Structural integrity, engine integrity, and other program representatives to provide logistic and sustainment analysis requirements needs for the platform.

3.6.2.3.5. Experienced aviation mishap investigator from the Air Force Safety Center to provide mishap investigation and mFOQA analysis requirements.

3.6.2.3.6. Test and Evaluation representative.

3.6.2.3.7. Advisors to identify issues and provide technical input that primary members can use as the basis for recommendations. The Recorded Aircraft Information IPT chairperson selects advisor participation as required. Representatives of the weapon system manufacturer and/or other applicable contractors may be included as

advisors. Representatives from AFMC, test centers, legal offices and other agencies such as the National Aeronautics and Space Administration may be selected as advisors as needed. AFLCMC/HNC can provide Subject Matter Expertise on Encryption Issues, including Classified Data at Rest (CDAR).

3.6.2.3.8. Other members as deemed necessary by the Recorded Aircraft Information IPT chairperson, including members of other services for joint acquisition programs.

3.6.2.4. Recorded Aircraft Information IPT Responsibilities. The Recorded Aircraft Information IPT offers a unified government position to the PM. The Recorded Aircraft Information IPT completes the following actions to ensure the capture of critical information and optimization of benefit while minimizing cost:

3.6.2.4.1. Identify and evaluate all investigative, safety, logistical, operational, maintenance and training information needs associated with the aircraft, to include the collection, processing, storage, distribution and reporting of such information, and ensure information interoperability with current USAF Information Technology (IT) systems.

3.6.2.4.2. Assess existing and planned recording systems' capabilities compared to the above information needs and determine necessary information recording system improvements in consideration of mishap investigation needs and the operational usage, maintenance and system integrity concept of the weapon system.

3.6.2.4.3. Determine the level of compliance with Recorded Aircraft Information requirements listed in Attachment 4 of this Pamphlet.

3.6.2.4.4. The parameters listed in the Tables of Attachment 4 are used as the starting point to determine what aircraft information is recorded.

3.6.2.4.5. Table A4.1 parameters in Attachment 4 are recorded on all aircraft, as applicable, for mishap investigations and require a waiver if the parameter is not recorded by a crash survivable flight data recorder. Table A4.2 parameters in Attachment 4 are also recorded for new acquisition aircraft and for existing aircraft if a sensor for the information is installed and the data is accessible via a data stream on the aircraft; otherwise, recording of Table A4.2 parameters is desired.

3.6.2.4.6. Determine the applicability of each required parameter to the particular aircraft under consideration. For example, some parameters are applicable only to fixed-wing aircraft, or only to rotary-wing aircraft, or only to tanker aircraft, or only to powered-lift aircraft.

3.6.2.4.6.1. For each applicable parameter: identify if it is currently recorded (including how/where) or develop a plan to obtain recording capability.

3.6.2.4.6.2. For each non-applicable parameter: identify rationale for non-applicability.

3.6.2.4.6.3. Other applicable parameters not included in the Tables are added as determined appropriate by the Recorded Aircraft Information IPT (see paragraph 3.7.1 in this chapter for additional information).

3.6.2.4.7. Identify methods to cost effectively record, retrieve, secure, and disseminate aircraft information that can assist in determining the causes of aircraft mishaps, reducing operating cost, anticipating equipment failure, detecting faulty operational procedures, forecasting remaining aircraft life based on structural data, and optimizing engine maintenance through the use of engine data.

3.6.2.4.8. Review FAR Part 25 Section 1459, Flight Data Recorders, and FAR Part 25 Section 1457, Cockpit Voice Recorders, for applicability to each program (or these same sections in FAR Part 23, Part 27 or Part 29 as appropriate).

3.6.2.4.9. Determine the extent data link communications are to be recorded either onboard or at the receiving ground station for platforms with data link messaging capability.

3.6.2.4.10. Validate any requirements to inhibit devices employed to enable the recovery of the crew and information recorders in the event of a mishap if determined necessary to address combat operational concerns.

3.6.2.4.11. Consider the use of encryption in the system design if unique wartime and/or peacetime security concerns dictate that geographical, flight path, data link or performance parameters are classified. The Recorded Aircraft Information IPT addresses issues such as perishability of the classified data, access to crypto keys following a mishap, and determine access to the decrypted data. If encryption is determined not to be a viable option, the Recorded Aircraft Information IPT will consider the ability to inhibit recording of certain parameters as determined by security concerns and prepare data sanitization procedures in case of unintentional recording of classified data to return the system to an unclassified state. This capability will be validated by the customer of the information and utilized only as unique operational requirements dictate. Sufficient safeguards to prevent arbitrary and capricious deletion of information will be considered as part of the system design.

3.6.2.4.12. Determine the most cost effective means to achieve the recording capability that meets the identified information needs and addresses non-compliant Recorded Aircraft Information requirements.

3.6.2.4.12.1. To record all possible information on every aircraft may be both cost-prohibitive and unrealistic; however, achieving a balance between parameter availability, optimization for the information customers, and cost avoidance is the desired outcome.

3.6.2.4.12.2. Cost-benefit analyses are performed to determine the cost effectiveness of accomplishing various possible options for achieving the required information recording capability.

3.6.2.4.13. Recommend solutions chosen to best meet information-recording requirements and develop plan for implementing the recommended solution(s).

3.6.2.4.14. Determine the appropriate inspection intervals for validating the quality and functionality of all Recorded Aircraft Information components.

3.6.2.4.15. Document completion of the above actions. Developing an Aircraft Information Management Plan (AIMP) is recommended for documenting Recorded

Aircraft Information IPT activities (see paragraph 3.8 below for additional information).

3.6.2.4.16. Stay abreast of proposed/planned aircraft modifications for potential impacts to Recorded Aircraft Information and those that may enable collection of additional data.

3.6.2.4.17. Advocate for funding of recommended solution(s) and assist in developing waiver requests as requested by the Lead Command.

3.7. Additional Information on the use of Mishap Parameter Tables.

3.7.1. When conducting the systematic assessment of information needs, the parameters listed in Attachment 4 of this Pamphlet will be used to determine what information is required to be recorded on an aircraft. Table A4.1 and Table A4.2 in Attachment 4 reflect an extensive list of parameters available for recording on fixed wing, rotary wing and powered lift aircraft. These parameters are essential to investigative and preventative operations and logistics efforts.

3.7.2. Although the list is extensive, there is always a tendency to include "just one more" parameter that could be captured. Additionally, military aircraft may have mission specific or special equipment status that is also recorded. For example, an aircraft equipped with a helmet-mounted cuing system records the pilot's head and/or eye position and a jump-qualified aircraft records the status of the jump light indicating system as well as open/closed statuses for doors and ramps. So while the list may appear complete, mission needs and requirements could dictate a more extensive list when deciding on data recording requirements.

3.8. Developing an Aircraft Information Management Plan (AIMP).

3.8.1. The Recorded Aircraft Information IPT will develop an AIMP for each program to document the information requirements for the platform; the current information recording system capability, processes and infrastructure; shortfalls between available and needed data; compliance/non-compliance with Recorded Aircraft Information requirements; most cost effective means to address shortfalls; analysis of alternatives and/or cost-benefit analyses for options considered; and recommended actions for future efforts. An AIMP template is provided in Attachment 2. The AIMP is an active/living document that is updated preceding each milestone decision point or as program changes occur. The following steps/considerations are utilized in creating the AIMP:

3.8.1.1. Determine all aircraft information customers/stakeholders (i.e., who needs information off the aircraft?). At a minimum, this includes safety investigation boards, system/subsystem integrity programs, mFOQA, Reliability Centered Maintenance, CBM, and Joint Advanced Health and Usage Monitoring System.

3.8.1.2. Determine what information is generated by the aircraft and what information is recorded by existing systems.

3.8.1.3. Identify how and when the information comes off the aircraft and the classification of the information. Determine where the information goes and what is done with it.

3.8.1.4. Perform a gap analysis to determine if capabilities meet Recorded Aircraft Information requirements in Attachment 4 Tables or where they fall short.

3.8.1.5. Develop Rough Order of Magnitude (ROM) estimates for modifications required to address any identified shortfalls (ROMs can be developed in-house and/or by a contractor). Avoid single, monolithic ROMs of what it would take to fix everything; instead stratify modifications in a way that makes sense (e.g., easy versus difficult, cheap versus expensive, or short-term versus long-term).

3.8.1.6. Consider all forms of information (i.e., acoustic, imagery, data link and parametric, regardless of recording media or transmission method) when arriving at an integrated solution for the program.

3.8.1.7. Determine IT systems where the collected data is hosted and evaluate data interface requirements.

3.8.1.8. Realize that by combining information requirements, several customers may be served by the same recorder.

3.8.1.9. Conduct analysis of alternatives and/or cost-benefit analyses for different options being considered to determine the most cost effective system solution.

3.8.1.10. Upon completion, the AIMP is endorsed by the PM and provided to the Lead Command as supporting information to prepare funding requests and/or required waiver requests.

3.8.1.11. Be prepared for customer and/or information collection modifications as aircraft mission, aircraft capability and technology changes.

3.9. Recommended AFI 63-101/20-101 Recorded Aircraft Information Waiver Process.

3.9.1. In accordance with AFI 63-101/20-101, Lead Commands (as assigned by AFPD 10-9) administer any necessary Recorded Aircraft Information waivers for weapon systems under their responsibility. Exceptions may be made when a command has Lead responsibilities for a specialized variant of a platform (e.g., MC-130 assigned to AFSOC) but the Lead Command for the basic platform (e.g., AMC for C-130) is responsible for data recording capability.

3.9.2. The Lead Command Director of Safety develops waiver requests to address Recorded Aircraft Information deficiencies identified by the PM. Waiver requests address which parameter or recording requirements are not currently met, which requirements are planned to be met through modifications or upgrades, the timeline and cost estimate/funding plan for those modifications or upgrades, proposed steps/methods needed to meet the remaining requirements (including cost estimate/funding plan and timeline), and any requirements that cannot be met, along with justification for why they cannot be met. A template is provided in Attachment 3 for guidance.

3.9.3. In accordance with AFI 63-101/20-101, waiver requests are endorsed by MAJCOM/A3/A4/A5 and coordinated with AF/SE before submittal to the Lead Command/CC for consideration and disposition. AF/SE validates the accuracy and completeness of the package and the adequacy of recommended solutions before presentation to the waiver decision authority. The Lead Command/CC is the sole waiver authority for Recorded Aircraft Information requirements. Lead Command Directors of Safety notify AF/SE of all approved waivers.

3.9.4. When granted, a waiver remains in force until the execution plan is implemented or the waiver is rescinded. If the plan upon which a waiver was granted is not executed, the waiver

package is re-accomplished within six months following determination that the plan cannot be executed. In addition, if a new recording system is installed, a new waiver package is accomplished if all Recorded Aircraft Information requirements are not met.

Chapter 4

CREW STATION WORKING GROUPS

4.1. Overview.

4.1.1. Crew Station and Maintainer Working Groups are the new names for groups that support aircraft operations and crew station development, replacing the old term Cockpit Working Groups.

4.2. Applicability.

4.2.1. For every Air Force program that involves crew station development, or substantially modifies a crew station, Program Managers will consider establishing a Crew Station Working Group (CSWG) as a recommended best practice to implement the design requirements of AFI 63-101/20-101.

4.3. Crew Station and Maintainer Interface Working Groups.

4.3.1. Crew Station Working Groups.

4.3.1.1. Crew stations include but are not limited to cockpit, flight deck, remote operator stations, or mission operator stations such as: battle management, reconnaissance, electronic warfare, or aerial refueling operator stations.

4.3.1.2. Similarly, anytime the maintainer interface to an aircraft is first designed or substantially modified, Program Managers will consider establishing a Maintainer Interface Working Group (MIWG).

4.3.2. Maintainer Interface Working Groups.

4.3.2.1. Maintainer interfaces include, but are not limited to: electronic maintenance systems (e.g. diagnostics systems), physical aircraft interface in non-occupied areas, and individual Line Replaceable Units (LRUs).

4.3.3. Purpose.

4.3.3.1. CSWGs and MIWGs serve to ensure good human factors engineering principles are used during the development and modification of a platform design. Through the program office, the CSWG offers a unified government position on matters pertaining to crew station development and modification.

4.3.3.2. The CSWG bases its position on members' collective experience and technical knowledge. Since the CSWG cannot change contractual requirements, it gets approval from the PM and lead command for any recommended changes that affect the contract (cost, schedule, and performance). Approved changes are incorporated by the contracting officer.

4.3.3.3. The CSWG and MIWG information along with recommended procedures below are based on lessons-learned during decades of Air Force experience with cockpit and crew station design. Contact the Crew Systems and Human Systems Integration Enterprise Branch (AFLCMC/EZFC) for additional information and training on establishing CSWGs and MIWGs.

4.3.4. CSWG and MIWG Objectives.

4.3.4.1. Provide the PM with technical guidance and a current operational perspective to help evaluate the operational suitability and effectiveness of the proposed crew station and maintainer interface designs to include human factors evaluations such as situation awareness, workload, accommodation, control/display evaluation, and task analyses.

4.3.4.2. Clarify and evaluate operational tasks and critical mission elements, and evaluate simulated mission scenarios.

4.3.4.3. Act as the formal lead liaison with the program office and prime contractor in the earliest stages of the crew station and maintainer interface design process.

4.3.4.4. Ensure the use of appropriate levels of simulations throughout the entire crew station design process.

4.3.4.5. Provide an audit trail for decisions on crew station and maintainer interface issues.

4.3.4.6. Provide interface documentation to address air worthiness compliance criteria regarding the human engineering design approach to meet safety objectives.

4.3.5. Membership and Responsibilities.

4.3.5.1. CSWGs include both members and advisors.

4.3.5.2. CSWG Members: Members need a broad understanding of their organization and its concerns. They make crew station design recommendations to the CSWG chairperson. Appointment is for at least 2 years to guarantee continuity of critical information. Through the program office, the CSWG offers a unified government position on matters pertaining to crew station development and modification. Required members and their respective responsibilities include the following:

4.3.5.3. The CSWG chairperson (selected by the PM): The chairperson establishes the CSWG during EMD or as early as possible. He/she contacts the Crew Systems and Human Systems Integration Branch (AFLCMC/EZFC) for information on how to establish and organize the CSWG.

4.3.5.3.1. Typically, the role of CSWG chairperson is fulfilled by the Crew Systems Engineer assigned to the program. However, the prime contractor counterpart to the Crew Systems Engineer can be a co-chair.

4.3.5.3.2. The chairperson coordinates with each of the members' organizations to ensure each member representative meets the qualifications. It is the responsibility of the chairperson to manage the list of CSWG attendees. The chairperson writes and maintains the charter for the program while referring to Crew Systems Bulletin (CSB) 004 on CSWGs for guidance on developing the charter.

4.3.5.3.3. The chairperson maintains a database of CSWG design decisions and issues. Design decisions are recorded using decision documents, which are also described in CSB-004 for guidance. It is also the chairperson's responsibility to develop the simulation and conduct data analysis for the crew station design, usually by working with the system developer.

4.3.5.3.4. The chairperson is responsible for maintaining current and accurate CSWG meeting records. Lastly, the chairperson establishes a Crew Station Evaluation Team to support the CSWG. The chairperson may appoint additional members and/or advisors such as pilot physicians, safety representatives, and engineering support as necessary.

4.3.5.4. Crew station or human factors engineering representative. This person provides human factors input on the crew station design and evaluation.

4.3.5.5. Senior aircrew representatives from the requirements and the operations offices of the lead command, operational commands and National Air Guard or reserve components, as necessary.

4.3.5.5.1. These members are appointed by the operational command based on their level of expertise. They provide the CSWG with expertise for the analysis of the crew station design and clarify the critical elements to the CSWG and system developer.

4.3.5.5.2. These members will also develop or assess suitability of mission scenarios for use in dynamic simulations used for design evaluation.

4.3.5.6. An Air Force Flight Standards Agency representative. The Air Force Flight Standards Agency representative is the instrument flight expert for the CSWG and assesses proposed crew station design for instrument flying requirements.

4.3.5.7. A representative from the Lead Development Test and Evaluation Organization or Air Force Test Center. The Lead Developmental Test and Evaluation Organization Evaluation Test Organization or Air Force Test Center member provides a developmental test perspective on proposed crew station designs based on lessons learned from developmental flight-testing.

4.3.5.8. An Air Force Operational Test and Evaluation Center (AFOTEC) representative. The AFOTEC member evaluates proposed crew station designs for functionality and early operational utility based on lessons learned.

4.3.5.9. Advisors are subject matter experts used to help identify cockpit/remote operator station design issues and provide technical input that members can use as the basis for recommendations.

4.4. Maintainer Interface Working Groups (MIWGs) Members.

4.4.1. MIWGs also include both members and advisors. Members need a broad understanding of their organization and its concerns as it pertains to maintainers. They make maintainer interface design recommendations to the MIWG chairperson. Appointment is for at least 2 years to guarantee continuity of critical information. Similar to CSWGs, the MIWG also bases its position on members' collective experience and technical knowledge. Since the MIWG cannot change contractual requirements, it gets approval from the PM and lead command for any recommended changes that affect the contract (cost, schedule, and performance). Approved changes are incorporated by the contracting officer. Members and their respective responsibilities include:

4.4.1.1. The MIWG chairperson(s) (selected by the PM). The chairperson establishes the MIWG during EMD or as early as possible. He/she can contact the Crew Systems and Human Systems Integration Branch (AFLCMC/EZFC) for information on how to establish

and organize the MIWG. Typically, the Crew Systems Engineer assigned to the program is assigned the role of MIWG chairperson. The chairperson coordinates with each of the members' commands to ensure each member representative meets the qualifications. It is the responsibility of the chairperson to manage the list of MIWG attendees. The chairperson writes and maintains the charter for the program while referring to CSB-004 for guidance. The chairperson maintains a database of MIWG design decisions and issues. As with CSWGs, MIWG design decisions are documented using decision documents as described in CSB-004. The chairperson is also responsible for maintaining current and accurate MIWG meeting records. The MIWG chairperson may appoint additional members and/or advisors as necessary.

4.4.1.2. Crew Systems Engineering representative. The crew systems engineering representative typically serves as the MIWG chairperson as appointed by the PM. This person provides human factors input on the maintainer interface design and evaluation. The prime contractor counterpart to the crew systems engineer can also serve as an MIWG co-chair.

4.4.1.3. Senior maintainer representatives from the requirements and operations offices of the lead command, operational commands, and reserve components as deemed necessary.

4.4.1.3.1. These members assess the maintainer interface design based on experience and lessons learned.

4.4.1.3.2. These members also include operational maintainers in the field.

4.4.1.4. The MIWG chairperson may appoint advisors to help identify maintainer interface design issues and provide input that can serve as a basis for recommendations.

4.4.2. CSWG and MIWG References. Guidance on writing a charter for CSWGs and MIWGs is contained within CSB-004 managed by AFLCMC/EZFC. Similarly, samples of design decision documents are also contained with the Bulletin. Programs will use the Bulletin in conjunction with this chapter in establishing and managing CSWGs and MIWGs.

WILLIAM B. ROPER
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Attachment 1

GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION

References

Air Force Guidance Memorandum (AFGM) 2019-63-01, *Air Force Guidance Memorandum for Rapid Acquisition Activities*, 27 June 2019

AFI 11-202V3, *General Flight Rules*, 10 August 2016

AFI 17-220, *Spectrum Management*, 16 March 2017

AFI 25-201, *Intra-Service, Intra-Agency, and Inter-agency Support Agreements Procedures*, 18 October 2013

AFI 62-601, *USAF Airworthiness*, 11 June 2010

AFI 63-101/20-101, *Integrated Life Cycle Management*, 9 May 2017

AFI 63-125, *Nuclear Certification Program*, 24 July 2017

AFI 63-133, *Aircraft Information Program*, 06 February 2001

AFI 91-102, *Nuclear Weapon System Safety Studies, Operational Safety Reviews and Safety Rules*, 22 May 2019

AFI 91-202, *The US Air Force Mishap Prevention Program*, 24 June 2015

AFI 91-204, *Safety Investigation and Hazard Reports*, 27 April 2018

AFI 99-103, *Capabilities-Based Test and Evaluation*, 6 April 2017

AFI 62-601_AFMCSUP, *USAF Airworthiness*, 28 March 2016

AFMAN 21-201, *Munitions Management*, 26 March 2019

AFMAN 33-363, *Management of Records*, 1 March 2008

AFMAN 91-201, *Explosives Safety Standards*, 21 March 2017

AFMAN 91-223, *Aviation Safety Investigations and Reports*, 14 September 2018

AFPD 10-9, *Lead Command Designation and Responsibilities for Weapon Systems*, 8 March 2007

AFPD 16-4, *Accounting for Units, Installations and Aerospace Vehicles*, 20 November 2018

AFPD 62-6, *USAF Airworthiness*, 16 January 2019

AFPD 63-1/20-1, *Integrated Life Cycle Management*, 7 August 2018

AFPAM 63-128, *Integrated Life Cycle Management*, 10 July 2014

DoDD 5000.01, *The Defense Acquisition System*, 31 August 2018

DoDD 5000.71, *Rapid Fulfillment of Combatant Commander Urgent Operation Needs*, 31 August 2018

DoDI 4000.19, *Support Agreements*, incorporating Change 2, 31 August 2018

DODI 5000.02, *Operation of the Defense Acquisition System*, Change 4, 31 August 2018

Airworthiness Bulletin (AWB-325), a periodic publication

DoDI 6055.07, *Mishap Notification, Investigations, Reporting, and Record Keep*, 6 June 2011, (Incorporating Change 1, 31 August 2018)

EUROCAE ED 112, Minimum Operational Performance Specification for Crash Protected Airborne Systems, current edition

FAA TSO-C123c, Cockpit Voice Recorder Equipment, December 19, 2013

FAA TSO-C124c, Flight Data Recorder Equipment, December 19, 2013

MIL-HDBK-244A, *Guide to Aircraft/Stores Compatibility*, 6 April 1990

MIL-DTL-9977, Version M, *Manuals, Technical-Nonnuclear Munitions and Nuclear Weapons Basic Information, Loading Procedures, NATO Stage B Cross-Serving, Functional Check Procedures, and End of Runway Procedures Checklist*, 22 February 2018

MIL-PRF-38384, *Checklists and Source Data Packages, Aircraft Weapons Delivery, current version*

MIL-PRF-9977, *Performance Specifications: Manuals, Technical and Checklists: Munitions/Weapons Loading Procedures, Nonnuclear and Nuclear Packages, Standard Data: Munitions Loading Procedures, Nonnuclear*, current edition

MIL-STD-461, *Requirements for the Control of Electromagnetic Interference Characteristics of Sub systems and Equipment*, current edition

MIL-STD-810, *Environmental Engineering Considerations and Laboratory Tests*, current edition

MIL-STD-882, *DOD Standard Practice for System Safety*, current edition

MIL-STD-1289, *Airborne Stores, Ground Fit and Compatibility Requirements*, current edition

MIL-STD-8591, *Airborne Stores, Suspension Equipment and Aircraft-Store Interface (Carriage Phase)*, current edition

MIL-STD-38784, *Standard Practice for Manuals, Technical: General Style and Format Requirements*, current edition

TO 00-5-3, *AF Technical Order Life Cycle Management*, 15 July 2013

Prescribed Forms

AF Form 4694, *Store Technical and Mass Properties (STAMP) Sheet*

Adopted Form

AF Form 847, *Recommendation for Change of Publication*

Abbreviations and Acronyms

ACC—Air Combat Command

ADS-B—Automatic Dependent Surveillance Broadcast

AF—(US) Air Force

AFGM—Air Force Guidance Memorandum

AFI—Air Force Instruction

AFLCMC—Air Force Life Cycle Management Center

AFMAN—Air Force Manual

AFMC—Air Force Materiel Command

AFNWC—Air Force Nuclear Weapons Center

AFOTEC—Air Force Operational Test and Evaluation Center

AFPAM—Air Force Pamphlet

AFPD—Air Force Policy Directive

AFSAC—Air Force Security Assistance and Cooperative Directorate

AFSEC—Air Force Safety Center

AFSEO—Air Force SEEK EAGLE Office

AFRC—Air Force Reserve Command

AIMP—Aircraft Information Management Plan

AMC—Air Mobility Command

AT—Anti-Tamper

AT&L—Acquisition, Technology and Logistics

AWB—Airworthiness Bulletin

BRNAV—Basic Area Navigation

CAF—Combat Air Force

CBM+—Condition Based Maintenance Plus

CC—Commander

CDA—Commercial Derivative Aircraft

CDAR—Classified Data at Rest

CDCs—Capability Development Documents

CDD—Capability Development Document

CDP—Certification Data Package

CE—Chief Engineer

CI—Counterintelligence

CJCSI—Chairman of the Joint Chiefs of Staff Instruction

CM—Configuration Management

CNS/ATM—Communication, Navigation, Surveillance/Air Traffic Management

COE—Center of Excellence

CONOPS—Concept of Operations

CR—Compliance Report

CSAF—Chief of Staff of the Air Force

CSB—Crew Systems Bulletin

CSFDRs—Crash survivable flight data recorders

CSWG—Crew Station Working Group

CV—Vice Commander

CVR—Cockpit voice recorder

DAF—Department of the Air Force

DCS—Direct Commercial Sales

DMSMS—Diminishing Manufacturing Sources/Material Shortages

DO—Document

DoD (or DD)—Department of Defense

DoDD—Department of Defense Directive

DoDI—Department of Defense Instruction

DT&E—Developmental Test and Evaluation

EMD—Engineering and Manufacturing Development

EO—Executive Order

EUROCAE—European Organization for Civil Aviation Equipment

FAA—Federal Aviation Administration

FAR—Federal Acquisition Regulation

FDR—Flight data recorder

FMS—Foreign Military Sales

FOUO—For Official Use Only

FY—Fiscal Year

HAF—Headquarters Air Force

HQ—Headquarters

HSI—Human Systems Integration

IAW—In Accordance With

IC—Intelligence Community

ICD—Initial Capabilities Document

ID/IQ—Indefinite Delivery/Indefinite Quantity

ILS—Instrument Landing System

GPS—Global Position System

HUD—Heads-up-display

JEON—Joint Emergent Operations Need

JUON—Joint Urgent Operational Need

iGATM—internet Global Air Traffic Management

IPT—Integrated Product Team

IS—Information System

IT—Information Technology

JAA—Joint Aviation Authority

LOA—Data Chain of Acceptance

LRUs—Line Replaceable Units

MDA—Milestone Decision Authority

MESL—Minimum Essential Subsystem List

mFOQA—military Flight Operations Quality Assurance

MAJCOM—Major Command

MDA—Milestone Decision Authorities

MFD—Multi-function display

MIL-HDBK—Military Handbook

MIL-PRF—Military Performance (Specification)

MIWG—Maintainer Interface Working Group

MIL-STD—Military Standard

MLS—Microwave Landing System

MOA—Memorandum of Agreement

MUFM—Munitions User Functional Manager

NASA—National Aeronautics and Space Administration

NavDB—Navigational Database Conversion

NGA—National Geospatial Intelligence Agency

NextGen—Next Generation Air Transportation System

NTSB—National Transportation Safety Board

OPR—Office of Primary Responsibility

PA—Performance Assessment

PAR—Performance Assessment Report

PEO—Program Executive Officer

PM—Program Manager

POC—Point of Contact

POM—Program Objectives Memorandum

R&M—Reliability and Maintainability

RDS—Records Disposition Schedule

RDT&E—Research, Development, Test, and Evaluation

RNAV—Required Area Navigation

RNP—Required Navigation Performance

ROM—Rough Order of Magnitude

RTCA—Radio Technical Commission for Aeronautics

RVSM—Reduced Vertical Separation Minimum

QRC—Quick Reaction Capability

SAF—Secretary of the Air Force

SE—SEEK EAGLE

SEPS—SEEK EAGLE Planning Summit

SER—SEEK EAGLE Request

SES—Senior Executive Service

SEWG—SEEK EAGLE Working Group

SME—Subject Matter Expert

SRDs—Systems Requirements Document

STAMP—Store Technical and Mass Properties

TAA—Technical Airworthiness Authority

T&E—Test and Evaluation

TEMP—Test and Evaluation Master Plan

TERPS—Terminal Instrument Procedures

TO—Technical Order

TPM—Tailored Performance Matrix

TSOs—Technical Standard Orders

UAS—Unmanned aircraft system

UON—Urgent Operational Need

US—United States

USAF—United States Air Force

U.S.C.—United States Code

VMS—Vibration Monitoring System

WG—50—EUROCAE Working Group-50

Note:—Refer to AFPAM 63-128 for a list of Acquisition Terms with Definitions

Terms

Acceptability—Aircraft store configuration that satisfy safety criteria and pertinent operational criteria. The ability to operate an aircraft-store system and effectively satisfy mission requirements.

Aircraft Program Manager—The single face to the customer for a system or product group. The Program Manager directs one or more programs and is accountable for cost, schedule, and performance to the Program Executive Officer. The Program Manager is vested with full authority, responsibility, and resources to execute a program on behalf of the Air Force. The aircraft program office is the certification authority for aircraft store compatibility efforts.

Aircraft-Stores Compatibility—The ability of an aircraft, stores, stores management systems, and related suspension equipment to coexist without unacceptable effects of one of the aerodynamic, structural, electrical, or functional characteristics of the others under all flight and ground conditions expected to be experienced by the aircraft-store combination. A particular store may be compatible with an aircraft in a specific configuration, although not necessarily so with all pylons (or stations) under all conditions. MIL-HDBK-244A, *Guide to Aircraft/Stores Compatibility*, contains basic guidelines for evaluating aircraft-store compatibility and specifies an acceptable separation must meet pertinent weapon operational criteria, and outlines DOD standardized procedures for the certification (safe carriage and safe/acceptable separation) of stores on aircraft.

Ballistics Accuracy Verification—The determination of the accuracy of the weapon digital data program used with the trajectory model contained in the aircraft Operational Flight Program and the ballistics tables/weapons delivery technical order, through testing and analysis. Verification confirms the capability of the aircraft and store combination to meet user accuracy and bias requirements. The aircraft weapons delivery Operational Flight Program and updated Technical Order ballistics are fielded after verification testing. Additionally, a ballistics accuracy verification report compares weapon delivery results with user accuracy criteria.

Certification Data Package—A Store Certification Data is the primary data package used to ensure stores are physically, mechanically, electromagnetically, environmentally, structurally, and aerodynamically compatible with Air Force aircraft systems. It also ensures that the required data is present to produce the necessary Technical Orders. The Store Certification Data is composed of the Engineering Data Package, Weapon Source Data Package, and Standard Source Data Package in Attachment 9.

Compatibility Agency—An organization (Program Office, Contractor, other DoD service, etc.), other than AFSEO, which is designated the aircraft-store compatibility lead and provides engineering support to the aircraft or store program office.

Compatibility of Aircraft and Stores—The ability of an aircraft to carry and release the store and related suspension equipment without unacceptable effects upon the aerodynamic, electromagnetic (excluding high-altitude electromagnetic pulse), structural, or functional characteristics of either the aircraft or store under expected flight and ground conditions. MIL-HDBK-244, *Guide to Aircraft Stores Compatibility*, contains basic guidelines for evaluating aircraft-store compatibility and specifies an acceptable separation to meet pertinent weapon operational criteria and outlines DoD standardized procedures for the certification (safe carriage and safe acceptable separation) of stores on aircraft.

Customer Commitment Date—The date the AFSEO estimates the project deliverable will be provided to the aircraft or store program office.

Decertification—A store no longer in use by the United States Air Force.

Factor—A value used in computing requirements and assessments. Factors are developed for peace (readiness), and for war (surge and sustained).

Item Manager—For purposes of this document, the terms store Item Manager and store Program Manager are the same. See Store Program Manager.

Immediate Warfighter Need—Immediate Warfighter Need - A subset of Joint Urgent Operational Needs identified by the Joint Rapid Acquisition Cell and has a materiel or logistics solution that must be resolved within 120 days or less.

Joint Emergent Operations Need (JEON)—A Joint Emergent Operations Need that is identified by a Combatant Command as inherently joint and impacting an anticipated or pending contingency operation.

Joint Urgent Operational Need (JUON)—A Joint Urgent Operational Need identifies and subsequently gains Joint Staff validation and resourcing of a solution desired within days or weeks, to meet a specific high-priority need

Limited certification—Provided at the request of the using command to have a capability in the field while a routine certification and ballistics accuracy verification tasks are being accomplished. May consist of a limited employment envelope (not flight-tested), unverified Operational Flight Program, or manual ballistics only. Publication of technical data is required. For example, message flight clearance, operational supplements, and preliminary Technical Orders.

Mission Critical—A higher priority project such as an Urgent Operational Need and a Joint Emergent Operational Need, which are high valued interest projects designated by SECAF, (i.e. Nuclear Systems).

Mission Design Series—Standard nomenclature used to identify aircraft and missiles.

Nuclear Certification—Occurs when a determination is made by the applicable Service that procedures, personnel, equipment, facilities, and organizations are capable of performing assigned nuclear weapon functions and missions. The Air Force Nuclear Certification Program has two major components: Design Certification and Operational Certification. Refer to AFI 63-125 for details.

Project Plan—The Project Plan is an agreement between the AFSEO, the Program Office, SAF/AQP, and Lead Commands regarding the projects' priority requirements, schedule, and costs. The Project Plan includes cost-schedule-performance trade-off options and impacts on other SEEK EAGLE efforts, if applicable. Project Plans are not required for projects that have an estimated cost less than $25K.

Reliability Centered Maintenance—An analytical process to determine the appropriate failure management strategies, including preventive maintenance requirements and other actions needed to ensure safe operations while balancing readiness and costs.

Risk Assessment—An evaluation of the risk associated with a given test event, a test series, or the intent to field an aircraft-store compatibility capability (by another organization). The evaluation is based on the available engineering justification, identified deficiencies in the supporting justification, and established legacy or associated precedent.

Routine certification—Requires the completion of all activities required to certify the aircraft-store configurations requested in the SEEK EAGLE request. These activities include planning; analysis; tests; documentation; development; publication and fielding of pertinent technical manuals applicable to loading, carriage, and employment, which include the verified ballistics data in the -34 and -25 Technical Orders; and the incorporation of the appropriate software changes, resulting from ballistics accuracy verification of the Operational Flight Program.

Stores—Any device intended for internal or external carriage, mounted at aircraft suspension point locations, which may or may not intend to be separated in flight from the aircraft. Stores include missiles, rockets, bombs, nuclear weapons, mines, fuel and spray tanks, torpedoes, detachable fuel and spray tanks, dispensers, pods, targets, chaff and flares, decoys, other expendables, and suspension equipment. In this pamphlet, guns mounted internally to the structure of an aircraft are not considered stores for SEEK EAGLE purposes, but chaff, flare, and towed decoy magazines are considered aircraft suspension and release equipment whether mounted internally or externally. A SEEK EAGLE store for annual stores forecasting purposes is any store as described above that is used for dedicated SEEK EAGLE testing. (Refer to MIL-STD-8591)

Store Program Manager—The single face to the customer for a store program. The Program Manager directs one or more programs and is accountable for cost, schedule, and performance to the Program Executive Officer. The Program Manager is vested with full authority, responsibility, and resources to execute a program on behalf of the Air Force. For purposes of this document, the terms Store Item Manager and Store Program Manager are the same.

Suspension Equipment—Any device, such as pylons, racks**,** adaptors, launchers, and countermeasure dispensers used to carry and/or release other stores. Suspension equipment is considered a store unless it is part of the aircraft.

Technical Data—Technical Data required to perform engineering analysis in support of aircraft-store compatibility efforts. The compatibility agency provides the program office with technical data required to complete the SEEK EAGLE Request.

Threshold Weapon—Threshold weapons are defined in an aircraft's respective Acquisition Program Baseline or validated capabilities documents, and are typically inventory weapons that new aircraft will integrate onto the aircraft.

Urgent Operational Need (UON)—Capability requirements identified by a DoD Component as affecting an ongoing or anticipated contingency operation.

User Need Date—The date Lead Command or SAF/IA, or other organizational customer, requires all SEEK EAGLE Certification activities to be completed, to include the delivery of all Technical Orders to support implementation, together with Operational Flight Program ballistics updates. The user need date is normally six months before Initial Operational Capability for developmental or major modified aircraft and stores to permit lead-time for training and evaluation before implementation. For inventory stores and aircraft, the user need date is a balance between operational and threat requirement and the practical capability to meet that requirement.

Attachment 2

AIRCRAFT INFORMATION MANAGEMENT PLAN TEMPLATE

A2.1. The Aircraft Information Management Plan.

A2.1.1. The aircraft information management plan includes a cover page outlined in Figure A2.1.

Note: For a template of the Aircraft Information Management Plan discussed in paragraph A2.2. See Figure A2.2 for a suggested outline.

Figure A2.1. Aircraft Information Management Plan Cover Page Template.

Aircraft Information Management Plan

For

< Subject Aircraft System >

< Version/Revision number >
< Date >

-- *Insert Page Break* --

< COORDINATION PAGE >
[**NOTE**: AIMP will be coordinated by Recorded Aircraft Information IPT members and then endorsed by the Program/System Program Manager.]

-- *Insert Page Break* --

A2.2. Introduction.

Suggested language for the introduction is as follows:

A2.2.1. The purpose of this Aircraft Information Management Plan (AIMP) is to document Recorded Aircraft Information requirements by identifying the information produced by and the customer needs of the <subject aircraft system>. All forms of information (i.e., acoustic, imagery, data link and parametric, regardless of recording media or transmission method) have been considered in arriving at an integrated solution to program information needs.

A2.2.2. This AIMP was developed by the <subject aircraft> Recorded Aircraft Information Integrated Product Team (IPT) to address the information requirements for the platform; the current information recording system capability, processes and infrastructure; shortfalls between available and needed data; compliance/non-compliance with Recorded Aircraft Information requirements; most cost effective means to address shortfalls; analysis of alternatives and/or cost-benefit analyses for options considered; and recommended actions for future efforts.

Figure A2.2. Aircraft Information Management Plan Main Body Template

1. SYSTEM DESCRIPTION: < Include general information such as the following: >
1.1. Differences between blocks of aircraft.
1.2. Recording systems currently available and/or projected.
1.3. What parameters are currently recorded and/or projected to be recorded, and to what fidelity?
1.4. Life cycle information (remaining service life, replacement plans, attrition, etc.).
2. INFORMATION CONCEPT OF OPERATIONS: < Address issues such as the following:
2.1. Who are the customers for currently recorded information?
2.2. Who are the prospective customers for the information that can or is projected to be recorded?
2.3. What are the investigative, safety, logistical, operational, maintenance and training information needs associated with the aircraft?
2.4. What are the procedures for gathering the information?
2.5. What are the procedures to upload/download/transmit the recorded data and what are the data interface requirements?
2.6. What are the processes/procedures for using the information?
2.7. How periodic verification of system functionality is accomplished as required by AFPAM 63-129, Chapter 3. (Include appropriate inspection interval(s) for validating the quality and functionality of all Recorded Aircraft Information components).
2.8. If data link messaging is a platform capability, to what extent will the data link communications be recorded either onboard or at the receiving ground station?
3. TECHNICAL SOLUTION: < Address issues such as the following: >
[**NOTE**: This section is normally the largest section of the AIMP.]
3.1. Baseline Recorded Aircraft Information compliance with the requirements in Attachment 4 of AFPAM 63-129 (i.e., where are we now? Is a Recorded Aircraft Information waiver currently required/in place?).
3.2. Projected Recorded Aircraft Information compliance (i.e., where do we plan to be based on programmed upgrades or modifications?).
3.3. New/upgraded recorder systems required to achieve Recorded Aircraft Information compliance (include Rough Order of Magnitude (ROM) cost estimates).
3.4. Specific information about block differences, as required.
3.5. Aircraft update/upgrade schedules, block update plans, etc.
3.6. Certification requirements for existing, programmed, and required information recording equipment (include FAA and/or USAF military specific requirements).
3.7. Most cost effective means to record, retrieve, secure, and disseminate required aircraft information (include cost-benefit analysis and/or analysis of alternatives results for considered options to achieve the required information recording capability).
3.8. Recommended solutions to best meet information recording requirements (include applicable funding requirements and technical implementation timelines).
4. MANAGEMENT:
4.1. Funding plan and implementation schedules for programmed upgrades or modifications identified in paragraph 3.2 above.
4.2. Plan for implementing recommended solutions identified in paragraph 3.8 above.
4.3. Status of Recorded Aircraft Information waiver requests (if required).

5.SECURITY: < Address issues such as the following: >

[**NOTE**: Validation by the proper security personnel and by Air Force Safety Center is needed.]

5.1. Are there security concerns with any information recorded? (For classified data concerns, reference applicable Security Classification Guide citation).

5.2. How are these concerns addressed? (i.e., clearing/erasing/sanitizing data, encryption, physical security, etc.).

5.3. What parameters will be inhibited to address wartime and peacetime security concerns? (If parameter inhibition is used to address security concerns for certain missions, procedures will be established to properly mark, handle, sanitize and/or erase data recorders that inadvertently record classified information.)

5.4. Are devices employed to enable the recovery of the crew and information recorders in the event of a mishap (such as Emergency Locator Transmitters or Underwater Locator Beacons) inhibited to address combat operational concerns?

5.5. Has the system, including the information to be recorded, received the proper Air Force IT Assessment and Accreditation?

6. REPORTING:

6.1. Documenting Recorded Aircraft Information IPT Decisions (i.e., how are Recorded Aircraft Information issues and design decisions documented as prescribed in AFPAM 63-129, paragraph 3.6.2.). For example, exceptions to international standards such as EUROCAE ED-112, etc.

6.2. Recorded Aircraft Information IPT Meeting Records (i.e., minutes to Recorded Aircraft Information meetings).

6.3. Recorded Aircraft Information Deficiency/Improvement Reporting (i.e., how will Recorded Aircraft Information IPT recommendations and lessons learned be documented?).

7. AIR FORCE SAFETY CENTER: < Address how necessary hardware, software, documentation and training are provided for the Mishap Analysis & Animation Facility. >

[**NOTE:** IAW AFMAN 91-223, *Aviation Safety Investigation and Reports*, the Air Force Safety Center Mishap Analysis & Animation Facility is the central Air Force agency for recovery, transcription, analysis, simulation, and animation of all data in support of Air Force Safety Investigations.]

8. APPENDICES:

8.1. Recorded Aircraft Information IPT Charter, if used.

8.2. Recorded Aircraft Information IPT Membership (include organizational symbols and phone numbers. In order to avoid document obsolescence when personnel changes occur, no names are required.) [**NOTE**: Membership list may be included in Recorded Aircraft Information IPT Charter.]

8.3. Flight Data Recorder Parameter List (parameter name, source(s), recording frequency, resolution, range, etc.)

8.4. List of Applicable Documents

8.4.1. AFI 63-101/20-101, Integrated Life Cycle Management, 9 May 2017

8.4.2. AFPAM 63-129, Air System Development and Sustainment Engineering Processes and Procedures, to be published in 2020

8.4.3. AFMAN 91-223, Aviation Safety Investigations and Reports, 14 September 2018

8.4.4. Others as required.

Attachment 3

RECORDED AIRCRAFT INFORMATION WAIVER REQUEST TEMPLATE

Figure A3.1. Recorded Aircraft Information Waiver Request Template.

MEMORANDUM FOR: MAJCOM A3/A4/A5
MAJCOM Legal Office
AF/SE
AF/A3
AF/A5
AF/A8
SAF/AQ
SAF/GCQ
AF/CV
In Turn

FROM: MAJCOM/SE

SUBJECT: Waiver to AFI 63-101/20-101 Recorded Aircraft Information Requirements

AFI 63-101/20-101 directs each Air Force weapon system that requires AF airworthiness approval to evaluate and integrate aircraft information requirements. Integrating these data requirements requires a systematic assessment of the aircraft's information needs to ensure the capture of critical information and the optimization of benefit while minimizing cost. Recording of crash survivable parametric and acoustic information to support mishap investigation is the minimum required Recorded Aircraft Information capability defined in AFI 63-101/20-101. Waiver to these requirements has been endorsed by MAJCOM/A3/A4/A5 and coordinated with AF/SE before submittal to <Lead Command>/CC for consideration and disposition.

The <subject aircraft> Recorded Aircraft Information Integrated Product Team (IPT) has determined the <subject aircraft> is unable to meet the full requirements of AFI 63-101/20-101 at this time. This waiver request summarizes the technological, cost, and timeline issues detailed in the <subject aircraft> Recorded Aircraft Information IPT documentation (e.g., an Aircraft Information Management Plan (AIMP) at Attachment 2 in this AFPAM).

Requirement Baseline.

Address what requirements have not been met. Is it a recording capability (i.e., Crash Survivable Flight Data Recorder, Cockpit Voice Recorder), a locator device, data verification process, or is it a required mishap information parameter from AFPAM 63-129, Attachment 4. Is a parameter not recorded at all or is it not recorded to the fidelity required?

Consider providing a spreadsheet as an attachment that lists the requirements and parameters, which are not satisfied, various solutions considered, proposed resolution and justification for the proposed solutions (see example Attachment A3.1, Recorded Aircraft Information Parameters for Waiver Spreadsheet).

Cost Estimates to Meet Requirements.

Summarize costs to implement various solutions, referencing Recorded Aircraft Information IPT documentation for details.
Analysis.
Provide a summary of the cost-benefit analysis and implementation timeline for the various solutions considered, referencing the Recorded Aircraft Information IPT documentation for details. Keep in mind that some of the solutions considered may not meet all the Recorded Aircraft Information requirements, which is where the cost-benefit analysis comes in. The goal is to get "the most bang for the buck."
Recommendation.
State the recommended solution, rationale, and outline the funding plan and implementation schedule (if applicable). Provide sufficient justification if the recommendation is to make no modifications. **Note**: a waiver can be either temporary or permanent (or a combination of the two). A temporary waiver is based on an execution plan for a programmed or proposed modifications/upgrade that addresses non-compliance requirements. A permanent waiver is justified with the reason(s) expending funds cannot efficiently meet non-compliant requirements. Approval of a permanent waiver does not indicate the requirement will not be reconsidered as future modifications are proposed or technology changes, it merely indicates that a further waiver is not required.
Request a temporary waiver to the <specific> Recorded Aircraft Information requirements of AFI 63-101/20-101 and processes detailed in AFPAM 63-129 until the <recommended solutions> plan is executed, as outlined above.
--*AND/OR*—Request a permanent waiver to the <specific> Recorded Aircraft Information requirements of AFI 63-101/20-101 and processes in AFPAM 63-129 due to the <reason> as outlined above.

MAJCOM SE SIGNATURE BLOCK

Table
A3.1 Recorded Aircraft Information Parameters Waiver Spreadsheet

Table A3.1. Recorded Aircraft Information Parameters Waiver Spreadsheet.

List of requirements not met/parameters not captured or not captured to the required fidelity	**Why the requirement is not met**	**Possible solutions considered**	**Proposed resolution and justification**
Example Spreadsheet of Aircraft Parameters for Waiver:			
Aircraft does not have a crash survivable recorder to collect data for mishap investigation.	The aircraft has been in the AF inventory since 1954 and crash survivable flight data recorders (CSFDRs) were not a requirement when the aircraft was fielded.	1. Install CSFDR and sensors necessary for data collection (has weight and cost implications as identified in AIMP). 2. Install lipstick cameras to record flight instruments, and a data collection package, that includes an ability to digitize the video, store the data in a crash-survivable format, and later analyze the data (has RDT&E and acquisition costs and timeline implications as identified in AIMP). 3. Request waiver to data recorder requirement due to cost and technical difficulty of installing a crash-survivable data collection capability (cost estimates and technical analysis provided in AIMP).	Request a waiver to the data recorder requirement (see cost-benefit analysis justification in AIMP). Current AF Service Life plan for this platform is to retire within 8 years. Though a promising technological solution, the additional time needed to validate the technical feasibility of digitalizing flight parameters recorded on video means this option is not available until 2 years prior to the planned platform retirement date.

List of requirements not met/parameters not captured or not captured to the required fidelity	Why the requirement is not met	Possible solutions considered	Proposed resolution and justification
Aircraft does not have a cockpit voice recorder to collect acoustic data for mishap investigation.	The aircraft flight data recorder (FDR) was installed in 1982 and voice recording was not a requirement at that time.	1. Incorporate voice capability in a replacement FDR since the current recorder is facing obsolescence issues (has weight and cost implications as identified in AIMP). 2. Request waiver to voice recorder requirement (cost estimates and technical analysis provided in AIMP).	Add voice-recording capability with planned replacement FDR scheduled for procurement beginning in FY12 (see implementation timeline in AIMP).
The installed cockpit voice recorder only has the capacity to record 30-minutes of data.	The Air Force purchased an FAA certified cockpit voice recorder (CVR) and the FAA requirement for a CVR on this aircraft is only 30-minutes recording time.	1. Replace the CVR with an updated model capable of meeting the 2-hour record time (has cost implications as identified in AIMP). 2. Request waiver to CVR time recording requirement (technical analysis provided in AIMP).	Request waiver to 2-hour CVR recording requirement (see cost-benefit analysis justification in AIMP). Due to age of fleet and minimal previous mishap history, replacing the CVR is not cost-effective.
Parameter 1.3.3 in Table A4.1, UTC.	Sampled every 4 seconds vs. requirement for every 1 second.	1. Modify sample rate during next recorder software update (has cost implications as identified in AIMP). 2. Request waiver to sample rate requirement due to planned retirement of system within next 5 years (see technical analysis and cost estimates in AIMP).	Request a waiver sample rate requirement due to planned retirement of system within next 5 years (see justification in AIMP).

List of requirements not met/parameters not captured or not captured to the required fidelity	Why the requirement is not met	Possible solutions considered	Proposed resolution and justification
Parameter 4.1.2.2 in Table A4.1, Pitch Trim Control Input Position	Requires installation of sensors and wiring	1. Install sensors and wiring necessary for data collection and update FDR to record data (has weight and cost implications as identified in AIMP). 2. Request waiver to requirement (cost estimates and technical analysis provided in AIMP).	Install sensors and wiring as part of planned Flight Control System upgrade scheduled to begin in FY15 and update FDR as part of regularly scheduled software block updates (see implementation timeline in AIMP).
Primary Control Surface Configuration related parameters (4.1.1, 4.1.2, 4.1.3, 4.1.4, 4.1.5, and 4.1.6 in Table A4.1)	Sensors are not installed to measure these control surface positions nor wiring to transmit the signals to the flight data recorder (FDR).	1. Install sensors and wiring necessary for data collection and update FDR to record data (has weight and cost implications as identified in AIMP). 2. Request waiver to requirement (cost estimates and technical analysis provided in AIMP).	Request a waiver due to the cost and technical difficulty of installing these sensors and associated wiring (see cost-benefit analysis justification in AIMP).
Sufficient parameters to determine the thrust of each engine (6.2.2.1 in Table A4.1)	The current aircraft bus structure does not make engine parameters available to the crash survivable flight data recorder (CSFDR). Engine parameters are available on a non crash-hardened stand-alone recorder.	1. Rewire the aircraft to direct the data from the current engine recorder to the CSFDR (has weight and cost implications as identified in AIMP). 2. Include recording of the engine parameters on the CSFDR in the engine	Include recording of the engine parameters as a requirement in the planned engine replacement modification. The engine replacement program includes major re-wiring of the aircraft and including the engine parameters can be incorporated in this effort (see technical analysis, cost

List of requirements not met/parameters not captured or not captured to the required fidelity	Why the requirement is not met	Possible solutions considered	Proposed resolution and justification
		replacement program scheduled for 2021 (cost estimates and technical analysis provided in AIMP). 3. Request waiver to requirement (cost estimates and technical analysis provided in AIMP).	estimates, modification POM information, and modification timeline in AIMP).
Aircraft does not have an Emergency Locator Transmitter or Underwater Locator Beacon to assist in the recovery of the crew and information recording devices (AFI 63-101/20-101, para 5.4.).	Emergency Locator devices were not a requirement at the time the aircraft was acquired.	1. Install Emergency Locator Transmitter or Underwater Locator Beacon (has cost and weight implications as identified in AIMP). 2. Request waiver to requirement due to cost and technical difficulty of installing these devices (cost estimates and technical analysis provided in AIMP).	Installation of an Emergency Locator Transmitter is included as part of the planned FDR upgrade scheduled to begin in 2014 (see technical analysis, cost estimates, and implementation timeline in AIMP).

Attachment 4

RECOMMENDED REQUIREMENTS FOR AIRCRAFT CRASH SURVIVABLE PARAMETRIC AND ACOUSTIC DATA

A4.1. Purpose. As cited in AFI 63-101/20-101, paragraph A4.2 of this Attachment provides the minimum mandatory attributes of crash survivable flight data recorders for AF aircraft. **NOTE:** Attachment 4 is being converted to a Military Standard.

A4.2. Minimum Crash Survivable Data Recording Requirements.

A4.2.1. All Air Force air systems (manned aircraft or UAS classified as Group 3 or higher in accordance with DoD 6055.07) employ information recording systems consisting of those components deemed necessary in consideration of mishap investigation needs. In addition, IAW AFI 63-101/20-101 aircraft Program Managers (PMs) integrate and optimize data recording capabilities that support mishap investigation with other data capabilities that support the operational usage, maintenance, and system integrity concept of the weapon system.

A4.2.2. A crash survivable information recording capability sufficient to facilitate mishap investigations, to include parametric and acoustic data recording equipment are installed on all applicable Air Force aircraft, as required by AFI 63-101/20-101. Non-crash survivable data provided through telemetry methods and recorded at a ground station may substitute for on-board recording capability.

A4.2.2.1. The crash survivable information recording capability will meet the mishap parameter requirements defined in Table A.4.1 and Table A.4.2 of this Attachment, as applicable.

A4.2.2.1.1. Crash survivable FDRs record a minimum of 25 hours (guidance from FAR 121.343).

A4.2.2.1.2. Crash survivable FDRs operate continuously from the time power is applied to the recorder during preflight or ground operations, until the recorder is shut down during the post-flight checklist or at the conclusion of ground operations.

A4.2.2.1.3. Crash survivable cockpit voice recorders (CVRs) record a minimum of two hours (guidance from FAR 121.359).

A4.2.2.1.4. CVRs record all aircrew voice communications, all communications between the aircraft and ground stations, and ambient cockpit/flight deck noises.

A4.2.2.1.5. CVRs operate continuously from the time power is applied to the recorder during preflight or the initiation of ground operations, until the recorder is shut down during the post-flight checklist or the conclusion of ground operations.

A4.2.2.1.6. All crash survivable recorders meet crashworthiness requirements for impact shock, penetration resistance, static crush, thermal shock (high and low temperature fire), deep sea pressure and sea water immersion, fluid immersion, beacon

operation and deployment in accordance with recognized industry standards such as the latest revision of EUROCAE ED-112, FAA TSO-C123c, and FAA TSO-C124c.

A4.2.2.1.7. In accordance with AFMAN 91-223, *Aviation Safety Investigations and Reports*, the Air Force Safety Center Mishap Analysis & Animation Facility has the necessary equipment, procedures and training to enable recovery, transcription and analysis of crash survivable data recorded for mishap investigations.

A4.2.2.2. All applicable Air Force aircraft employ devices to enable the recovery of the crew and information recording devices in the event of a mishap. Examples of such devices include Emergency Locator Transmitters, Underwater Locator Beacons and Crash Position Indicators. Consideration may be given to inhibit these devices to address combat operational concerns.

A4.2.2.3. For aircraft equipped with crash survivable recorders for mishap investigation, the information recording equipment are included on the aircraft's MESL. If a mission essential data recorder is non-operational, a one-time waiver for situations other than training (such as ferry to next repair point, weather evacuation, and urgent strategic nuclear missile security missions) may be granted in accordance with the applicable aircraft specific AFI 11-2, Volume 3. Provide notification of approved one-time waivers by electronic mail to the Air Force Safety Center at **AFSEC.SEFE@us.af.mil**. Actual combat/contingency employment and aircraft generated to a real-world alert status are the only exceptions to the one-time waiver requirement.

A4.2.2.3.1. Crash survivable data recorders will not be disabled, except to address mission security concerns.

A4.2.2.3.2. Periodic downloads of the crash survivable memory units are performed to verify the functionality and quality of the mishap data recording process, as well as the functionality of associated support equipment.

A4.3. Use of Mishap Parameter Tables. When conducting the systematic assessment of information needs, the parameters listed in Tables A4.1 and A4.2 of this Pamphlet are used to determine what information is required to be recorded on an aircraft, IAW AFI 63-101/20-101. The Tables were specifically crafted for military aircraft from participation in international working groups, recommendations of the NTSB and lessons learned from military safety investigation boards.

A4.3.1. The parameters identified in Table A4.1 are recorded for all existing and new acquisition aircraft (both fixed and rotary wing, as applicable) or a waiver IAW AFI 63-101/20-101 is required. The parameters identified in Table A4.2 are also recorded for new acquisition aircraft and for existing aircraft when a sensor for the information is installed and the data is available via a system bus on the aircraft; otherwise, recording of parameters is also desired but does not require a waiver.

A4.3.2. The number in the Mishap Parameter Count column indicates the running total of recommended parameters to be recorded for each table. A number with a letter suffix (e.g., 3a, 3b, and 3c) indicates that any of the parameters with the letter suffix can be recorded to satisfy the overarching (i.e., 3) required parameter. Although only one of the suffixed number parameters is required to be recorded to meet the requirement, whenever possible it is preferred that all the suffixed number parameters be recorded to enable sub-system closed loop failure analysis.

A4.3.3. A "√" in the mFOQA column indicates mishap-related parameters that also support an aircraft's mFOQA program. It may be possible to integrate the recording and retrieval of these mishap data elements with other aircraft data requirements. PMs will evaluate those integration opportunities, without degrading the minimum crash survivable data recording and retrieval capability.

A4.3.4. The Range column indicates the set of values for specific sensor operation. The Interval column indicates the time in seconds between samples of a particular parameter. The Accuracy column indicates the maximum difference between the true value at sensor input and the recorded measured value of a parameter. Finally, the Resolution column indicates the smallest increment of a particular parameter that can be detected or reported.

Table A4.1. —Required Parameters for Existing and New Acquisition Aircraft.

Parameter Name	Required Mishap Parameter Count	mFOQA	Range	Interval (secs/sample)	Accuracy	Resolution	Remarks
1.0 Recorder, System or Mission Parameters							
1.1 CVR/Digital Flight Data Recorder Synchronization Reference	1						Enables synchronizing FDR and CVR data during analysis after a mishap. For example: (1) Record UTC on both the FDR and the CVR, or (2) Record a discrete parameter(s) on the FDR to indicate when any microphone is keyed—this parameter would then be aligned by the analyst with radio calls recorded on the CVR.
1.2 Microphone/ Transmitter Keying	2		Discrete(s)	0.5 (1 for Rotary-			Preferably each crew member but one

				Wing Aircraft)			discrete acceptable for all transmissions provided the CVR/FDR system complies with 1.1 of this Table.
1.3 Data Time Tag Reference (can be met by one of the following):	3						
1.3.1 Universal Time Constant	3a	√	24 hours	1	±0.125% per hour	0.5 second	Preferred.
1.3.2 Relative Time Count	3b		0 to 4095	1	±0.125% per hour	1 second	Counter increments each 4 seconds of system operation.
1.3.3 Recorder Elapsed Time	3c			1			
1.4 Event Marker	4		Discrete	1			Cockpit switch initiated by crew to provide an FDR data time marker at a significant event.
1.5 Date	5	√	366 days	Power on		1 day	UTC time preferred where available.
1.6 CVR/FDR Recording Status	6		Discrete	1			For aircraft with the capability to mute the CVR or stop the recording by the FDR, record time and current status when CVR is muted or un-muted, and when the FDR recording is stopped and started.
2.0 Aircraft Dynamics							

2.1 Velocity							
2.1.1 Indicated Airspeed	7	√	Minimum value from installed pitot static system to 1.2 V_{NE}.	1	±5%	0.5 kt (1 kt for Rotary-Wing Aircraft)	Will be obtained from the air data computer where installed.
2.1.2 Yaw Rate	8	√	±400°/Sec	0.25	±1%	2°/Sec	For Rotary-Wing aircraft only. Yaw Acceleration (2.2.1.3 in Table A.4.2.) is an acceptable alternative.
2.2 Attitude							
2.2.1 Pitch Attitude	9	√	±90 degrees	0.25 (0.5 for Rotary-Wing Aircraft)	±2 degrees	0.5 degree	Accuracy applies within ±75° range. Highly maneuverable (i.e. fighter-type) aircraft will record this parameter more frequently.
2.2.2 Roll Attitude	10	√	±180 degrees	0.5	±2 degrees	0.5 degree	Highly maneuverable (i.e. fighter-type) aircraft will record this parameter more frequently.
2.3 Accelerations							
2.3.1 Linear Accelerations							
2.3.1.1 Vertical/Normal Acceleration	11	√	±12g	0.125	±0.09g excluding a	0.004g	Highly maneuverable (i.e. fighter-type)

			(-3g to +9g for Rotary-Wing aircraft)		datum error of ±0.45g		aircraft will record this parameter more frequently.
2.3.1.2 Lateral Acceleration	12	√	±2g (±1g for Rotary-Wing aircraft)	0.25	±0.015g excluding datum error of ±0.05g	0.004g	
2.3.1.3 Longitudinal Acceleration	13	√	±3g (±1g for Rotary-Wing aircraft)	0.25	±0.015g excluding datum error of ±0.05g	0.004g	
2.4 Angle of Attack (α), Left & Right if available	14		As installed	0.5	As installed	0.3% of full range	For Fixed-Wing Aircraft only. If left and right sensors are available, each may be recorded at 1 second intervals so as to give interleaved data points each half second. Highly maneuverable (i.e. fighter-type) aircraft will record this parameter more frequently.
2.5 Main Rotor Speed	15	√	50 to 130%	0.5	2%	0.3% of full range	For Rotary-Wing Aircraft only.
3.0 Aircraft Environment							
3.1 Altitude							

3.1.1 Pressure Altitude	16	√	-1000 to maximum altitude of aircraft +5000 ft	1	±100 ft to ±700 ft (see ED-112, Table II-A.3)	5 ft	Will be obtained from the air data computer where installed.
3.2 Geodetic Position (Latitude/Longitude)	17	√	As installed	1	Data will be obtained from the most accurate system as installed	0.00002 degree	Latitude/longitude will be recorded to the maximum resolution of the installed system.
3.3 Heading (Primary Crew Reference)	18	√	0 - 360° and discrete 'true' or 'mag'	1	±2 degrees	0.5 degree	When true or magnetic heading can be selected as the primary heading reference, a discrete indicating selection will also be recorded.
3.4 Temperature (can be met by one of the following):	19						
3.4.1 Total Air Temperature	19a	√	-50°C to +90°C or available sensor range	2	±2°C	0.3°C	
3.4.2 Outside Air Temperature	19b	√	-50°C to +90°C or available sensor range	2	±2°C	0.3°C	
4.0 Aircraft Aerodynamic Configuration							

4.1 Fixed-Wing Aircraft Primary Control Surface Configurations							
4.1.1 Pitch Axis Primary Control Surface Positions	20	√	Full range	0.25	±2 degrees unless higher accuracy uniquely required or available	0.2% of full range or the resolution required to operate the aircraft.	For Fixed-Wing Aircraft only.
4.1.2 Pitch Axis Trim Configuration (can be met by one of the following):	21						For Fixed-Wing Aircraft only.
4.1.2.1 Pitch Axis Trim Control Surface Positions	21a	√	Full range	1	±3% unless higher accuracy uniquely required or available.	0.3% of full range or the resolution required to operate the aircraft.	Where dual surfaces are provided it is permissible to record each surface alternately.
4.1.2.2 Pitch Trim Control Input Position	21b	√	Full Range	1	±5%	0.2% of full range	When mechanical means for control inputs are not available, cockpit displayed trim positions will be recorded.
4.1.3 Roll Axis Primary Control Surface Positions	22	√	Full range	0.25	±2 degrees unless higher accuracy uniquely required or available	0.2% of full range or the resolution required to operate the aircraft.	For Fixed-Wing Aircraft only.
4.1.4 Roll Axis Trim Configuration (can be met by one of the following):	23						For Fixed-Wing Aircraft only.

4.1.4.1 Roll Axis Trim Control Surface Positions	23a	√	Full range	2	±3% unless higher accuracy uniquely required or available	0.3% of full range.	
4.1.4.2 Roll Trim Control Input Position	23b	√	Full Range	1	±5%	0.2% of full range	When mechanical means for control inputs are not available, cockpit displayed trim positions will be recorded.
4.1.5 Yaw Axis Primary Control Surface Positions	24	√	Full range	0.5	±2 degrees unless higher accuracy uniquely required or available	0.2% of full range or the resolution required to operate the aircraft.	For Fixed-Wing Aircraft only.
4.1.6 Yaw Axis Trim Configuration (can be met by one of the following):	25						For Fixed-Wing Aircraft only.
4.1.6.1 Yaw Axis Trim Control Surface Positions	25a	√	Full range	2	±3% unless higher accuracy uniquely required or available	0.3% of full range.	
4.1.6.2 Yaw Trim Control Input Position	25b	√	Full Range	1	±5%	0.2% of full range	When mechanical means for control inputs are not available, cockpit displayed trim positions will be recorded.

4.2 Rotary-Wing Aircraft Primary Control Configurations							
4.2.1 Collective Pitch Position	26	√	Full range	0.5	±3% unless higher accuracy is uniquely required	0.5% of operating range	For Rotary-Wing Aircraft only.
4.2.2 Longitudinal Cyclic Pitch Position	27	√	Full range	0.5	±3% unless higher accuracy is uniquely required	0.5% of operating range	For Rotary-Wing Aircraft only.
4.2.3 Lateral Cyclic Pitch Position	28	√	Full range	0.5	±3% unless higher accuracy is uniquely required	0.5% of operating range	For Rotary-Wing Aircraft only.
4.2.4 Tail Rotor Pitch Position	29	√	Full range	0.5	±3% unless higher accuracy is uniquely required	0.5% of operating range	For Rotary-Wing Aircraft only.
4.2.5 Controllable Stabilator Position	30	√	Full range	0.5	±3% unless higher accuracy is uniquely required	0.5% of operating range	For Rotary-Wing Aircraft only.
4.2.6 Hydraulic System Active	31	√	Discrete	1			For Rotary-Wing Aircraft only.
4.3 Fixed-Wing Aircraft Secondary Flight Control Surface Configurations							

4.3.1 Trailing Edge Flap Configuration (can be met by one of the following):	32						For Fixed-Wing Aircraft only.
4.3.1.1 Trailing Edge Flap Position	32a	√	Full range	1	±3 degrees	0.5% of full range	
4.3.1.2 Trailing Edge Flap Cockpit Control Selection	32b	√	Full range or each discrete position	1	Sufficient to determine each discrete position		
4.3.2 Leading Edge Flap/ Slat Configuration (can be met by one of the following):	33						For Fixed-Wing Aircraft only.
4.3.2.1 Leading Edge Flap/Slat Position	33a	√	Full range	1	±3 degrees	0.5% of full range	Left and right sides may each be sampled at 2 second intervals so as to give interleaved data points each second.
4.3.2.2 Leading Edge Flap/Slat Cockpit Control Selection	33b	√	Full range or each discrete position	1	Sufficient to determine each discrete position		
4.3.3 Ground Spoiler Configuration (can be met by one of the following):	34						For Fixed-Wing Aircraft only.
4.3.3.1 Ground Spoiler Position	34a	√	Full range or each discrete position	0.5	±2% unless higher accuracy uniquely required	0.2% of full range	Sufficient to determine the position of the surfaces.

4.3.3.2 Ground Spoiler Cockpit Selection	34b	√	Full range or each discrete position	1	±2% unless higher accuracy uniquely required	0.2% of full range or discrete	Sufficient to determine the use of the cockpit selector.
4.3.4 Wing Sweep Position	35	√	Full range	1			For Variable Geometry/ Swing-Wing aircraft only.
4.4 Fixed-Wing Aircraft Propulsion Thrust Configurations							
4.4.1 Thrust Reverse Status	36	√	Turbo-jet = stowed, in transit and reverse Propeller = reverse	Each reverser each second			For Fixed-Wing Aircraft only. Turbo-jet or turbo-fan status can be determined with 2 discretes; Propeller status with 1 discrete.
4.4.2 Nozzle Rotation Position	37	√	As installed				For Fixed-Wing Aircraft only.
4.5 Landing Gear Configuration (can be met by one of the following):	38						
4.5.1 Landing Gear Position	38a	√	Discrete(s)	1 (0.5 recommended)			A suitable combination of discretes will be recorded to determine down and locked, in transit, or up and locked, for each gear.

4.5.2 Landing Gear Selector Position	38b	√	Discrete(s)	1 (0.5 recommended)			A suitable combination of discretes will be recorded to determine position of each gear selector (Downlock switch position or equivalent).
5.0 Crew Control Parameters							
5.1 Fixed-Wing Aircraft Primary Control, Cockpit Inputs & Forces							
5.1.1 Pitch Axis Primary Flight Control Input	39	√	Full range	0.25	±2 degrees unless higher accuracy uniquely required or available	0.2% of full range or the resolution required to operate the aircraft	For Fixed-Wing Aircraft only. For airplanes that have a flight control break away capability that allows either pilot to operate the controls independently, record both control inputs. The control inputs may be sampled alternately.

5.1.2 Roll Axis Primary Flight Control Input	40	√	Full range	0.25	±2 degrees unless higher accuracy uniquely required or available	0.2% of full range or the resolution required to operate the aircraft	For Fixed-Wing Aircraft only. For airplanes that have a flight control break away capability that allows either pilot to operate the controls independently, record both control inputs. The control inputs may be sampled alternately.
5.1.3 Yaw Axis Primary Flight Control Input	41	√	Full range	0.5	±2 degrees unless higher accuracy uniquely required or available	0.2% of full range or the resolution required to operate the aircraft	For Fixed-Wing Aircraft only. For airplanes that have a flight control break away capability that allows either pilot to operate the controls independently, record both control inputs. The control inputs may be sampled alternately.
5.1.4 Thrust/Power Lever Angle	42	√	Full range	Each lever each second	±2% or sufficient to determine any gated position	2% of full range	For Fixed-Wing Aircraft only.
5.1.5 Stability Augmentation System Engagement	43	√	Discrete	1			For Fixed-Wing Aircraft only.
5.2 Rotary-Wing Aircraft Primary Flight Control Inputs and Forces							

5.2.1 Collective Pitch Input	44	√	Full range	0.5	±3% unless higher accuracy is uniquely required	0.5% of operating range	For Rotary-Wing Aircraft only.
5.2.2 Longitudinal Cyclic Pitch Input	45	√	Full range	0.5	±3% unless higher accuracy is uniquely required	0.5% of operating range	For Rotary-Wing Aircraft only.
5.2.3 Lateral Cyclic Pitch Input	46	√	Full range	0.5	±3% unless higher accuracy is uniquely required	0.5% of operating range	For Rotary-Wing Aircraft only.
5.2.4 Tail Rotor Pitch/Pedal Input	47	√	Full range	0.5	±3% unless higher accuracy is uniquely required	0.5% of operating range	For Rotary-Wing Aircraft only.
5.2.5 Controllable Stabilator Input	48	√	Full range	0.5	±3% unless higher accuracy is uniquely required	0.5% of operating range	For Rotary-Wing Aircraft only.
5.2.6 Hydraulic System Selected	49	√	Discrete(s)	1			For Rotary-Wing Aircraft only.
5.3 Fixed-Wing Aircraft Secondary Control, Cockpit Inputs & Forces							
5.3.1 Speedbrake Configuration (can be met by one of the following):	50						For Fixed-Wing Aircraft only.

5.3.1.1 Speedbrake Cockpit Selection/Lever Position	50a	√	Full range or each discrete position	1	±2% unless higher accuracy uniquely required	0.2% of full range or discrete	Sufficient to determine the use of the cockpit selector.
5.3.1.2 Speedbrake Position	50b	√	Full range or each discrete position	0.5	±2% unless higher accuracy uniquely required	0.2% of full range	Sufficient to determine the position of the surfaces.
5.3.2 Left and Right Brake Pedal Position	51	√	Full Range	1	±5%		For Fixed-Wing Aircraft only. To determine braking effort applied by pilots or by autobrakes.
5.4 Autopilot/Autothrottle/ Automatic Flight Control System Engagement Status	52	√	A suitable combinatio n of discretes	1			Discretes show which systems are engaged and controlling the aircraft.
5.5 Rotary-Wing Aircraft Cockpit, Primary Control, Trim Input Positions							
5.5.1 Collective Trim Position	53	√	Full range	1	±5%	0.2% of full range	For Rotary-Wing Aircraft only. When mechanical means for control inputs are not available, cockpit display trim positions will be recorded.

5.5.2 Longitudinal Cyclic Trim Position	54	√	Full range	1	±5%	0.2% of full range	For Rotary-Wing Aircraft only. When mechanical means for control inputs are not available, cockpit display trim positions will be recorded.
5.5.3 Lateral Cyclic Trim Position	55	√	Full range	1	±5%	0.2% of full range	For Rotary-Wing Aircraft only. When mechanical means for control inputs are not available, cockpit display trim positions will be recorded.
5.6 Calibration, Navigation, Performance, and Warning Settings							
5.6.1 Selected Altitude (All pilot selectable modes of operation)	56	√	As installed	1	As installed	Selectable resolution	Required for aircraft fitted with electronic displays. Otherwise, desired.
5.6.2 Pilot Selected Barometric Setting	57	√	As installed	64	As installed	0.01 in-Hg	Required for aircraft fitted with electronic displays. Otherwise, desired. Where practicable, a 4-second sampling interval is recommended.

5.6.3 First Officer Selected Barometric Setting	58	√	As installed	64	As installed	0.01 in-Hg	Required for aircraft fitted with electronic displays. Otherwise, desired. Where practicable, a 4-second sampling interval is recommended.
5.6.4 Selected Decision Heights (All pilot selectable modes of operation)	59	√	As installed	64	As installed	Selectable resolution	Required for aircraft fitted with electronic displays. Otherwise, desired. Where practicable, a 4-second sampling interval is recommended.
5.6.5 Selected Flight Path (All pilot selectable modes of operation)							
5.6.5.1 Course/Desired Track	60	√	As installed	1	As installed	Selectable resolution	Required for aircraft fitted with electronic displays. Otherwise, desired.
5.6.5.2 Path Angle	61	√	As installed	1	As installed	Selectable resolution	Required for aircraft fitted with electronic displays. Otherwise, desired.
5.6.5.3 Selected Heading (All pilot selectable modes of operations)	62	√	As installed	1	As installed	Selectable resolution	Required for aircraft fitted with electronic displays. Otherwise, desired.

5.6.6 Selected Navigation Frequencies	63	√	Sufficient to determine selected frequencies	4	As installed		An offset value or channel counter would be acceptable. The frequency to be recorded is associated with the information displayed to the pilot.
5.6.7 Selected Mach (All pilot selectable modes of operation)	64	√	As installed	1	As installed	Selectable resolution	Required for aircraft fitted with electronic displays. Otherwise, desired.
5.6.8 Selected Speed (All pilot selectable modes of operation)	65	√	As installed	1	As installed	Selectable resolution	Required for aircraft fitted with electronic displays. Otherwise, desired.
5.6.9 Selected Vertical Speed (All pilot selectable modes of operation)	66	√	As installed	1	As installed	Selectable resolution	Required for aircraft fitted with electronic displays. Otherwise, desired.
6.0 Warnings, Cautions, Advisories, and Statusing							
6.1 Warnings, Cautions & Advisories	67	√	Discretes	1			A discrete will be recorded for the master warning. Each 'red' warning will be recorded when the warning condition cannot be determined from other parameters or from the cockpit voice recorder.
6.1.1 Navigation WCAS							

6.1.1.1 Terrain Avoidance and Ground Proximity Warning System	68	√	Discretes	0.5 (1 for Rotary-Wing Aircraft)			A suitable combination of discretes to convey status of the system. Include warnings, cautions, advisories, alerts, on/off position, selection of terrain display mode, and pop-up display status.
6.1.1.2 Traffic Alerting and Collision Avoidance System	69	√	Discretes	0.5 (1 for Rotary-Wing Aircraft)	As installed		A suitable combination of discretes to determine sensitivity level and status of system, Combined Control, Vertical Control, Up Advisory and Down Advisory.
6.1.2 Computer Failure	70	√	Discrete(s)	4	As installed		Safety-critical control systems.
6.1.3 Hydraulic Pressure Low Warning	71	√	Discrete(s) or available sensor range	1	As installed	0.5% of full range	Each essential system to be recorded.
6.1.4 Loss of Cabin Pressure Warning	72	√	Discrete	1			
6.1.5 Gearbox Low Oil Pressure Warning	73	√	Discrete	1			For Rotary-Wing Aircraft only.
6.2 Statusing							
6.2.1 Autopilot/ Autothrottle/AFCS Mode Status	74	√	A suitable combination of discretes	1			Discretes show which systems and modes are engaged and controlling the aircraft.

6.2.2 Engine Status/Parameters							
6.2.2.1 Thrust/Power of Each Engine	75	√	Full range	Each engine each second	As installed	0.1% of full range	Sufficient parameters will be recorded to determine power in both normal and reverse thrust, if applicable. A margin for possible overspeed will be provided.
6.2.2.2 Torque	76	√	Full range	Each engine each second	As installed	0.1% of full range	Required for Rotary-Wing Aircraft only; desired for Fixed-Wing Aircraft.
6.2.3 Navigation System Status							
6.2.3.1 Vertical Beam Deviation (can be met by one of the following):	77	√					It is not intended for both ILS and MLS data to be recorded at the same time, only the aid in use at the time.
6.2.3.1.1 Instrument Landing System (ILS)/Global Position System (GPS) Glidepath	77a		±0.22 data distribution and management or available sensor range as installed	1	As installed. ±3% recommended	0.3% of full range	For autoland/category 3 operations, each system will be recorded but arranged so that at least one is recorded each second.

6.2.3.1.2 Microwave Landing System (MLS) Elevation	77b		+0.9 to +30 degrees	1	As installed. ±3% recommended	0.3% of full range	For autoland/category 3 operations, each system will be recorded but arranged so that at least one is recorded each second.
6.2.3.2 Horizontal Beam Deviation (can be met by one of the following):	78	√					It is not intended for both ILS and MLS data to be recorded at the same time, only the aid in use at the time.
6.2.3.2.1 ILS/GPS Localizer	78a		±0.22 Data Distribution and Management or available sensor range as installed	1	As installed. ±3% recommended	0.3% of full range	For autoland/category 3 operations, each system will be recorded but arranged so that at least one is recorded each second.
6.2.3.2.2 MLS Azimuth	78b		±62 degrees	1	As installed. ±3% recommended	0.3% of full range	For autoland/category 3 operations, each system will be recorded but arranged so that at least one is recorded each second.

6.2.3.3 Primary Navigation System Reference (e.g., GPS, Inertial Navigation System, VHF omnidirectional range/Distance Measuring Equipment, MLS, Loran C, Localizer Glideslope)	79	√	As installed	1 (4 for Rotary-Wing Aircraft)	As installed		A suitable combination of discretes to determine the primary navigation system reference if more than one system is available.
6.2.3.4 Marker Beacon Passage	80	√	Discrete(s)	1			A single discrete is acceptable for all markers.
6.2.3.5 Distance Measuring Equipment (DME) 1 and 2 Distance	81	√	0 to 200 NM	4	As installed	1 NM	A sampling interval of 64 seconds is acceptable where other navigation parameters are recorded.
6.2.4 Electrical Subsystem Status							
6.2.4.1 AC Electrical Bus Status	82		Discrete(s)	1 (4 for Rotary-Wing Aircraft)	As installed		Each bus.
6.2.4.2 DC Electrical Bus Status	83		Discrete(s)	1 (4 for Rotary-Wing Aircraft)	As installed		Each bus.
6.2.5 Fuel System Status							
6.2.5.1 Fuel Quantity, Each Tank	84	√	As installed	4	As installed	1% of full range	

6.2.6 Hydraulic Pressure, Each System	85	√	Full range	1 (2 for Rotary-Wing Aircraft)	±5%	100 psi	
6.2.7 Head Up Display (HUD) in Use	86	√	As installed	4	As installed		
6.2.8 Main Gearbox Oil Pressure	87	√	As installed	1	As installed	6.895 kN/m2 (1 psi)	For Rotary-Wing Aircraft only.
6.2.9 Landing System Status							
6.2.9.1 Air/Ground Status & Each Landing Gear Weight on Wheels Switch as Installed	88	√	Discrete(s)	1 (0.25 recommended)			
6.2.9.2 Left and Right Brake Pressure	89	√	Maximum brake system pressure range	1	±5%		To determine braking effort applied by pilots or by autobrakes.
7.0 Parameters Specific to Tanker Aircraft							Consider the specific refueling capabilities of the tanker aircraft when determining parameters to be recorded.
7.1 Boom Parameters							
7.1.1 Azimuth	90	√	As installed	1			For Tanker Aircraft only
7.1.2 Elevation	91	√	As installed	1			For Tanker Aircraft only
7.1.3 Extension	92	√	As installed	1			For Tanker Aircraft only

7.1.4 Fuel Flow	93	√	As installed	1			For Tanker Aircraft only
7.1.5 Stowed/Not Stowed	94	√	Discrete	1			For Tanker Aircraft only
7.1.6 Engaged/Not Engaged with Receiver	95	√	Discrete	1			For Tanker Aircraft only
7.1.7 Boom Operator Inputs	96	√	As installed	0.5			For Tanker Aircraft only
7.1.8 Control Surface Position(s)	97	√	As installed	0.5			For Tanker Aircraft only
7.2 Drogue Parameters		√					If equipped with more than one drogue system, parameters for each drogue will be recorded.
7.2.1 Extension	98	√	As installed	1			For Tanker Aircraft only
7.2.2 Fuel Flow	99	√	As installed	1			For Tanker Aircraft only
7.2.3 Stowed/Not Stowed	100	√	Discrete	1			For Tanker Aircraft only
7.2.4 Engaged/Not Engaged with Receiver	101	√	Discrete	1			For Tanker Aircraft only
8.0 Parameters Specific to Powered-lift Aircraft							
8.1 Tilt Angle	102						For Powered-lift Aircraft only
8.2 Lever Settings	103						For Powered-lift Aircraft only
8.3 Power Settings	104						For Powered-lift Aircraft only

Table A4.2. —Required Additional Parameters for New Acquisition and for Existing Aircraft if data is available on system bus.

Parameter Name	Required/ Desired Mishap Parameter Count	mFOQA	Range	Interval (secs/sample)	Accuracy	Resolution	Remarks
1.0 Recorder, System or Mission Parameters							
1.1 Aircraft Number	1	√	As installed	Power on			
1.2 Departure Base	2	√	As installed	Power on			
1.3 Aircraft Weight	3	√	As installed	Power on			
2.0 Aircraft Dynamics							
2.1 Velocity							
2.1.1 Calibrated Airspeed (KCAS)	4		Minimum value from installed pitot static system to 1.2 V_{NE}.	1	±3%	0.5 kt (1 kt for Rotary-Wing Aircraft)	Obtained from the air data computer where installed.
2.1.2 Groundspeed	5	√	As installed	1	Data is obtained from the most accurate system.	0.5 kt (1 kt for Rotary-Wing Aircraft)	
2.1.3 Taxi Speed	6	√	As installed	1	Data is obtained from the most	0.5 kt (1 kt for Rotary-	Not required or recommended if Groundspeed (2.1.2) captures the data.

					accurate system.	Wing Aircraft)	
2.1.4 Altitude Rate/Vertical Velocity Indicator (VVI)	7	√	As installed	1	As installed		
2.2 Accelerations							
2.2.1 Angular Accelerations							
2.2.1.1 Pitch Acceleration	8		As installed	0.25			
2.2.1.2 Roll Acceleration	9		As installed	0.25			
2.2.1.3 Yaw Acceleration	10		As installed	0.25			Acceptable alternative to Yaw Rate (2.1.2 in Table 1) for Rotary-Wing Aircraft.
2.3 Yaw (Ψ) or Sideslip Angle (β)	11	√	Full range	1	±5%	0.5 degree	For Fixed-Wing Aircraft only. Highly maneuverable (i.e. fighter-type) aircraft will record this parameter more frequently.
3.0 Aircraft Environment							
3.1 Altitude							
3.1.1 Radio/Radar Altitude	12	√	-20 ft to +2500 ft	1	Below 500 ft: ±2 ft or ±3% whichever is greater.	Below 500 ft: 1 ft.	For autoland/category 3 operations, each radio altimeter will be recorded, but arranged

					Above 500 ft: ±5%	Above 500 ft: 1 ft + 0.5% of full range	so that at least one is recorded each second. Radio altitude can go negative depending on aircraft attitude and sensor calibration.
3.1.2 GPS Altitude	13	√	-1000 to maximum altitude of aircraft +5000 ft	1			
3.2 Airflow							
3.2.1 Wind Direction	14	√	As installed	1 (4 for Rotary-Wing Aircraft)	Data is obtained from the most accurate system as installed	1 degree	
3.2.2 Wind Speed	15	√	As installed	1 (4 for Rotary-Wing Aircraft)	Data is obtained from the most accurate system as installed	1 knot	
3.2.3 Drift Angle	16	√	As installed	4	Data is obtained from the most accurate system as installed	0.1 degree	

4.0 Aircraft Aerodynamic Configuration							
4.1 Fixed-Wing Aircraft Propulsion Thrust Positions							
4.1.1 Nozzle Position/Area	17	√	As installed				For Fixed-Wing Aircraft only.
4.2 Computed Center of Gravity	18	√	As installed	64	As installed	1% Full range	
4.3 Tailhook	19		As installed				For Fixed-Wing Aircraft only.
4.4 Stores/Weapon Configuration	20	√	As installed				
4.5 External Door/Panel Positions	21		As installed				
5.0 Crew Control Parameters							
5.1 Fixed-Wing Aircraft Primary Control, Cockpit Inputs & Forces							
5.1.1 Control Wheel Cockpit Input Forces	22	√	±30 Kgs	1	±5%	0.2% of full range or as installed	For Fixed-Wing Aircraft only. For fly-by-wire aircraft where control surface position is a function of the displacement of the control input device only, it is not necessary to record this parameter.

5.1.2 Control Column Cockpit Input Forces	23	√	±40 Kgs	1	±5%	0.2% of full range or as installed	For Fixed-Wing Aircraft only. For fly-by-wire aircraft where control surface position is a function of the displacement of the control input device only, it is not necessary to record this parameter.
5.1.3 Rudder Pedal Cockpit Input Forces	24	√	±75 Kgs	1	±5%	0.2% of full range or as installed	For Fixed-Wing Aircraft only. For fly-by-wire aircraft where control surface position is a function of the displacement of the control input device only, it is not necessary to record this parameter.
5.1.4 Engine Thrust Command	25		As installed	2	As installed	2% of full range	For Fixed-Wing Aircraft only.
5.1.5 Engine Thrust Target	26		As installed	4	As installed	2% of full range	For Fixed-Wing Aircraft only.
5.2 Rotor Brake	27		Discrete	1			For Rotary-Wing Aircraft only.
5.3 Propulsion Controls							
5.3.1 Bleed Air Select	28	√	As installed				
5.3.2 Nozzle Rotation Control	29	√	As installed				For Fixed-Wing Aircraft only.
5.3.3 Afterburner Select	30	√	As installed				For Fixed-Wing Aircraft only.

5.3.4 Thrust Reverser Select	31	√	As installed				For Fixed-Wing Aircraft only.
5.3.5 Throttle Setting	32	√					For Rotary-Wing Aircraft only.
5.4 Calibration, Navigation, Performance, and Warning Settings							
5.4.1 Selected Communication Frequencies	33	√	Sufficient to determine selected frequencies	4	As installed		An offset value or channel counter would be acceptable. The recorded frequency is associated with the communication frequency used by the pilot.
5.5 Subsystem Functional Selection							
5.5.1 De-icing and/or Anti-icing System Select	34	√	Discretes	4			
5.5.2 Secondary Power System (APU/EPU) Select	35	√	Discrete	1			
5.6 Ejection Selection/Handle Pull	36		Discrete	1			For Fixed-Wing Aircraft only.
6.0 Warnings, Cautions, Advisories, and Statusing							
6.1 Warnings, Cautions & Advisories (WCAS)							
6.1.1 Navigation WCAS							

6.1.1.1 Windshear Warning	37	√	Discrete	1	As installed		
6.1.2 Flight Control WCAS							
6.1.2.1 AFCS Malfunction	38	√	Discrete(s)	1			
6.1.2.2 Stability Augmentation System/Stability and Control Augmentation Systems (SAS/SCAS) Failure	39	√	Discrete	1			
6.1.2.3 Operational Stall Protection, Stick Shaker/Pusher Activation	40	√	As installed	1	As installed		A suitable combination of discretes to determine activation.
6.1.3 Propulsion WCAS							
6.1.3.1 Vibration Warning, Each Engine	41	√	As installed	1	As installed		
6.1.3.2 Oil Press Low Warning, Each Engine	42		As installed	1	As installed		
6.1.3.3 Over Temp Warning, Each Engine	43		As installed	1	As installed		
6.1.3.4 Overspeed Warning, Each Engine	44		As installed	1	As installed		
6.1.3.5 Engine Controller Failure	45	√					
6.1.4 Electrical System WCAS							
6.1.4.1 Converter(s) Fail/Malfunction	46	√	Discrete(s)	1			

6.1.4.2 Generator(s) Fail	47	√	Discrete(s)	1			
6.1.4.3 Inverter	48	√	Discrete(s)	1			
6.1.4.4 Battery Temp/Failures	49	√	Discrete(s)	1			
6.1.5 Fuel System WCAS							
6.1.5.1 Low Fuel Warning	50	√	Discrete	4			
6.1.5.2 Fuel Pump Fail	51	√	Discrete(s)	1			
6.1.6 Secondary Power (APU/EPU) System Fail	52	√	Discrete	1			
6.1.7 Pneumatic Low Pressure Warning	53	√	Discrete(s) or available sensor range	2	As installed	0.5% of full range	Each essential system to be recorded.
6.1.8 Crew/Cabin Environment WCAS							
6.1.8.1 Oxygen Concentration Low	54	√	Discrete	4			
6.1.8.2 Oxygen Back Up	55	√	Discrete	4			
6.1.8.3 Canopy Unlock	56	√	Discrete	0.5			
6.1.8.4 Seat Ejection/Initiation	57		Discrete	0.1 (0.5 for Rotary-Wing Aircraft)			
6.1.9 Anti Icing System							

6.1.9.1 Anti Ice Fail	58	√	Discrete	4			
6.1.9.2 Ice Detection	59	√	As installed	1	As installed		A suitable combination of discretes to determine the status of each system.
6.1.9.3 Ice Rate	60	√	As installed	1	As installed		
6.1.10 Landing Gear System WCAS							
6.1.10.1 Nose Gear Steering Fail	61	√	Discrete	1			
6.1.10.2 Anti-Skid/ Brakes Fail/Inop	62	√	Discrete	1			
6.1.11 Fire Detection & Suppression WCAS							
6.1.11.1 Fire Warning	63	√	Discrete(s)	1			
6.1.12 Exterior Panel(s) Open/Unlatched	64		Discrete(s)	1			
6.1.13 Launch/Jettison Fail	65	√	Discrete(s)	1			
6.1.14 Rotor RPM Low	66	√	Discrete	1			For Rotary-Wing Aircraft only.
6.1.15 Transmission(s) Oil Pressure	67	√	Discrete	1			For Rotary-Wing Aircraft only.
6.1.16 Transmission Oil Bypass	68	√	Discrete	1			For Rotary-Wing Aircraft only.
6.1.17 Intermediate Gearbox Overtemp	69	√	Discrete	1			For Rotary-Wing Aircraft only.
6.1.18 Tail Rotor Gearbox Overtemp	70	√	Discrete	1			For Rotary-Wing Aircraft only.

6.2 Statusing							
6.2.1 Engine Bleed Valve Position	71	√	Discrete(s)	4	As installed		Sufficient discretes will be recorded to determine the configuration of engine bleed valve(s).
6.2.2 Para Visual Display On	72		As installed	1	As installed		
6.2.3 Multi-Function/ Engine/Alerts Display Format	73	√	Discrete(s)	4	As installed		Discretes shows the display system status (e.g. off, normal, fail) and the identity of display pages for emergency procedures, checklists. Information in checklists and procedures need not be recorded.
6.2.4 Pilot Electronic Flight Instrument System (EFIS) Display Format	74	√	Discrete(s)	4	As installed		Discretes show the display system status (e.g. off, normal, fail, composite, sector, plan, rose, nav aids, wxr, range, copy).
6.2.5 First Officer EFIS Display Format	75	√	Discrete(s)	4	As installed		Discretes show the display system status (e.g. off, normal, fail, composite, sector, plan, rose, nav aids, wxr, range, copy).
6.2.6 Engine Status/Parameters							

6.2.6.1 Engine Pressure Ratio (EPR)	76	√	As installed	Each engine each second	As installed	0.1% of full range	
6.2.6.2 Fan Speed (N1)/Gas Generator Speed (NG/N1)	77	√	As installed	Each engine each second	As installed	0.1% of full range	
6.2.6.3 Indicated Vibration Level	78	√	As installed	Each engine each second	As installed	0.1% of full range	
6.2.6.4 Core Speed (N2)/Power Turbine Speed (NP/N2)	79	√	As installed	Each engine each second	As installed	0.1% of full range	
6.2.6.5 Exhaust Gas Temperature (EGT)	80	√	As installed	Each engine each second	As installed	0.1% of full range	
6.2.6.6 Fuel Flow	81	√	As installed	Each engine each second	As installed	0.1% of full range	
6.2.6.7 Fuel Cutoff Lever Position	82		As installed	Each engine each second	As installed	0.1% of full range	
6.2.6.8 Oil Pressure	83	√	As installed				
6.2.6.9 Oil Temperature	84		As installed				
6.2.6.10 Turbine Inlet Temperature	85		As installed				
6.2.6.11 Chip Detector/Lights	86	√	As installed				
6.2.6.12 Engine Stall	87	√	As installed				
6.2.6.13 Fuel Pressure	88	√	As installed				
6.2.7 Navigation System Status							

6.2.7.1 Tactical Air Navigation (TACAN) -- (Channel, Bearing, Range)	89						
6.2.8 Fuel System Status							
6.2.8.1 Total Fuel Quantity	90	√	As installed	64	As installed	1% of full range	
6.2.8.2 Fuel Flow	91	√	As installed				
6.2.8.3 Fuel Transfer	92	√	As installed				
6.2.8.4 Fuel Boost	93	√	As installed				
6.2.8.5 Fuel Filter/Bypass	94	√	As installed				
6.2.8.6 In-flight Refueling Receptacle/Probe Fuel Flow	95	√	As installed				
6.2.8.7 In-flight Refueling Engage	96	√	Discrete				
6.2.8.8 Fuel Dump Switch Position	97	√	As installed				For Fixed-Wing Aircraft only.
6.2.8.9 Fuel Dump Valve Position	98	√	As installed				For Fixed-Wing Aircraft only.
6.2.9 APU Bleed Valve Position	99		Discrete(s)	4	As installed		
6.2.10 Head Up Display (HUD) Display Parameters	100	√					

6.2.11 Gearbox Oil Temperatures							
6.2.11.1 Main Gearbox Oil Temperature(s)	101	√	As installed	2	As installed	1°C	For Rotary-Wing Aircraft only.
6.2.11.2 Intermediate Gearbox Oil Temperature(s)	102	√	As installed	2	As installed	1°C	For Rotary-Wing Aircraft only.
6.2.11.3 Tail Rotor Gearbox Oil Temperature	103	√	As installed	2	As installed	1°C	For Rotary-Wing Aircraft only.
6.2.12 Cabin Pressure	104	√	As installed	1	As installed		
6.2.13 Indicated Sling Load Force	105	√	0 to 200% of maximum certified load	0.5	±3% of maximum certified load	±0.5% of maximum certified load	For Rotary-Wing Aircraft only.
6.2.14 Landing System Status							
6.2.14.1 Parking Brake On	106	√	Discrete	2			
6.2.14.2 Wheel Speed	107	√					For Fixed-Wing Aircraft only.
6.2.15 Strain Gauges	108		As installed				For Fixed-Wing Aircraft only.

Attachment 5

SEEK EAGLE REQUEST TEMPLATE AND INSTRUCTIONS

Note: A5.1. Figure A5.1 below provides an outline of SEEK EAGLE Request and instruction of detail contents.

Figure A5.1. Seek Eagle Request.

XX May 2020

MEMORANDUM FOR LEAD COMMAND (ACC/A5TT/AFGSC)
FROM: (Requesting Unit and Organization)
SUBJECT: **SEEK EAGLE Request (SER) for, (Store nomenclature) on (Aircraft)**

1. Type of request: (Reference chapter 1, paragraph 1.3.2 in this AFPAM)

2. Store and aircraft: (AIM-120C on F-16C/D Blks 40-52). (Only one aircraft per SER)
- a. Store Description: (New and Modified Stores Only)

3. Configuration and Limitations information:
- a. Aircraft-store Configuration (Station Load outs)
- b. Carriage Airspeed and Load Factors
- c. Release Airspeed and Load Factors
- d. Jettison Airspeed and Load Factors
- e. Dive Angle Restrictions

4. Funding: State the fund provider, POC name, contact information, and organization. If known, include Job Order Number and Work Breakdown Structure (JON/WBS).

5. User Need Date (UND): Identify the User Need Date for the Type of Request.
Note: SEEK EAGLE process takes 120 days to deliver a project plan.

6. Justification: Justify the user need date for the type of request (i.e. flight clearance, certification, etc.) State the consequence if the user need date is not met. Include an impact statement if identified in strategic, operational, or acquisition program document.

7. Points of Contact:
- a. MAJCOM: Name, Phone, and Organization
- b. User/Originator: Name, Phone, and Organization
- c. Store Manager: Name, Phone, and Organization (if applicable)
- d. Aircraft System Program Office: Name, Phone, and Organization (if applicable)

Requires Signature of O-6 or above

SEEK EAGLE Request (SER) Instructions

MEMORANDUM FOR ACC/A5T
FROM: (Requesting organization)
Subject: *Indicate the store and the applicable aircraft in addition to the type of request.*

1. I*ndicate the type of request per AFPAM 63-129 (Reference chapter 2, paragraph 2.4) (One type of request only; and Flight Clearance or Routine Certification)*
2. *Identify Store and Aircraft (**only one aircraft per SER**)*
a. Short *description of the new or modified store and a brief statement of capability/function (if classification allows). (Example, GBU-12 with new tail kit (KMU-888) and forward fiber optic sensor with illuminate lighting. GBU-12Z/B is an increase capability with an improved sensor for increased reliability.)*
3. Configuration and Limitations information.
a. *Provide applicable aircraft stations with identified stores*
- Consider how you want the entire aircraft loaded if going out to accomplish Flight Test i.e. Fuel Tanks, PODS, Cameras, etc.
b. *Provide suggested/recommended flight envelope for applicable aircraft*
4. Funding. *This individual/representative has the authority to obligate government resources. Job Order Number (JON) and Work Breakdown Structure (WBS) is added if known.*
5. *Identify the UND for the request (one date for each: Ex. 13 Jan 15 for Flight Clearance Recommendation). Be as accurate as possible as this will drive AFSEO resources and plans.* ***MAJCOM and AFSEO have 120 days, from the date the SER is signed to deliver a Project Plan*** *and Customer Commitment Date (CCD) to the originator.*
6. *Justify the User Need Date (UND)) for the request (ex. The flight clearance supports a captive carry test mission). The consequence will include your most negative 1st order effects if the User Need date is missed. (Example, we will lose funding and our opportunity for test will slide 6-9 months and ultimately delay a needed capability to the warfighter). Include an impact statement if identified in strategic, operational, or acquisition program document. (Ex. SAF/AQ approved program IOC may be delayed, thus impacting future appropriations funding).*
7. *Self-Explanatory. Providing points of contact saves AFSEO time and energy when specific questions need to be answered.*
Note: *Amendments to the SEEK EAGLE Request can be initiated by the requesting entity or prompted by AFSEO based on updated knowledge of operational requirements, potential limits and/or restrictions associated with the capability addressed in the adopted SEEK EAGLE Request. Amendments are subject to the original SEEK EAGLE Request process, necessary revisions to the Project Plan are also coordinated. Amendment justifications will be in bold between items 1 and 2 above to clearly tell the reader what is being amended.*

Requires Signature of O-6 or above

Attachment 6

FORMAT FOR TYPICAL PROJECT PLAN

Figure A6.1. Format for Typical Project Plan.

From: SK/DO
To: Customer
Cc: SKP & SKW Chiefs; AFSEO PM; ACC SEEK EAGLE PEM, others as required
Subject: AFSEO Project Plan for SER XXX-XX: Store on Aircraft
Requester's Name,

The Air Force SEEK EAGLE Office (AFSEO) is thankful for this opportunity to support the Warfighter! We received SEEK EAGLE Request (SER) XXX-XX: Store on Aircraft on DD MMM YY. We completed our project strategy phase and developed the attached project plan to deliver the requested (Flight Clearance Recommendation, Certification Recommendation, etc.). We can/cannot (explain limitations & strategy to address the SER requirements if UND cannot be met) meet the user need date of DD MMM YY as listed in the SER and provide the (FCR, CR, etc.) by DD MMM YY as detailed in the attached Cost & Schedule Estimate. Here are some highlights of the plan:

Total Project Cost Estimation:
Planned start date: DD MMM YY (Subject to change)
Planned completion date(s): DD MMM YY (Subject to change)
Schedule milestones: (list/add all applicable events)

Combat deployment support date:
Primary Operational Flight Program (Designation/Name) freeze / fielding date:
TO input cutoff date:
Acquisition Milestone date:
Test store availability date:
Test aircraft availability date:

Identified Risks:

If required, describe any special considerations like required data or resources (funding, stores, etc.).

The following items are required from (Program Office, Prime Contractor, etc.) by DD MMM YY to remain on schedule:

- Data X (Office / Contractor)
- Store Y (Office / Contractor)
- Special Test AME Z (Office / Contractor)
- Additional funding $ (see cost estimate for further details)

We are ready to support. Please respond with your concurrence to complete this project. Pending approval, your assigned PM, Mr./Mrs./Ms. First Last (cc'd) will coordinate any remaining arrangements to start executing this project. If you have any questions, please direct them to Mr./Mrs./Ms. PM Last Name, the 96 SK Chief of Weapons Certification Division, SKP Chief (cc'd) or me.

Respectfully,
Director of Operations, AFSEO

Attachments:
1. SER XXX-XX: Title
2. Cost and Schedule Estimate
3. (If additional funding is required) Project SOC

Attachment 7

CRITERIA REQUIRING AIRCRAFT STORE CERTIFICATION

A7.1. New aircraft or weapon development programs, including:

A7.1.1. New aircraft development.

A7.1.2. New weapon development.

A7.1.3. New aircraft-store configurations on operational aircraft, even if of limited duration (a flight clearance).

A7.1.4. New tactics requiring new carriage, employment, or jettison limits, or new safe separation or ballistics data.

A7.2. Significant aircraft characteristic changes, including:

A7.2.1. Weapon delivery portion of the Operational Flight Program or input parameters to the weapon algorithms, which could affect accuracy for ballistics weapons.

A7.2.2. Analysis of aircraft loads, flutter, stability, and control which show unacceptable impact on the aircraft due to stores changes in center of gravity, store weight, or pitch or yaw moments of inertia.

A7.2.3. Addition of a computer weapon delivery capability to an aircraft with a manual delivery system or modification of an existing computer weapon delivery system.

A7.2.4. Modification of the aircraft or change in carriage location or type that affects the safe carriage and separation or ballistics accuracy of previously certified aircraft-store configurations.

A7.3. Significant store characteristic changes, including:

A7.3.1. External aerodynamic shape.

A7.3.2. Changes to stores autopilot that occur in the vicinity of the aircraft.

A7.3.3. Arming wire or lanyard routing system.

A7.3.4. Electromagnetic radiation environment.

A7.3.5. Suspension lug location.

A7.3.6. Electrical or electronic connectors or characteristics.

A7.3.7. Safing or arming design.

A7.3.8. Nomenclature changes which affect loading/aircrew inspection procedures.

A7.3.9. Basic structural characteristics.

A7.3.10. Environmental tolerance.

A7.3.11. Function.

A7.3.12. Ballistics or propulsion.

A7.3.13. Fragmentation pattern.

A7.3.14. A change to the production specification for store center of gravity location tolerance or a center of gravity shift greater than 1/2" (12.7mm) for stores without a specified tolerance.

A7.3.15. A change to the production specification for store weight tolerance or a weight change greater than 5% for stores without a specified tolerance.

A7.3.16. A change to the production specification for store pitch or yaw moments of inertia tolerance or a moment of inertia change greater than 10% for stores without a specified tolerance.

A7.3.17. Multiple changes within the limits of center of gravity, store weight, or pitch or yaw moments of inertia (less than the aforementioned limits), which constitute a significant store characteristic change.

Attachment 8

CERTIFICATION COMPLETION NOTIFICATION TEMPLATE

Figure A8.1. Certification Completion Notification Template.

The following is an example of a template that is submitted when notifying that the Air Force SEEK EAGLE Office of Certification Completion Notification.

RECOMMENDED FORMAT FOR CERTIFICATION COMPLETION NOTIFICATION (CONVENTIONAL)
(Issued within 3 weeks of completion)

FROM: Aircraft System Program Director/Program Manager
TO: AFSEO EGLIN AFB FL//SKP//
Requesting MAJCOM or SAF WASH DC//IAR
INFO: ACC LANGLEY AFB VA//A5T//
SAF WASH DC//AQP//
All MAJCOMs
OO-ALC Hill AFB UT//WMN (Bomb Assembly)
WR-ALC Warner Robins AFB GA//LKG// (Munition Delivery)
Store Program Office

SUBJECT: Certification Completion Notification, SEEK EAGLE Request X-XX, (Store) on (Aircraft)

1. The aircraft-store combination listed in SE Management Support System, Priority No xxx, MCL line number xxx, was certified for operational use on (DD, MM, YY).
a. Certification testing complete, or date of Certification Recommendation.
b. Accuracy verification testing complete: Date (or not required).
c. Requester (ACC, AMC, AFSOC, and SAF/IAR) accepted accuracy verification results: Date.
d. Verified weapon delivery Operational Flight Program tape No (XX) fielded: Date:
e. Aircraft flight manual, -1 fielded: Date. (Last book to be updated.)
f. Weapon delivery manual, -34, with verified ballistics accuracy data incorporated in Operational Flight Program block No (XX) in D above. Fielded: Date. (Last book to be updated.)
g. Aircraft loading manual, -33/35, Job Guide. Fielded: Date.
h. Munition assembly/delivery, -63/-38 and Item Technical Orders. Fielded: Date.
i. Other pertinent technical data. Fielded: Date.
2. System Program Office point of contact, office symbol, and telephone number.

Attachment 9

STORE CERTIFICATION DATA PACKAGE (CDP) SUBMISSION

A9.1. About Certification Data Package.

A9.1.1. The data listed in this attachment ensures that both munition and non-munition type stores developed, procured from others, or modified are physically, mechanically, electromagnetically, environmentally, structurally, and aerodynamically compatible with United States Air Force aircraft systems. The Certification Data Package is a collection of data used to generate flight clearances and support the publication of aircraft Technical Orders. The program office, with management responsibility for the weapon, obtains and maintains a current Certification Data Package. Store Program Offices provide all current Certification Data Package data to the AFSEO designated agency upon request.

A9.2. The Certification Data Package.

A9.2.1. The certification data package typically consists of an Engineering Data Package, a Weapon Source Data package, and a Standard Source Data Package.

A9.2.1.1. The Engineering Data Package. The Engineering Data Package is used to determine if a flight clearance or certification can be granted, and it is applicable to both munition and non-munition type stores. In addition, the Engineering Data Package is used to obtain the specific engineering data, test data, and computer simulation programs needed to provide inputs to the Weapon Source Data package. An Engineering Data Package is typically composed of the following:

A9.2.1.2. Physical Description. Drawings and documentation (Computer Aided Design model) to establish external dimensions and location of pertinent parts, such as, attaching hardware, fluid or electrical connections, fuze installations, arming wire guides, and access covers.

A9.2.1.3. Mass Properties. Includes average weights; centers of gravity; pitch, yaw, and roll moments of inertia; and variations of these figures due to manufacturing processes, fuzing options, or hysteresis (slosh). Each parameter requires specific tolerances. This information is provided with submission of an AF Form 4694, Store Technical and Mass Properties (STAMP) Sheet to the SEEK EAGLE Office.

A9.2.1.4. Functional Description. Includes operational description and sequence, safing and arming actions, control surface actuation or deployment, motor performance, sub-munition employment, autopilot activation, guidance and control activation, and anticipated actions by the launch aircraft before and after store separation. Provides systems mathematical models when their existence relates to aircraft compatibility.

A9.2.1.5. Interface Control Drawings. Includes structural, electrical, mechanical, hydraulic, pneumatic, or fuel interface, schematics, connector descriptions and locations, pin functions, electrical loads, and arming wire or lanyard routing. The Engineering Data Package uses either aperture card or magnetic media (tapes, discs, etc.) format.

A9.2.1.6. Aerodynamic Data. Includes freestream, near aircraft, and installed aerodynamic force and moment coefficients; and drag counts of store, suspension equipment, and combinations of aircraft, suspension equipment, and store. Includes

parameters and assumptions used in their generation. If applicable, aerodynamic control surface force and moment data, control system laws/model, and thrust/mass flow time histories are included if functional within 5 seconds of release.

A9.2.1.7. Electromagnetic Compatibility Interference Data. Detailed operational description for each store electronic system or subsystem (including electro-explosive devices) and the test data and reports generated during development and qualification testing according to MIL-STD-461.

A9.2.1.7.1. Transmitting and Receiving Systems. For each system or subsystem, identifies operating frequencies, minimum sensitivity, dynamic range, half-power bandwidth, shape factor, interference rejection circuitry, and antenna type, location, orientation, frequency response, and reception pattern.

A9.2.1.8. Structural Analyses and Testing Data. Contains structural analyses (loads based on MIL-STD-8591, strength, durability, damage tolerance, flutter, vibration, etc.), validation test data, and special reaction loads due to store functions. Includes store influence coefficients and associated mass matrix with certain stores and addressees service life considerations as appropriate.

A9.2.1.8.1. Environmental Analyses and Qualification Test. Includes vibration tests conducted according to MIL-STD-810, static loads tests; discusses components known or hypothesized to be sensitive to high or low temperature, aerodynamic heating, rain, ice, or hail, or other environments to the extent that safety of flight or mission accomplishment is compromised in a basic structural or functional sense.

A9.2.1.9. System Safety Data. Detailed assessment/analysis of the safety hazards associated with each store. Document in the Program Office Tracking System risk assessments, design changes incorporated to reduce or eliminate risks, and risk decisions by the appropriate authorities. Refer to DODI 5000.02, AFI 63-101/20-101, AFI 91-102, AFI 91-202 and MIL-STD-882.

A9.2.2. The Weapon Source Data Package.

A9.2.2.1. The weapon source data package is the primary resource used to develop ballistics and safe escape data for non-nuclear, munition type stores. The -34 Technical Order uses the Weapon Source Data package as the source data. Content is described in MIL-PRF-38384. The Weapon Source Data package can be a complex, expensive data package, requires a considerable amount of analysis and testing (both ground and flight), and is composed of the following:

A9.2.2.2. Front Matter. The front matter includes a title page, an explanation of each of the sections, definition of notes, statements concerning procedures, definitions or directions to crew members, glossary, list of illustrations, and a list of abbreviations.

A9.2.2.3. Description. Contains a description of the various delivery modes for all applicable non-nuclear weapons. Includes the aircraft weapon release systems and controls, weapon suspension systems, non-nuclear weapons unique to the aircraft and not already covered in the standard volume, and the non-nuclear training weapons equipment definition.

A9.2.2.4. Normal Aircrew Procedures. Contains the normal procedures to be followed from the time the aircrew arrives at the aircraft until they depart from the aircraft. Consists of a command-response line for the steps in the checklist supplement. Provides a brief statement of the scope and pre-flight, inflight and post-flight procedures.

A9.2.2.5. Emergency Aircrew Procedures. Includes emergency release of non-nuclear stores and emergency jettison of non-nuclear stores and suspension equipment certified on a particular aircraft. Defines firefighting criterion.

A9.2.2.6. Supplementary Data. Includes error analysis, harmonization, safe escape and fuze arming time data, conversion values, appropriate ballistics equations, and automated systems error analysis.

A9.2.2.7. Planning Procedures and Sample Problem. Contains a description of the charts, tables, and assumptions to be used with respect to temperature, pressure, atmospheric density, and appropriate illustrations, and descriptions of the planning methods for each type of delivery mode. Includes safe escape charts, conversion tables, and other charts used in mission planning.

A9.2.2.8. Planning Charts and Ballistics Tables/Digital Data Program. Contains a description (when available) for safe escape charts, fuze arming time charts, angle-of-attack charts, sight-depression-angle charts, airspeed and altimeter position error charts (if applicable), dive recovery charts, conversion tables, and tables necessary for planning all types of releases.

A9.2.3. The Standard Source Data Package.

A9.2.3.1. The standard source data package for non-nuclear munition type stores is the primary resource used to develop loading procedures. The -33 Technical Order uses the Standard Source Data Package as source data. Technical Order 00-5-3 and MIL-PRF-9977 govern the Standard Source Data Package process. It contains a description of the munition and how it functions and provides step-by-step instructions for munition preparation and loading. MIL-PRF-9977 specifies Standard Source Data Package contents and is typically composed of the following:

A9.2.3.1.1. Munitions Description Data. Describes and illustrates items, systems, or components of the munition. Includes (as applicable): weight, dimensions, components, suspension requirements, fuzing options, model differences, integral safety features, and functional description.

A9.2.3.2. Support Equipment Description. Describes and illustrates all special tools and specific items developed for handling, testing, and loading of equipment.

A9.2.3.3. Bomb fuzes. Contains descriptive data on bomb fuzes, including a brief description and illustration of the fuze. Includes functional type, safety devices, arm and safe indications, type of fuze action, arming delays, and functioning delays.

A9.2.3.4. Emergency Procedures. Includes emergency procedures prefaced by a brief explanation of actions to be accomplished by the loading crew in case of fire or other emergency. Specifies the expected amount of time, once a munition is engulfed in flames, before an un-commanded energetic reaction, e.g., detonation, deflagration, burning. Marked according to MIL-STD-38784, which is in Standard Data Package number 37.

A9.2.3.5. Specific Safety Requirements. Provides all specific explosive safety data requirements pertaining to the storage and handling, preparation, loading, and unloading of the munition. Specifies the safety requirements contained in Standard Data Packages 40 and 37 when appropriate.

A9.2.3.6. Munitions Preparation. Includes steps applicable to a single munition, multiple rack, and preloaded accessories required to inspect and prepare each munition (including components). Contains the steps required to assemble and install authorized fuzes before munitions loading and procedures to verify the safety of each fuzed munition.

A9.2.3.7. Loading. Includes steps required to load the store.

A9.2.3.8. Fuzing. Includes steps required to check pre-fuzed munitions and install those fuzes that are not authorized to be installed before loading the munition.

A9.2.3.9. Post Loading. Provides steps required to ensure the compatibility and safety of the munitions.

A9.2.3.10. Cartridge Installation. Applies to impulse cartridges and contains descriptive data and inspection criteria according to Standard Data Package number 36.

A9.2.3.11. Post Loading Inspection. Includes steps required to ensure that required safety devices are installed, bombs and non-nuclear fuzes are installed properly, and non-nuclear fuze safety devices have been removed or installed as required.

A9.2.3.12. Delayed Flight or Alert. Includes procedural steps required for safing of aircraft accessories, munitions, and impulse cartridges.

A9.2.3.13. Unloading Procedures. Includes safing, unloading, fuze removal, and the step-by- step procedures for downloading a munition.

A9.2.4. The Standard Source Data Package.

A9.2.4.1. The standard source data package for non-munition type stores (pods, fuel tanks, etc.) is the primary resource used to develop installation/removal procedures. It is used as information for the job guides and the -35 series and related Technical Orders. The Standard Source Data Package contains a description of the store and how it functions. A Standard Source Data Package is typically composed of the following:

A9.2.4.2. Store Description Data. Describes and illustrates items, systems, or components of the store. Includes (as applicable): weight, dimensions, components suspension requirements, model differences, integral safety features, and functional description.

A9.2.4.3. Support Equipment Description. Describes and illustrates all special tools and specific items developed for handling, testing, loading of equipment.

A9.2.4.4. Emergency Procedures. Includes emergency procedures prefaced by a brief explanation of actions to be accomplished by the loading/installing crew in case of fire or other emergency. Marked according to the requirements pertaining to the preparation, loading, and unloading of the store.

A9.2.4.5. Specific Safety Requirements. Provides all specific safety requirements pertaining to the preparation, loading, and unloading of the store.

A9.2.4.6. Store Preparation. Includes steps required to inspect and prepare each store (including components).

A9.2.4.7. Loading. Includes steps required to load the store.

A9.2.4.8. Post Loading Inspection. Includes steps required to ensure required safety devices are removed or installed as required.

A9.2.4.9. Delayed Flight or Alert. Includes procedural steps required for safing aircraft accessories.

A9.2.4.10. Unloading Procedures. Includes safing, pre-unloading, and the step-by-step procedures for downloading a store.