DEPARTMENT OF THE AIR FORCE
HEADQUARTERS AIR FORCE LIFE CYCLE MANAGEMENT CENTER
WRIGHT-PATTERSON AIR FORCE BASE OHIO

BULLETIN
AWB–1015
15 July 2015

United States Air Force (USAF) Airworthiness Bulletin (AWB)-1015

Subject: Airworthiness Process for Deploying New or Substitute Materials, Processes, and Product Forms

Attachments: (1) Glossary of References and Supporting Information
(2) Standardized Requirements Form for Incoming New/Substitute Materials, Processes or Product Form Proposals

1. **Purpose:** This bulletin describes the process for deploying new or substitute materials, processes, and product form(s) on currently certified weapon systems/mission design series (MDS). The process described in this bulletin shall be applied to proposed materials, processes, or product forms that have been assessed by a weapon system's Chief Engineer (CE) as having an impact to the airworthiness of that weapon system.
2. **Office of Primary Responsibility:** The USAF Airworthiness Office, Air Force Life Cycle Management Center/Engineering (AFLCMC/EN-EZ). New or substitute material, process, and product forum proposals (using the template at Attachment 2), as well as comments, suggestions, or questions on this bulletin should be emailed to the "*Wright-Patterson AFLCMC/EZP_Airworthiness Workflow"* distribution list which can be found in the Microsoft Outlook Global Address List.
3. **Change Evaluation Team (CET):** An integrated team of subject matter experts will be established encompassing AFLCMC, Air Force Research Laboratory (AFRL), and if appropriate, stakeholders such as commercial industry with knowledge of the new or substitute materials, processes, and/or product form(s) in question. The CET is responsible for coordination with the MDS CE Delegated Technical Authority (DTA) and associated Director of Engineering DTA for impacted systems to identify unique requirements.
4. **Process Description:** This section provides details on the new or substitute materials, process and/or product forms deployment procedure within the Airworthiness process on platforms with existing Military Type Certificate or Military Flight Release. The steps are listed in order of their completion. The Airworthiness process outlined in this bulletin does not begin until the material, process, or product form under consideration has been properly evaluated and determined to be a suitable candidate for implementation considering the five primary factors: Stability, Producibility, Characterized Mechanical and Physical Properties, Predictability of Performance and Supportability.

   Stability means that maturation has occurred to where consistent and repeatable quality and predictable costs have been achieved to meet system production and performance requirements. Also, process parameters and methods are understood, and robust and documented approaches for control of these factors (i.e. specifications) exist.

Producibility means that current and future production rates can be achieved without adversely affecting costs and/or quality.

Characterized Mechanical and Physical Properties means that property investigation and characterization is extensive enough in scope to preclude the possibility that the proposed technology will fail to reach its intended purpose.

Predictability of Performance means that the use of sound and proven empirical, analytical, modeling, and/or testing methodologies has been demonstrated to accurately predict performance of the proposed new material, process, and/or product form under appropriate operating conditions.

Supportability means that thermal, environmental, and mechanical deterioration is understood and that acceptable quality and cost-effective preventive methods and/or in-service repair methods are either available or can be developed in a timely manner.

a. **Preliminary Evaluation:** Any new/substitute materials, processes, and product forms proposal(s) assessed by a weapon systems' CE as impacting Airworthiness shall be submitted by the cognizant government agency to Product Support Engineering (AFLCMC/EZP). Product Support Engineering shall establish a CET appropriate for the proposed change. The CET shall perform a preliminary evaluation of the proposed material/process/product form change to determine if the five primary factors have been sufficiently matured and if the change is a suitable candidate. Where applicable, the CET shall use Structures Bulletin EZ-SB-13-001 during their evaluation and document the following:

   - Single vs Multi-Platform Applicability*
   - Recommendation to proceed or terminate, with supporting rationale

   * Projects that only apply to a single platform will use the standard Airworthiness process based on the CET recommendations. The remaining steps will only be used for changes that may be applicable to multi-platforms.

   AFLCMC/EZP shall provide the results of the preliminary evaluation to the requesting government agency.

b. **Airworthiness Plan and Certification Basis Development**: The CET shall identify challenge(s) associated with the proposed change and work with the MDS CE DTAs to document the concern(s) in the Airworthiness Determination Form per AFLCMC OI 62-601.

c. **Business Case Development and Endorsement**: Using the cost-benefit analysis performed by the cognizant government agency, an enterprise business case shall be developed by the CET using each MDS's certification basis to develop the optimum qualification plan that integrates all of the certification requirements. The business case will either be endorsed by the applicable key Senior Stakeholder(s) allowing the effort to proceed or rejected leading to refinement or termination of the effort.

d. **Certification Basis/Compliance Review**: If the effort is endorsed, the CET will establish a team to conduct the qualification program (including all analysis, testing, etc.) and to evaluate the results, subject to approval of each applicable MDS. The

CET shall provide recommendations and artifacts to all applicable MDS CE DTAs to support their Certification Basis/Compliance Report submission using the standard Airworthiness Process outlined in AFLCMC OI 62-601.

e. **Implementation:** MDS CE DTA shall provide the Product Support Engineering Division (AFLCMC/EZP) their implementation plan, cost and schedule. AFLCMC/EZP shall update the business case analysis and recommend any changes to planned implementation.

JORGE F GONZALEZ, SES
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Director, Engineering and Technical Management/Services
Air Force Life Cycle Management Center

Attachment 1

GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION

References

AFLCMC OI 62-601, *USAF Airworthiness Process for Delegated Technical Authority*
MIL-HDBK-516, *Airworthiness Certification Criteria*
Structures Bulletin EZ-SB-13-001, "Material, Product Form, and Process Substitution Guidelines for Metallic Components", 11 Jan 2013
USAF Airworthiness SharePoint website;
https://cs.eis.afmc.af.mil/sites/AeroEngDisciplines/Systems/Airworthiness/default.aspx

Abbreviations and Acronyms

ADF – Airworthiness Determination Form
AFLCMC – Air Force Life Cycle Management Center
AFRL – Air Force Research Laboratory
AWB – Airworthiness Bulletin
CE – Chief Engineer
CET – Change Evaluation Team
DTA – Delegated Technical Authority
MDS – Mission Design Series
MRL – Manufacturing Readiness Level
ROI – Return On Investment
TRL – Technology Readiness Level
USAF – United States Air Force

Attachment 2

STANDARDIZED REQUIREMENTS FORM FOR INCOMING NEW/SUBSTITUTE MATERIALS, PROCESSES OR PRODUCT FORM PROPOSALS

Section I: Project Description
Problem Statement **-** Describe the opportunity, problem, or gap the proposal intends to address:
Proposed Solution **-** Describe the proposed solution in detail. Explain how the proposed solution addresses current weapon system opportunities, problems, or gaps. Include a top-level implementation plan:
Airworthiness Analysis **-** Include an Airworthiness Determination Form (ADF) if applicable. If an ADF is not applicable, discuss potential impacts of the new technology across the USAF enterprise:

Section II: Background on Proposed Solution Technology
Technology Background - Provide a background narrative covering the proposed solution's technology:
Technology Maturity - Explain why this technology is considered mature. Describe current commercial and/or military applications of this technology, any testing that has been carried out on this technology and/or certifications the technology has attained. If applicable, provide the Technology Readiness Level (TRL) and Manufacturing Readiness Level (MRL) of the technology:
Benefits of New Technology - Describe the benefits of the new technology from the user's perspective. Discuss potential cost and/or time savings, environmental, safety, and/or occupational health benefits, performance benefits, availability, maintainability, and/or reliability benefits, and warfighter readiness benefits, as applicable:
Cost Benefit Analysis: - Explain the projected return on investment (ROI) of the proposed technology and how long it is projected to take to achieve this ROI:

Technology Applicability - Discuss the potential applicability of this technology to other weapon systems, if known: