Sustaining Aging Air Force Aircraft into the 21st Century
Abstract

The United States Air Force (USAF) will operate its aircraft well beyond their original service lives. While structures and engines are known to be life limiting, other aircraft systems can limit life, pose safety risks, and affect availability, effectiveness, and costs. The Sustaining Aging Aircraft (SAA) Study was chartered to identify for the USAF investments that contribute to safety, availability, and capability. The SAA Study Panel of the USAF Scientific Advisory Board visited a cross section of military and commercial aircraft maintenance organizations to assess sustainment practices and identify technologies that can extend system life and ease maintenance costs. The Panel developed the following findings and recommendations:

1. Sustainment investments are driven by aircraft availability which may not correlate to resource utilization efficiency. A quantitative understanding is lacking concerning how efficient utilization of resources can best be achieved. Recommendation: Use existing USAF data to quantify the cost of aircraft availability (AA/$) as an efficiency metric and employ it, along with AA, to make depot investment decisions for each Mission Design Series (MDS).

2. Diminishing manufacturing sources are an increasing sustainment issue as aircraft age. Inaccurate demand forecasts result in inadequate supply support from the AF Global Logistics Support Center (AFGLSC). Recommendation: Improve AFGLSC supply chain data and forecasting to minimize field level and depot delays due to parts shortages.

3. Software complexity and requirements have grown faster than the Air Logistics Center (ALC) software sustainment workforce. Software sustainment scales with the number of MDSs, not number of tails. Recommendation: The USAF should adopt an enterprise approach to software sustainment throughout the lifecycle of an MDS featuring partnerships between Original Equipment Manufacturers (OEMs) and ALCs.

4. AF Research Laboratory (AFRL) devotes 3.5% of its budget to sustainment Science and Technology research, but little is focused on reducing maintenance costs for the large USAF legacy aircraft fleet. Recommendation: The share of AFRL research devoted to maintenance technology needs should be increased and fundamental R&D is required in corrosion science and software sustainment.

5. Airlines and OEMs emphasize reliability data to optimize their maintenance practices and use the Federal Aviation Administration to provide independent airworthiness oversight. Recommendation: The USAF should emulate commercial practices to include reliability-centered maintenance, incentive-based contracting, strengthened airworthiness oversight, and improvements to the quality, searchability, and integration of maintenance databases.

6. The Aircraft Structural Integrity and Propulsion Systems Integrity Programs (ASIP and PSIP) contribute to managing airworthiness of aging platforms. The Mechanical and the Avionics Integrity Programs (AVIP and MECSIP) have just been reinvigorated and the Computer Systems and Software Integrity Program (CSSIP) is new and has yet to provide the standards and tools required to impact software verification and validation. Recommendation: Ensure the integrity programs are part of lifecycle management plans, AF Fleet Viability Board evaluations, and flight worthiness certifications. Bring MECSIP, AVIP, and CSSIP up to the rigor of the ASIP and PSIP efforts.