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RESEARCH BRIEF

The U.S. Air Force's Aging Fleets Require an Improved Structural Integrity Program

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In recent years, budget pressures and high replacement costs have forced the U.S. Air Force to keep aircraft in service longer than originally intended. Aging aircraft face potentially serious structural problems. For example, structural deteriorations due to fatigue can lead to cracks and even complete fractures. There is growing concern in the Air Force that structural deteriorations are increasing, thus raising the maintenance workload, reducing aircraft readiness, and potentially increasing safety risks.

The Air Force has successfully ensured structural safety for decades through its Aircraft Structural Integrity Program (ASIP). The program involves design, analysis, and testing activities to ensure that the aircraft structure is adequate to operate as intended. These activities provide information to aid fleet-management decisions, such as creating inspection and maintenance plans and setting modification priorities. In recent years, however, there have been concerns that budget pressures, diminishing program regulations, and challenges in communicating structural conditions and structural needs to decisionmakers may be leading to omission or incomplete performance of ASIP tasks.

To aid the Air Force in its effort to strengthen and improve ASIP, RAND Project AIR FORCE (PAF) surveyed structural-life management programs in the U.S. Navy, the Canadian Forces, and the U.S. Air Force. Researchers drew several key insights about the benefits and limitations of various approaches to policy guidance, regulations, and the organizational structure of the ASIP program:

- Explicit policy on ASIP provides clarity on ASIP compliance but limits flexibility in structural-life management. Broad policy on ASIP, on the other hand, enables flexibility but risks lack of clarity about what constitutes acceptable compliance. *The policy should be sufficiently explicit to provide general guidance on ASIP compliance but should rely on independent assessments of ASIP compliance on a case-by-case basis to enable tailoring.*
- ASIP regulations can provide checks and balances for structural-life management, enable clear and timely communication, and promote stable and adequate resources for ASIP. Regulations could also lead to complex processes and management inefficiencies. *The regulations should thus focus on elements of ASIP that are critical to the program's viability to ensure a balance between its control and its flexibility.*
- Centralization enables standardization of program management and a forcewide view of ASIP compliance and air fleet status, while decentralization enables tailoring to a specific weapon system to achieve a cost-effective ASIP. *Centralization of a set of selective ASIP tasks, where standardization is useful, could still allow other aspects of ASIP to be tailored for cost-effectiveness.*

Regulations, communications, and resource-management approaches are highly interdependent and need to complement each other to achieve ASIP effectiveness. The Air Force should consider several options for enhancing ASIP:

- Clarify ASIP policy and extend existing processes to enable independent assessment of ASIP compliance.
- Formalize key ASIP processes and assign an independent assessment authority to continue enforcement of ASIP and to enhance communications.
- Facilitate communications between the lead command and the system program office by establishing close working relationships.
- Instill standardization (e.g., of data collection and analysis) for a commandwide view.
- Dedicate separate funding lines for critical ASIP tasks to ensure their stability. ■

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