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Research Report

Enabling Early Sustainment Decisions

Application to F-35 Depot-Level Maintenance

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Summary

The importance of strategic sourcing has been well recognized within the U.S. Air Force as the service continues to work toward a cost-effective sustainment enterprise. The goal of this analysis is to develop a set of criteria for support system design sourcing decisions that weapon system program offices can apply early in the acquisition cycle. The criteria will help determine whether the enterprise has the capability to sustain a system and, if not, whether it would be beneficial to develop that capability. If the new system can be routinely sustained within the Air Force, it may fit it into an existing enterprise structure and available capabilities (that could be expanded, if necessary).

The framework presented in this report addresses these sustainment planning challenges in several ways. First, the approach presented here provides a repeatable, analytically based decision tool that does not require a large amount of detailed data; we use historical Air Force repair data that are readily available and constantly archived. Second, this approach considers repair source decisionmaking in the context of the broader Air Force enterprise. That is, we examine large, complex "systems of systems," such as fighter aircraft, from the perspective of technologies and subsystems, some of which are common across different aircraft. Finally, these concepts are potentially applicable to other aspects of sustainment planning, such as managing government-mandated repair sourcing mixes and informing other Air Force sustainment community responsibilities, including depot activation, sustaining engineering, supply chain management, and product support integration.

We demonstrate the use of this framework by applying it to a new weapon system, the F-35 Joint Strike Fighter (JSF), identifying depot maintenance strategies at the aircraft subsystem/technology level. As currently planned, the F-35 JSF is the largest aircraft acquisition program in the history of the U.S. Department of Defense (DoD). Its total acquisition and operating and support (O&S) cost is expected to exceed $900 billion through 2065. Moreover, the F-35's cost-per-flying-hour estimate increased by more than 80 percent (in constant dollars) from 2002 to 2010. To ensure that the affordability of the F-35 program is not threatened by continuing O&S cost growth, the Air Force is examining alternative strategies to reduce those costs. The Air Force, Navy, and Marine Corps, through the F-35 Joint Program Office, have determined that all depot-level repairs on the F-35 will have a core component. Having a core component means that the government will maintain the capability to perform some—but not necessarily all—repair work at a U.S. government facility.[1] Core decisions are made to protect the services so that, in an event of a natural disaster, war contingency, or disruption in

[1] U.S. Department of Defense Instruction 4151.20, *Depot Maintenance Core Capabilities Determination Process,* January 5, 2007.

commercial-sector operations, the government will retain the capability to perform certain tasks. Air Force Materiel Command's Depot Operations Division (AFMC/A4D) has suggested that approximately 60 percent of the total depot maintenance workload for the F-35 falls into the core category.[2] Thus, although the U.S. government will retain the capability to perform the range of depot-level repairs, 40 percent of the workload—known as "above core"—can be considered for sourcing to an organic Air Force facility, another military service's facility, a foreign partner, or the private sector. DoD guidance states that above-core depot workloads should be assigned on the basis of a best-value determination.[3] But this guidance does not specify how to determine "best value." To help fill this gap, this report presents an approach to determining best value when assigning above-core depot workloads.

In the longer term, this kind of analysis can help shape the future sustainment enterprise by giving the Air Force an opportunity to examine subsystems across weapon systems. In doing so, the Air Force needs to evaluate the effects of new or emerging technology on its subsystem strategies. By performing such a review across weapon systems and across technology types, the Air Force will be better positioned to identify the sustainment system that it would like to have in the future.

This framework can also inform decisions about other product support activities, such as supply chain management or sustaining engineering. For example, data from the framework can support decisionmaking when there are breaches of the congressionally mandated division of depot workload between commercial and government-owned providers (commonly referred to as "50/50"). Moreover, the framework could inform discussions between weapon system developers and the Air Force concerning engineering projections of reliability and maintainability parameters by providing a basis for comparison with data from legacy aircraft.

[2] Discussions with AFMC/A4D personnel, April 12, 2012.

[3] U.S. Department of Defense, "Memorandum of Agreement on Joint Strike Fighter (JSF) Depot Source of Repair Assignment Process," 2010.