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A Repair Network Concept for Air Force Maintenance

Conclusions from Analysis of C-130, F-16, and KC-135 Fleets

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Summary

For more than 15 years, the U.S. Air Force has continually engaged in operations outside the United States. These operations have included humanitarian relief efforts, shows of force, support of allies, participation in coalition exercises, and a host of other missions. Current planning guidance from OSD indicates that this environment is likely to persist and directs the services to plan for high levels of such operations, although the specific nature, locations, durations, and intensity may be unknown. This is called the *steady-state security posture*. It depicts use of U.S. military capabilities different from that during the Cold War; the steady state is characterized by frequent deployments. Planning guidance still directs the services to develop capabilities to meet the requirements of major combat operations. At the same time, services are under pressure to operate more efficiently, to meet their mission responsibilities, and to contribute to joint expeditionary operations in Afghanistan and Iraq. Several logistics career fields have experienced serious stress, including security forces and civil engineering, in meeting these continuous deployment requirements. Therefore, the Air Force logistics leadership wishes to find more-efficient ways of supporting continuous aircraft deployments with fewer people. If this could be accomplished while providing the same or better level of effectiveness—e.g., aircraft availability—then some of the people freed up by more-efficient support could be reprogrammed into career fields that need it most, thereby making the Air Force more expeditionary.

To meet current and future aircraft deployment requirements, the Air Force has been using a logistics structure that was developed

primarily to support the Cold War and to meet the requirements of large-scale combat operations. This structure provided for largely self-sufficient units that carried with them significant maintenance capabilities, stocks, and other resources, on the assumption that they would be cut off from transportation for long periods.

However, the Cold War logistics support structure may not be the best one to meet many of the demands of current and likely future requirements. The Cold War structure was tailored to support full-squadron deployments to a set of known locations and a specific operational tempo. However, recent engagements have called for different deployment concepts, such as those that employ only parts of squadrons and those that deploy forces to unexpected locations and for unknown durations. These partial-squadron deployments are referred to as *split operations* because they split a squadron into smaller deployment packages. These split-squadron operations require more maintenance personnel because the squadron operates at two locations, which requires more personnel to support. These additional personnel exceed authorizations, and the Air Force has decided not to fund the additional spaces. So, more-efficient ways are required to support split operations.

In addressing the inability of the Cold War structure to meet the Air Force's needs, the leadership saw an opportunity for a comprehensive strategic reassessment of the entire Air Force logistics system. Senior Air Force logistics leaders asked PAF to analyze the logistics enterprise to identify and rethink the basic issues and premises on which the Air Force plans, organizes, and operates its logistics enterprise from a total force perspective—including the active-duty Air Force, the Air Force Reserve, and Air National Guard.

At a fundamental level, the logistics enterprise strategy must answer the following three questions:

- What will the logistics workload be?
- How should the logistics workload be accomplished?
- How should these questions be revisited over time?

Research Approach

To answer these questions, we organized our research into four steps. First, we examined the OSD planning guidance to ascertain what the requirements for Air Force weapon systems are likely to be, and, from that, we calculated a logistics workload. Second, we determined what workload must be performed at the unit level—largely that associated with launching and recovering aircraft and removing and replacing parts or components. Third, we generated various network options for other workload with an eye to optimizing them from an efficiency and effectiveness standpoint. Our analysis considers every potential combination, from fully decentralized solutions to fully centralized ones. Finally, we tested the network designs for sensitivity to location and various policy considerations.

The complex nature of this project led us to approach it in phases. Thus far, we have analyzed the F-16, KC-135, and C-130 maintenance networks (see McGarvey et al., 2009; Van Roo et al., forthcoming). Subsequent analyses will examine other mission design series (MDS) (types and models of aircraft), such as strategic air lifters.

Findings

Our major overarching conclusion is that consolidating certain wing-level scheduled maintenance tasks and off-equipment component repairs is more effective and efficient than the current system, in which every wing has significant maintenance capabilities to support these activities. Consolidating inspections and back-shop maintenance is more efficient because it requires fewer people. (See pp. 12–19.) It is more effective because consolidation can speed the flow of aircraft through isochronal and phase inspections,[1] including associated com-

[1] C-130 and other cargo aircraft undergo an isochronal inspection, based on calendar days since last inspection. F-16 (and other fighter aircraft) receive a phase inspection based on accumulated flying hours since last inspection. KC-135 undergo what is called a *periodic inspection*, defined as the earlier of a given number of calendar days or flying hours accumulated since last inspection.

ponent repairs, which means that fewer aircraft are tied up in maintenance processes at any given time, thus making more aircraft available to the operational community. (See pp. 31–34.) Consolidating backshop operations can provide immediate benefits and provide a good basis for integrating what are currently stovepiped intermediate- and depot-level processes, thereby opening up possibilities for even greater efficiencies and effectiveness.