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Unmanned Aerial Vehicle End-to-End Support Considerations

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Summary

Unmanned aerial vehicles (UAVs) have been used in combat operations since the mid-1900s (Office of the Secretary of Defense, 2002). More recently, both Operations Enduring Freedom and Iraqi Freedom have employed UAVs for intelligence, surveillance, and reconnaissance, as well as time-critical targeting. These successes have confirmed the military utility of UAVs and portend that a greater number of such vehicles may become part of the DoD's future force posture. However, because of the acquisition strategy employed to field UAVs as quickly as possible, the implications for their long-term support needs are unclear.

The Air Force originally acquired its Predator UAV, used in recent operations, as an advanced concept technology demonstration (ACTD). While an ACTD makes it possible for an operational capability to reach a combatant commander quickly, it raises concerns about the mid- to long-term effects of not completing the traditional logistics requirements determination processes. Because of the rapid acquisition and accelerated production schedules for the current unmanned systems, there was not enough time to complete these processes—or to gather the data with which to do so. A method for bridging the gap between rapid acquisition and traditional processes for determining logistics requirements needs to be established.

This report provides the background and results of a review of Air Force UAV and, to the extent possible, unmanned combat aerial

vehicle (UCAV) support options.¹ The analysis concentrates on current support postures and evaluates methods for improving current postures that may also be applied to future systems. Operational issues, such as potential employment options, are not considered in this report unless specifically related to support requirements. This report is meant as a review of systems that the Air Force currently owns or is acquiring, not as a critique of what the Air Force has purchased. We review the acquisition process only in terms of identifying ways to aid future acquisitions. The Air Force Deputy Chief of Staff for Installations and Logistics (AF/IL) sponsored this research in coordination with the Air Force Directorate for Operational Requirements (AF/XOR) and the Office of the Assistant Secretary of the Air Force for Acquisitions (SAF/AQ).

After reviewing combat support postures and lessons learned data for various current UAV systems (Global Hawk, Predator, Pointer, Raven, FPASS, BATCAM, and UCAV), the team looked for commonality among vehicles, support equipment, and requirements and examined the lessons learned on the individual programs and the issues they faced that could assist with defining recommendations to shape future support decisions. The team found that rapid acquisition strategies lead to design and procurement issues and disconnects between the requirements determination process and the acquisition process (see pages 19–24).

Rushing advanced concept technology demonstration prototype vehicles into production leaves no time for completing the system development and demonstration (SDD) cycle.² SDD would allow support concerns to be addressed prior to production of the vehicle. Without an SDD, much of the type of data needed for determining logistics requirements is not available (see pages 19–21).

A balance must be struck between providing a new capability rapidly and the effects of that on long-term support of that capability.

¹ At the time of this study, the UCAV was a Defense Advanced Research Projects Agency effort, and the Navy and Air Force had just submitted new operational requirements.

² SDD is the process formerly known as engineering and manufacturing development (EMD).

Traditional metrics normally associated with Air Force aircraft may not accurately depict the capabilities of a UAV system. For UAVs, a key metric in assessing the effectiveness of support and acquisition policies is the UAV fleet's ability to provide orbital coverage. To that end, the RAND Corporation developed a methodology for evaluating options for improved end-to-end combat support for UAVs (see pages 25–29). This methodology, which may be applied to both current and future systems, can be used to illustrate how logistics issues can affect operational capability. For this analysis, we applied the methodology to illustrate ways to improve UAV global support concepts to improve deployment and employment of current and future systems (see pages 29–36).

Even if the Air Force does not employ a methodology similar to the Logistics Implications Capabilities Assessment Model, there are several logistics support issues that the Air Force should address to enhance future UAV development. One example is budgeting to resolve support issues that arise during testing and evaluation. Future systems could build funding into the program budget for addressing test and evaluation support findings, thus improving air vehicle design and perhaps reducing long term support costs before the air vehicles enter full rate production (see page 37). Training issues need to be evaluated, and an integrated training requirement needs to be developed (see pages 41–42). Spiral development could also be addressed before production begins. If spiral development is used in future systems, having a plan in place to standardize the airframe before production begins could alleviate some logistical issues, such as maintaining multiple configurations of an air vehicle. Multiple aircraft configurations drive multiple spare component packages and, in the most extreme cases, may drive multiple pieces of test equipment, all significantly increasing long-term support costs (see pages 21–23). Additionally, a process should be initiated to ensure insights gained in current programs will be applied to future UAV acquisitions.