

In 1994, the Defense Advanced Research Projects Agency (DARPA), in conjunction with the Defense Airborne Reconnaissance Office (DARO), began the development of two unmanned aerial vehicles (UAVs). These systems were intended to provide intelligence, surveillance, and reconnaissance (ISR) information to the warfighter. They responded to the recommendations of the Defense Science Board and to operational needs stated by DARO on behalf of military service users.

UAV and tactical surveillance/reconnaissance programs have a history of failure in the United States resulting from inadequate integration of sensor, platform, and ground elements, together with unit costs far exceeding what operators have been willing to pay. This history of failure has contributed to a sense of frustration and to a realization that the DoD needs to explore ways to simplify and improve the acquisition process. To overcome these historical problems, DARPA, with congressional support, adopted an innovative acquisition strategy that differed from normal DoD acquisition procedures in several important ways. These innovations were embodied in seven specific elements of the strategy: designation as an Advanced Concept Technology Demonstration (ACTD) program; use of Section 845 Other Transaction Authority (OTA); use of Integrated Product and Process Development (IPPD) and a management structure based on Integrated Product Teams (IPTs); contractor design and management authority; a small joint program office; user participation through early operational demonstrations; and a single requirement—unit flyaway price (UFP)—with all other performance characteristics stated as goals.

The High-Altitude Endurance Unmanned Aerial Vehicle (HAE UAV) ACTD program consisted of two complementary system development efforts: the conventionally configured Tier II+ Global Hawk and the Tier III- DarkStar, which incorporated low-observable (LO) technology into the design of the air vehicle. The program also included a common ground segment (CGS) that was intended to provide launch, recovery, and control for both air vehicles.

The ACTD program was structured into three phases. Phase I was a design competition for the conventional Tier II+ system. Phase II included the development and test of both the Tier II+ (Global Hawk) and the LO Tier III- (DarkStar). Phase III involved the demonstration and evaluation (D&E) activity leading to a military utility assessment.

RAND has been analyzing the execution of the HAE UAV ACTD program's innovative acquisition strategy since the program's inception in 1994. Previous reports have documented the effects of that innovative acquisition strategy on Phase I and Phase II of the ACTD program.¹ The current research addresses the completion of Phase II, the transition to Phase III, and the transition to post-ACTD activities.

As the HAE UAV ACTD program transitioned to Air Force management and subsequently entered its D&E phase, it became useful to break down our analysis into several key issue areas: transition management issues; the activity content of the program; and the flight test program. This report specifically addresses the flight test program. A separately published summary document synthesizes the results of these three efforts; draws conclusions regarding the advantages and disadvantages of this innovative acquisition strategy; and suggests ways in which the strategy can be enhanced.

¹See Geoffrey Sommer, Giles K. Smith, John L. Birkler, and James R. Chiesa, *The Global Hawk Unmanned Aerial Vehicle Acquisition Process: A Summary of Phase I Experience*, MR-809-DARPA, Santa Monica: RAND, 1997; and Jeffrey A. Drezner, Geoffrey Sommer, and Robert S. Leonard, *Innovative Management in the DARPA High Altitude Endurance Unmanned Aerial Vehicle Program: Phase II Experience*, MR-1054-DARPA, Santa Monica: RAND, 1999. See also Robert S. Leonard, Jeffrey A. Drezner, and Geoffrey Sommer, *The Arsenal Ship Acquisition Process Experience*, MR-1030-DARPA, Santa Monica: RAND, 1999.

OBJECTIVES

The process of improving acquisition management methods, policy, and supporting analyses requires the accumulation of experience from ongoing or recently completed projects, especially those involving unusual situations or innovative acquisition strategies. This research contributes to that effort. The objective of this research was twofold: to understand how the innovative acquisition strategy used in the HAE UAV ACTD program affected program execution and outcomes, and to identify lessons that might be applied to a wider variety of programs in order to improve DoD acquisition strategies.

This report addresses the HAE UAV ACTD flight test program. This flight test program, conducted for the most part from February 1998 to September 2000, includes both engineering development testing and user demonstrations. Engineering development testing was conducted predominantly during Phase II of the ACTD; Phase III of the ACTD consisted predominantly of the D&E activities. The goal of this report is to understand how the HAE UAV ACTD program's innovative acquisition strategy affected the execution of the flight test program.

RESEARCH APPROACH

This multiyear research effort tracked and documented the execution of the HAE UAV ACTD program through the completion of the ACTD. The overall project was organized into three tasks.

Task 1: HAE UAV ACTD Program Tracking

The primary research task was to track and document the experience of both the program office and contractors as the HAE UAV ACTD program proceeded. This task involved periodic discussions with both the government program office and contractors in efforts to understand current program status, key events and milestones, and how the innovative elements of the acquisition strategy were being implemented. Task 1 also involved a thorough review of program documentation, including solicitations, proposals, Agreements, memoranda, and program review briefings. Information on program funding, scheduling, and the flight test program was also reviewed.

Through discussions and reviews of documentation, we were able to assess whether the acquisition strategy was having the expected effect as well as to identify issues arising in the course of program execution that either affected or were affected by the acquisition strategy.

Task 2: Comparisons to Other Programs

In this portion of the research, we collected and analyzed historical cost, schedule, and flight test data from comparable past programs. Relatively little historical data has been preserved on past UAV programs at a detailed level, limiting their value as a baseline for comparison with the current HAE UAV ACTD programs. Therefore, we assembled data on program outcomes from broader databases of historical experience in order to assess HAE UAV ACTD program outcomes in a historical context. Additionally, we examined the transition experience and the adequacy of testing of other programs in order to gain insight on the relative utility of the strategy employed in the HAE UAV ACTD program.

Task 3: Analysis and Lessons Learned

In this task, we synthesized the information collected under Tasks 1 and 2 and developed two kinds of overall results. One focused on understanding the extent to which the HAE UAV ACTD program was implemented as planned and the degree to which the program had achieved its expected outcomes. The other focused on comparisons between the HAE UAV ACTD program and other comparable programs. Together, these tasks yielded an understanding of the strengths and weaknesses of the overall HAE UAV ACTD acquisition strategy. We then interpreted those results in terms of lessons that might be applied to future programs.