
LESSONS AND RECOMMENDATIONS

ACTD PROGRAMS QUICKLY MATURE TECHNOLOGY AND DEMONSTRATE NEW OPERATIONAL CAPABILITIES

We believe that the ACTD program achieved a level of developmental and system maturity beyond what a traditional program would accomplish given similar time and funding. Yet while much was accomplished, at the end of the HAE UAV ACTD Global Hawk was not a fully developed system and was not ready for production and sustained operational deployment.

The Air Force program office believes that had the program's overriding priority lay in making the system production ready by the completion of the ACTD, this goal could have been accomplished. However, the overall objective of the acquisition strategy was to demonstrate an enhancement to the warfighter's operational capabilities in a way that was deemed by the users to be worth the cost. Given this overriding objective, the path to success in the ACTD required the use of limited program funding to prove the system's military utility via the execution of the D&E program.

There is a bias in ACTD guidance toward transitioning directly into low-rate production at the conclusion of an ACTD. This bias was reflected in the HAE UAV's original plan and subsequent post-ACTD planning efforts. We believe that this bias is neither suitable nor appropriate for a large, complex system. The constrained budget and tight schedule of an ACTD program are not conducive to addressing the complete development needs of a major defense system. As a result, many programs with characteristics that place them in the

realm of an MDAP—i.e., those with expected development and procurement costs large enough to be classified as an MDAP—may be too complex and involve too much risk to be constrained by the program structure an ACTD acquisition strategy demands. An ACTD's focus is rightly oriented toward demonstrating military utility, not toward the operationalization of a system.

ACTD-developed systems with characteristics that place them in the realm of an MDAP should be biased toward entry into the traditional process at EMD. The EMD should be tailored to take advantage of what was learned in the ACTD. Planning for the transition from ACTD to the tailored EMD should begin midway through the ACTD, thus providing enough time to ensure that the benefits of the ACTD experience become the foundation for post-ACTD development activities.

THE INNOVATIVE MANAGEMENT APPROACH WAS RESPONSIVE TO CHANGE

The HAE UAV ACTD program illustrates an important characteristic of program management that could benefit a wider array of programs. The management approach employed in the HAE UAV ACTD program was highly responsive to changing circumstances, including funding issues, technical challenges, cost increases, oversight conditions, political support, and business environment. Changes could be made to the program structure, the timing and length of phases, and performance characteristics that reflected both changes in the external environment and lessons from the ongoing program. There was also sufficient flexibility in the strategy to adjust development and test activity content in response to such stimuli while retaining a focus on the primary objective of demonstrating the utility of a new capability. That flexibility was facilitated by the use of OTA and IPTs, which led to a collaborative working relationship, as well as by the ACTD construct and early user participation, which maintained and enforced the program's prioritization of objectives.

GOVERNMENT MUST EXERT STRONG OVERSIGHT AND HAVE KEEN INSIGHT

The government program office must establish and maintain a strong oversight function while managing a program under OTA. The increased level of contractor design authority and management responsibility should not imply decreased government oversight responsibility; in fact, it demands more insight into the contractor's activities and progress. Because industry and government are motivated differently, only the government can ensure that its interests remain paramount. Even with a strong top-level oversight function, the government-contractor relationship can and must be collaborative at the working level using an IPT structure. This combination of management characteristics—government insight, strong oversight, and a collaborative work relationship—developed over time in the HAE UAV ACTD program.

Contractor responsibility should be limited to those areas constituting that contractor's core competency. Different contractor organizations have different strengths and weaknesses. The unstructured nature of OTA implementation can lead to the elimination of formal processes, particularly with regard to system engineering, that are essential to the success of a program. Care must be taken that the OTA contractual instrument is written to include equivalent processes.¹

Government program management must both be aware of and compensate for those weaknesses on the part of its contractor or contractor team. There are some areas—specifically flight testing beyond basic engineering flight test—in which virtually no contractor has a core competency. For instance, Ryan did very well in test execution but fared poorly in test planning. In these areas, the acquisition strategy should be altered to ensure that appropriate government organizations are in charge.

The government must also retain the authority to modify program goals as information is created. While increased contractor design

¹More recent programs using OTA have addressed this issue and have avoided many of the problems experienced in the early portions of the HAE UAV ACTD program. Giles K. Smith, Jeffrey A. Drezner, and Irving Lachow address this in "Assessing the Use of 'Other Transaction' Authority for Prototype Projects," DB-375-OSD, Santa Monica: RAND, forthcoming.

responsibility and management authority can contribute to innovation and streamlined program execution, the government must be able to enforce the execution of a program that addresses the government's priorities and risk preferences.

PROGRAM OBJECTIVES SHOULD BE MODIFIED AND BALANCED AS THE PROGRAM EVOLVES

Overall cost and schedule were essentially fixed in the HAE UAV ACTD program, with system performance stated as the parameter with a degree of flexibility. The only system requirement, the UFP, appears to have been designed to promote the program's survival up to the point at which the Air Force found the HAE UAV systems useful and therefore became less concerned with its cost. This strategy was successful in the Global Hawk program, as the Air Force abandoned the UFP shortly after D&E exercises proved the system's potential. The \$10 million UFP instilled a cost consciousness both in the program office and at the contractor.

We believe that cost, schedule, performance, and unit price should be stated as goals to be traded off within identified bounds. This approach allows for more intelligent trade-offs and leads to more cost-effective system design solutions. When one or more of these four parameters are fixed, the program becomes irrationally constrained. Flexibility of this sort already exists, but its use requires enhancement and encouragement in the acquisition, user, and requirements communities. All of these communities need to be more accepting of innovative concepts and more accepting of the results of trade-offs among cost, schedule, and performance objectives.

OPERATIONAL USERS MUST BE INVOLVED EARLY

Users must include both operators and product users—i.e., those responsible for putting the system into operation and those requiring the results of the system's successful operation. In most cases, these users are different communities or organizations with different perspectives, cultures, and priorities. Attention must be paid to the

valid requirements and desires of both users. It is the input and participation of operational users that allows trade-offs to be focused on key performance parameters that significantly affect mission capability.

Operational users must be incorporated into program decisions and processes early in the system's development, as it is these users who have the resources and knowledge to actively participate in the development process. To ensure the mutual support of both users and the success of the system under development, a mechanism should be put in place from the program's onset to quickly resolve user conflicts that are not easily resolved at the working level. We acknowledge, however, that involving operational users early in a development program is extremely challenging and that there are few examples of success. An operational user's desire to maximize operational suitability and supportability may conflict with the objective of maturing new technology and demonstrating a core capability. The challenge for program management is to achieve the appropriate balance given the objectives of the effort.

UP-FRONT PLANNING AND PREPARATION ARE CRITICAL TO SUCCESS

Sufficient time should be spent very early in the program on developing realistic cost, schedule, performance, and unit price goals as well as on creating a well-designed statement of overall program objectives to guide managers throughout the development activity. The characterization and assessment of risks, determination of nonrecurring engineering tasks, and planning for future transitions must also be conducted more thoroughly up front. These items should be revisited periodically during the course of the development effort.

Whether between phases and associated stages of development and technical maturity or of management responsibility and approach, transitions can be anticipated and provisions made for their realization. Early planning, inclusion of all relevant stakeholders, top-level

support, and event-driven milestones can contribute to smoother transitions.²

Organizations with a current or future interest in the system under development should have significant input into early planning. Key elements of the Air Force—particularly the operational users (ACC)—did not buy into the Global Hawk program. Had they been involved up front, a smoother program execution and transition into the force structure might have resulted. Early management plans should make it clear that the designated lead agency for post-ACTD activities should plan on funding the operationalization of the system. Mid-program reviews, potentially held immediately after flight test begins, should yield considerable insight into the nature and utility of the system and the kinds of development activities required in the future. Earlier consideration of these issues should resolve most of the requirements and budgeting process mismatches that occur at the conclusion of an ACTD.

A process should be put in place to ensure that the expectations of the various organizations involved in the program are managed and are realistic. In particular, expectations regarding the possible entry point of the system into the acquisition process should be thoroughly vetted. The acquisition and user communities should recognize that an important result of this type of approach might be the transfer of knowledge—new operational concepts, ideas, and technologies. These communities should also recognize that not all systems developed elsewhere are inherently deficient.

CONSISTENT SENIOR-LEVEL INVOLVEMENT AND SUPPORT IS CRITICAL TO SUCCESS

The consistent involvement and support of senior decisionmakers from key stakeholders is a critical factor in an ACTD's successful program execution. These endorsements facilitated the transition of the system into the force structure as well as the management approach for conducting further development, test, and production.

²For a complete discussion in the HAE UAV context, see Drezner and Leonard, *Innovative Development: Global Hawk and DarkStar—Transitions Within and Out of the HAE UAV ACTD Program*, 2001.

Stakeholders must include the leaders of the developing agency, the service and OSD acquisition organizations, the testing community, the designated unified command sponsor, and the operational user. Even with consistent senior-level support, resistance to new ideas can be expected throughout the organization. Senior-level support enables such resistance to be directly addressed and eventually overcome.