The Transition of ACTDs—Getting Capability to the Warfighter

Demonstrating Utility is Only Part of the Job

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The Advanced Concept Technology Demonstration (ACTD) initiative is a pre-acquisition activity that provides the user an opportunity to operate a prototype capability and to judge its military utility prior to an acquisition decision. Specifically, ACTDs focus on the question, "Is there a near-term solution, based on mature technology, that provides a useful and cost-effective response to this military need?" Demonstration managers typically structure ACTDs to be two to four years in duration and to be ready to move rapidly into the formal acquisition process if the user concludes that the proposed capability has significant utility and should be acquired. In the interim, the user retains the residual equipment from the ACTD, thus establishing a limited operational capability.

One set of challenges that the ACTD process faces is to enter the acquisition as far downstream as possible, and to do so with a quality product while maintaining the ACTD's established momentum. Another challenge is to transition effective and supportable residuals to the user, providing a useful interim capability. To respond to these challenges, the ACTD process includes development of a transition strategy during the initial planning phase for each ACTD, and the use of an integrated product team (IPT) approach during the ACTD to coordinate both the planning and preparations for these transitions.

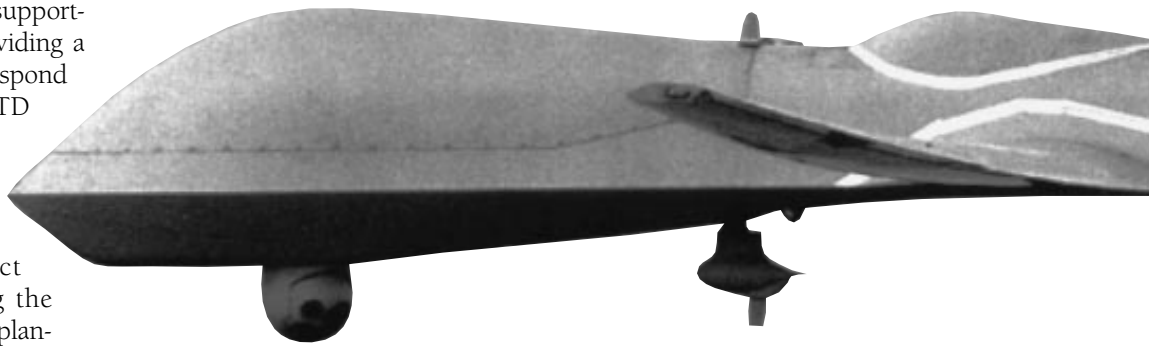
Classes of ACTDs

The wide variety of ACTDs and the broad spectrum of capabilities that they represent, make it difficult to be definitive about ACTD transitions without first identifying the type of ACTD involved and the post-ACTD objective. To distinguish among types of ACTDs that present quite different transition issues, the Department created a classification system. This classification system does not apply in all cases, but it does provide a useful starting point for discussion.

Based on the ACTDs DoD initiated in FY95 and FY96, three major classes emerged (Figure 1). The first, Class I, contains those ACTDs that are software-intensive and that employ commercial workstations as the computing platforms. Here, proliferating the capability demonstrated during the ACTD involves purchasing additional commercial platforms, duplicating the software, and installing the system at additional sites. To maintain the system, the user will also require post-deployment software support. Class I ACTDs are generally the easiest to manage from a transition perspective.

Class II ACTDs are weapon, or sensor systems not unlike those found in the formal acquisition process. The unmanned aerial vehicles (UAV) are typical of ACTDs in this class.

Class III ACTDs are best described as systems-of-systems. They typically incorporate major elements (systems) in a high-level architecture that is intended to perform a specific mission. The individual elements may already be in the acquisition process and assigned to perform some other mission or missions. However, by acquiring additional elements or allowing joint use of the planned or existing assets, the ACTD architecture can provide a totally new capability. The transition of Class III ACTDs is the most difficult from a coordination perspective due to complexity and



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lack of precedent for many of the activities.

Post-ACTD Objective

Before a transition strategy can be established, the developer and user must define what they propose to do with the capability following completion of the ACTD, assuming that it is determined to have high military utility and is intended to be issued to the operating forces. First, is it appropriate to enter the formal acquisition process, and if so, what is the proper entry point? If the quantity and capability of the residual hardware are adequate to fully satisfy the military need, the objective should be to transition the residuals to the user and to acquire nothing more. On the other hand, for a specific Class I ACTD, there may be a need to install a small number of additional systems at designated locations. In this case, the post-ACTD objective would consist of acquiring and installing additional commercial workstations.

A third possibility for the post-ACTD objective would be to enter a final development phase. This would probably be a tailored Engineering and Manufacturing Development (EMD) program in which the ACTD configuration would be made more robust, smaller, less expensive, or would be integrated with an existing host system. While further development may be a legitimate objective, in some cases it will delay fielding and should be chosen only when a transition into production has serious drawbacks.

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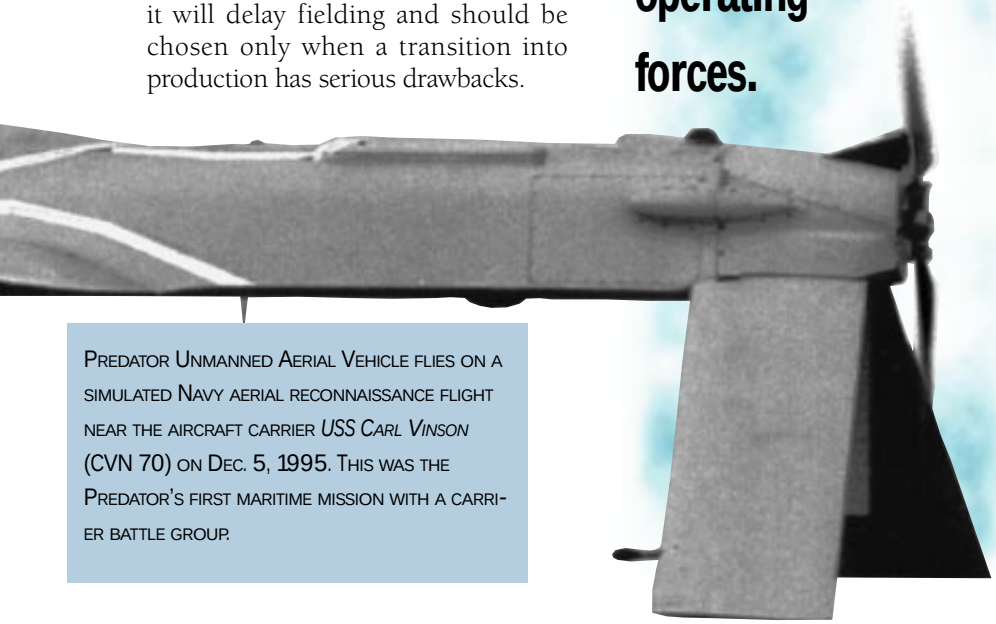

PREDATOR UNMANNED AERIAL VEHICLE FLIES ON A SIMULATED NAVY AERIAL RECONNAISSANCE FLIGHT NEAR THE AIRCRAFT CARRIER *USS CARL VINSON* (CVN 70) ON DEC. 5, 1995. THIS WAS THE PREDATOR'S FIRST MARITIME MISSION WITH A CARRIER BATTLE GROUP.

The fourth alternative is to enter directly into production following the ACTD. Entry into low rate initial production (LRIP) or, in some cases, into full rate production is a preferred objective when the hardware is required in quantity and unavailable commercially. Clearly, a major advantage exists in terms of getting capability into the hands of the warfighter quickly—a savings of three to five years. Aiming for LRIP is also fairly consistent with the demands associated with fieldable prototypes, since the design must already be suitable for the operational environment and for use by the intended operators. Admittedly, LRIP may not be the correct transition objective for all ACTDs, but for many Class II ACTDs, it will be.

Preparing for the Transition to Acquisition

Within this framework of types of ACTDs and post-ACTD objectives, it is possible to address guidelines for planning the transition process. The specific example that will be discussed in this article is the transition of a Class II ACTD into LRIP.

Contracting Strategy

Preparing for transition of a Class II ACTD into LRIP must begin as soon as DoD approves the ACTD. One of the first topics to consider is contracting strategy. It is important to obtain the benefits of competition early and to project those influences as far downstream as possible. One way to do this is to conduct a competition at the start of the ACTD and to retain multiple contractors during the early phases of the program. If multiple contractors cannot be retained, prior to the final downselect the government may choose to request bids for an option for LRIP, or may establish a unit price objective and make the production follow-on contingent upon meeting that objective. Regardless of the specific approach selected, it is important to develop a long-term contracting strategy and to communicate that strategy effectively to industry. Doing so will allow industry to judge both the risks and the rewards and to

make their investment decisions accordingly.

Supportability Strategy

Planning to proceed into LRIP at the conclusion of the ACTD means that there will be only one cycle of development and test prior to the start of production. Therefore, any required supportability features must be included in the design of the prototype. For example, built-in test capability required for fault detection and isolation must be developed and tested as an integral part of the ACTD. There will be no later opportunity to add that capability prior to the start of production. The Request for Proposal for the system development contract should clearly define the goal of entry into LRIP and should ask the bidders to describe their approach to ensure that supportability of both the residuals and the production configuration is adequately addressed in the ACTD.

Interoperability

In planning a fast-paced program to develop and demonstrate a solution to a critical military need, any tendency to adopt a stovepipe solution must be avoided. While ACTDs generally provide less than optimum solutions, they typically establish an early capability that will be improved upon over time. It is important that this initial capability recognize and respond to the need for interoperability. The preferred strategy is to define the interoperability for the objective system, to determine how many of those requirements are appropriate for the prototype, and then to define a credible growth path that leads to full interoperability.

Preparing for the Transition of Residuals

The decision to transfer the ACTD residual capability to the user is a decision separate from the acquisition decision, but one that will also be based primarily on the issues of effectiveness and suitability. In this context, effectiveness relates to the performance of the ACTD prototype and the quantity of prototypes required to achieve military significance.

The quantity will need to be large enough to enable commanders of receiving units to perform their missions more effectively than they could without the residuals. Otherwise, they are unlikely to be willing to accept the maintenance and training burdens imposed by the integration of new equipment into their units.

The developer and user need to address the quantity of residuals during the early planning for the ACTD. They also need to address the suitability of the prototypes for use by the intended operators in the operational environment. This means giving proper emphasis to such areas as reliability, maintainability, man-machine interface, and designing for the operating environment. These are the primary differences that distinguish the ACTD fieldable prototype from a more common functional prototype.

In addition to the issues of effectiveness and suitability, the preparations for the transition of residuals will also have to address the concept of operations, logistics support, safety, maintenance, manning, and training. In many cases, the approaches used during the ACTD can be extended either as an interim or a long-term solution. For example, contractor logistics support may be a cost-effective alternative to organic maintenance prior to the fielding of the full operational capability. Where maintenance activities are located outside of the combat area, contractor logistics support may be the preferred solution for the long term. The specific solution to each of these issues will need to be developed jointly between the developer and user organizations and tailored to the individual ACTD.

Figure 1. Classes of ACTDs

ACTD Class	POST-ACTD PHASE		
	EMD	PROD	FIELDING
I Software/ Workstation/ Communications			R+
II Weapon/ Sensor System	✓ or	✓	R
III System of Systems	✓ &/or	✓	R

✓ - Likely Transition R - ACTD Residuals

Assessing Military Utility

The objective of an ACTD is to respond to a critical military need by building a fieldable prototype and putting that prototype into the hands of the warfighter for assessment of its utility. The central question in an ACTD is the military utility of the proposed solution. Three key parts comprise the assessment:

- First, is the capability effective? In other words, does it do the job it is designed to do?
- Second, is it suitable for use by the intended operators?
- Third, how important is it to the overall warfighting capability?

The users determine military utility. They also ensure that the military

exercises used in making that determination are both realistic and representative of expected operational environments. The users can get significant assistance on the first two questions from the operational testers who have experience and expertise in evaluating effectiveness and suitability. The operational testers can assist in structuring the exercise, defining the data needs, and in characterizing the performance of the system. The third question, importance to overall warfighting capability, is a more subjective determination that must be made by the users. This question needs to be addressed because, normally no funds are programmed prior to this point for system acquisition. Obviously, if the lead Service decides to acquire the capability, it must program the necessary funds. Demonstrating that the system is effective and suitable is a necessary task, but it is not sufficient to justify funding. In a zero sum environment, many demands compete for funding. To obtain support for acquisition funding, users must also show that the new system makes a significant contribution to our total warfighting capability.

Defining Operational Requirements

As mentioned earlier in this article, the Department initiates ACTDs based on broad statements of need. However, entering the formal acquisition process requires preparation of an Operational Requirements Document (ORD). At the time the Department approves an ACTD, it also designates a lead Service. During the ACTD, that Service develops the ORD. Although the ACTD process provides unique and very valuable inputs to the ORD development effort, it can also introduce complications into the task. The unique inputs come from the opportunity to "go to war" with a prototype capability and to judge its strengths and weaknesses under stressing operational conditions. The complications stem from the fact that the user must then choose from among several possible outcomes for the ACTD (Figure 2).

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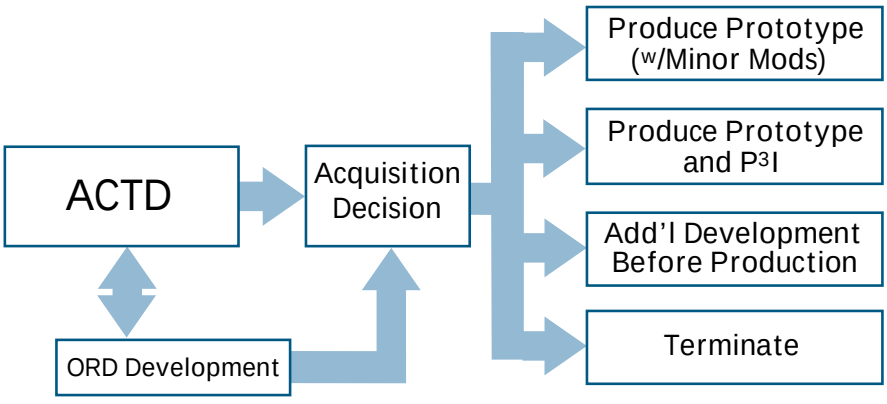
- If the prototype proves to be effective and suitable, the preferred course of action is to proceed directly into production, probably beginning with LRIP. Design refinements could be incorporated concurrently to correct minor deficiencies, if these refinements did not introduce significant risk into the program.
- A second outcome could be associated with a conclusion that the prototype is useful, but that specified upgrades could significantly improve its utility. Here, the approach could be to proceed directly into production with the prototype configuration (and minor modifications if needed), and to accomplish the upgrades via preplanned product improvements (P^3I).
- A third outcome could result from a conclusion that the prototype does not provide a useful capability, but with further development, it could eventually provide an effective and suitable capability. In this case, an EMD phase could be the appropriate follow-on activity.
- The fourth outcome reflects the conclusion that the prototype does not provide a useful capability, nor does it offer sufficient potential to justify further development.

The ORD for the first two outcomes would reflect the operational requirements for the prototype capability with specific changes or additions to address the minor modifications or P^3I. The ORD for the third outcome may also differ only in terms of the

Figure 2. ACTD Outcomes



specific values for a few critical requirements. A suggested approach to the development of the ORD is to create a draft ORD early in the ACTD that reflects the expected capability of the prototype. If concerns exist with certain capabilities of the prototype, these capabilities could be flagged for detailed evaluation during the ACTD.

The first two-way arrow between the two activities (Figure 2) represents this interaction between the ORD preparation and the ACTD. The final interaction between these two occurs at the conclusion of the ACTD when the user knows the results and begins to contemplate changes in the operational requirements. This interaction takes place among the user, who operates the prototype during the exercises; the developer, who can address the implications of potential changes from the standpoints of cost and the schedule for fielding; and the operational testers, who can address the implications on readiness to enter production. One of the greatest benefits of ACTDs is the depth of knowledge and understanding that they provide users before they have to choose which of the outcomes best fits their needs, and before they have to issue an ORD that supports that choice.

The Transition Planning Process

The actions taken during the early stages of an ACTD must reflect many of the elements of the transition process. For example, major procurement actions must reflect the contracting, affordability, interoperability, and supportability strategies. This requires that demonstration managers develop these strategies during the initial planning for the ACTD. Similarly, they must gear the demonstrations or military exercises to the basic issues that will determine military utility. The ACTD Management Plan then, should reflect these strategies and plans. As the Management Plan is taking form, and well before its approval, the demonstration manager should form a Transition Integrated Product Team (TIPT) to get the key stakeholders together and review the strategies and plans. As shown in Figure 3, the TIPT serves as a bridge between planning activity at the start of the ACTD and the decisions that will govern transition to acquisition and to fielding of the residuals.

During the ACTD, the TIPT ensures that the transition planning activities include participation by the responsible Office of the Secretary of Defense (OSD) and Service organizations. The emphasis is on the identification and resolution of issues, as well as full coordination of the resulting plans. As the ACTD nears completion, the TIPT will hand off to an Overarching IPT (OIPT), which will complete a final review of the proposed acquisition and will prepare for a formal program review by the Defense Acquisition Executive. The TIPT will also prepare for and schedule a review with the user to confirm that the necessary preparations are on track for fielding of the residuals.

Conclusion

The Predator ACTD is completed. The user judged the Predator's military utility to be very high, and one of the residual systems is currently operating in support of peacekeeping operations in Bosnia. The Predator TIPT efforts are also completed, and the TIPT has now handed off the ACTD to an OIPT. A Program Review to consider initiation of LRIP is planned for mid-FY97. Based on experience with Predator, the Department developed and published guidelines for the transition of Class II ACTDs in the first update of the Acquisition Deskbook. This article summarizes these guidelines. Using these guidelines, demonstration managers can tailor the transition plans for other Class II ACTDs. The strongest lesson learned from the Predator experience was the importance of getting key stakeholders involved early in the development of a transition strategy. Also important is to keep them involved, through an IPT approach, in the detailed planning and preparations for the transitions. Currently, the Department has formed TIPTs for three additional ACTDs: Outrider, the tactical UAV, which is another Class II ACTD; Counter Proliferation (CP), a Class III ACTD; and Rapid Force Projection Initiative (RFPI), another Class III ACTD. The transition guidelines will be expanded to address the unique aspects of Class III ACTDs based on experience gained from CP and RFPI.

Figure 3. Transition Framework