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Transitioning Advanced Concept Technology Demonstrations to acquisition programs

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THESIS

TRANSITIONING ADVANCED CONCEPT TECHNOLOGY DEMONSTRATIONS TO ACQUISITION PROGRAMS

by

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December 2003

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13. ABSTRACT

This thesis evaluated the Department of Defense's Advanced Concept Technology Demonstration (ACTD) process and the challenges encountered in transitioning an ACTD to an acquisition program. The methodology included case analyses of two ACTD programs that transitioned to acquisition programs to determine their levels of success. The scope included a review of: 1) ACTD origins and processes as of July 2002, 2) past ACTD programs, 3) the established documentation criteria associated with ACTD selection and evaluation, 4) the two ACTD case programs selected for analysis, 5) the apparent ACTD transition areas prone to success or failure, and 6) potential process improvements that would aid in ACTD transition to acquisition programs. This thesis identified both the strengths and the weaknesses in the existing ACTD transition process. The results indicated that several of the existing ACTD criteria should be maintained. However, it was also determined that several enhancements could be incorporated into future processes. It concluded with recommended improvements that would enhance the insertion of technology to the warfighter via the acquisition process. With the combination of current practices and implementation of these recommendations, ACTDs could become the cornerstone of the Secretary of Defense's new acquisition process.

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TRANSITIONING ADVANCED CONCEPT TECHNOLOGY DEMONSTRATIONS TO ACQUISITION PROGRAMS

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requirements for the degree of

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I. INTRODUCTION

In 1993, senior Department of Defense (DoD) leaders generated an idea they expected would add efficiency to the formal acquisition process while accelerating the implementation of new technology for the warfighter. The Advanced Concept Technology Demonstration (ACTD) process, as it became known, was officially initiated in 1994 in response to the recommendations of the Packard Commission of 1986 [President's Blue Ribbon Commission on Defense Management, Jun 1986] and the Defense Science Board reports of 1987, 1990 and 1991 [Reports of the Defense Science Board, 1987, 1990, 1991]. The Packard Commission outlined the problem by stating that "too many of our weapons systems cost too much, take too long to develop, and – by the time they are fielded – incorporate obsolete technology'. These sentiments were the nucleus for future ACTD efforts. Since its inception, a total of 98 ACTDs have been initiated during Fiscal Years (FYs) 1995 through 2002.

The intent of the ACTD process is admirable. However, complications can arise when transitioning a demonstration program to the acquisition process. This thesis evaluates the ACTD process and the challenges encountered in transitioning to an acquisition program. The objective is to analyze programs that have successfully completed the ACTD process and attempted an acquisition transition. Investigations will determine their level of success. If transition success has been limited, potential improvements to the transition process will be evaluated. Research associated with this thesis included Internet investigations, surveys of transitioned ACTD programs and discussions with various DoD offices and with ACTD program participants. The research and survey data will be used to support any changes that should be made to improve the execution of the ACTD process and its transition to acquisition.

A. BACKGROUND

As defined in Department of Defense Directive (DoDD) 5000.1 the primary objective of Defense acquisition is to acquire quality products that satisfy user needs with measurable improvements to mission accomplishment and operational support, in a timely manner, and at a fair and reasonable price. [DoDD 5000.1, Jan 2001] Department of Defense Instruction (DoDI) 5000.2 identifies technology transition mechanisms designed to ensure the transformation of innovative concepts and superior technology to the user and acquisition customer through: 1) Advanced Technology Demonstration (ATD) programs, 2) ACTD programs, and 3) Experiments. [DoDI 5000.2, Jan 2001]

The formal acquisition process, as directed by DoDD 5000.1 and DoDI 5000.2, is the primary mechanism for the procurement of new systems and the introduction of new capabilities via new or upgraded systems. Recently, it has been recognized that the ACTD process, as a pre-acquisition event, provides an important mechanism and opportunity for the warfighter to try out and evaluate proposed technology solutions to urgent military needs. [ACTD Introduction, Sep 2001] Each ACTD is aimed at one or more warfighting objective and is reviewed by the Services, Defense Agencies and the Joint Staff. Key criteria by which ACTD candidates are evaluated consist of: 1) Response to user needs, 2) Exploit of mature technologies, and 3) Potential effectiveness. [ACTD Guidelines - Introduction to ACTDs, May 2001] An ACTD is designed to provide a sound assessment of the military utility of a proposed solution prior to a decision on formal development or acquisition. The purchase of additional capability beyond the residuals provided by the ACTD, where appropriate, is accomplished through a formal acquisition program.

While identified as tools to rapidly transition technology to the warfighter, it is not certain whether ACTDs live up to their expectations. As defined in greater detail later in this thesis, ACTDs are two to four year programs that, if successful, may be transitioned to the warfighter as residual assets, for two or more years, or as a new acquisition program. Utilization of residual assets alone typically lack the logistics chain associated with standard DoD program, thus limiting useful life. The acquisition transition process however, currently requires funding, via the Program Objectives Memorandum (POM) cycle, along with the appropriate DoD acquisition related documentation to be available/completed before the process can move forward. These combined events impart a two-year acquisition transition window following the successful completion of an ACTD program, which adversely impacts program momentum. Additional momentum impacts include changes in user organizations, sponsor organizations or lead service organizations.

The ACTD process has a significant level of management oversight, however each program is highly tailored and there is a much less formal structure than with the standard acquisition process. The standard process typically involves programs with higher funding levels, which are therefore governed by laws and regulations, which have to be addressed by major defense acquisition programs. For those ACTDs that demonstrate strong military utility, the intent is to transition into the formal acquisition process to acquire the system in sufficient quantity to meet the operational requirement. However, without careful preparation, the transition may result in the loss of some of the benefits of the ACTD. For example, without suitable preparation in areas such as contracting, costly delays - including a break in a production line - could occur. Upfront planning is crucial to ensuring successful transition of an ACTD to the acquisition process. Potential outcomes that could be expected depending on the amount of groundwork performed could include:

1. ACTD does not transition because it is judged to lack military utility.
2. ACTD does not transition because of poor management (or other problems).
3. ACTD transitions, but has problems (due to poor management, etc).
4. ACTD transitions with no problems.

The ACTD process appears to be performing its job well, 43 out of 98 ACTDs have successfully completed the demonstration phase based on DoD statistics. However, ACTD transition to a DoD 5000 series acquisition project remains a hurdle with only 32 out of 98 ACTDs currently being executed as acquisition programs. [Joint Warfighting Science and Technology Plan, Feb 2002]. Tailoring of this process or defining transition needs to benefit the program and the warfighter is required. This thesis will attempt to define those elements that have helped or hindered ACTD transitions and establish guidelines to assist transitions in the future.

B. PURPOSE

The purpose of this thesis is to investigate the ACTD process and the ability of these programs to transition into the standard acquisition process. Investigations will also include the complications associated with these transition efforts and propose some possible improvements to these actions.

C. RESEARCH QUESTIONS

The research questions associated with this thesis consist of:

1. What potential improvements to the ACTD transition process can be indicated by comparing two ACTD programs?

2. When was the ACTD process initiated and what was the original intent?

3. What ACTD programs have been initiated to date?

4. Which ACTD programs have successfully transitioned/not transitioned to an acquisition program?

5. Why have or have programs not managed to successfully transition?

6. What comparisons and contrasts exist between transitioned ACTD programs?

7. What aspects of the acquisition process enhance / hinder program transition?

8. What strengths and weaknesses can be associated with an ACTD transition?

9. What processes or procedures could be implemented to enhance future transitions?

10. How can ACTD programs be used more extensively in the future?

D. BENEFITS OF STUDY

This thesis is intended to define actions that improve the ability of ACTD programs to transition to the acquisition process.

E. SCOPE AND METHODOLOGY

The scope of this thesis is to: (1) review of the ACTD process as defined under the DoD 5000 documentation effective as of July 2002, (2) review past ACTD programs – both successful and failed, (3) perform an analysis of 2 selected ACTD programs, (4) investigate potential areas prone to failure, and (5) define potential process improvement which would aid in ACTD transition to DoD 5000 acquisition programs. This thesis is intended to identify weaknesses in the existing ACTD transition processes and conclude with recommended improvements that enhance the insertion of technology to the warfighter via the acquisition process.

The methodology used in this thesis research consists of the following steps.

1. Research the origins and intent of the ACTD process. Identify why ACTDs were felt to be needed and what benefits were expected to be gained by its implementation.

2. Conduct a review of the DoD 5000 documentation effective as of July 2002. Gain an understanding of how ACTD programs relate to the DoD acquisition process. Identify the DoD 5000 elements/criteria that must be met for an ACTD to transition to the standard acquisition process.

3. Research the ACTD programs that have been initiated between FY95 and FY02. Establish a database of these programs and identify which have transitioned to the acquisition process. Define criteria for the selection of two ACTD programs to be analyzed.

4. Conduct a literature review of Internet sites, magazine articles, and other library or information resources related to the identified ACTD programs, their associated reports and processes.

5. Contact the DoD agencies responsible for ACTD execution and obtain appropriate background information. Locate key participants in selected ACTD programs and discuss overall program execution along with ACTD strength and weaknesses.

6. Establish evaluation criteria for ACTD analysis. Comparison points could include organization structure, service types, participant changes, degree of formality, establishment of documentation, extent of Military Utility Assessment (MUA), Milestone (MS) entry point or other potential success/failure criteria. Criteria can be considered for ACTD execution and post ACTD activities.

7. Define common factors between ACTDs, both potential strengths and weaknesses. Identify what comparisons and contrasts exist between transitioned ACTD programs. Define areas where DoD instructions hinder the transition process. Identify aspects that enhance ACTD transition.

8. Define the areas of ACTD production transition successes and failure. Identify what aspects of the acquisition process enhance/hinder program transition. Indicate what processes or procedures could be implemented to enhance future transitions and how ACTD programs can be used more extensively in the future.

F. ORGANIZATION OF STUDY

This thesis is organized into five primary sections, the first of which discusses the acquisition reform revolution. This section will describe the DoD acquisition process, the beginnings of the ACTD revolution, ACTD goals, processes and program review. The second section will review the successes and failures of the ACTD process. Content will consist of acquisition history, contracting and cost goals, program management, development, deployment, and transition to production. These sections will be followed by separate analysis of the Unattended Ground Sensors (UGS) and Joint Modular Lighter System (JMLS). Analysis will include the successes and failures encountered by these ACTDs, and a summary of their impacts on the respective programs. From these sections, potential incentives and hindrances of the ACTD process will be described completing with ACTD program transition conclusions and recommendations.

II THE ACQUISITION REFORM REVOLUTION

> In 1995 the first ACTD programs were initiated. In that year, twelve demonstrations were authorized. These programs were the first steps of an evolutionary acquisition reform revolution that continues today. The latest of these, the definition of the spiral development concept, was clarified in April of 2002. Evolutionary acquisition and spiral development are methods that will allow the US government to reduce its cycle time and speed its delivery of advanced capability to the warfighters. [Evolutionary Acquisition and Spiral Development, Apr 2002]

Chapter II will discuss the evolution of the DoD acquisition process, the initiation, development and adaptations implemented in the ACTD lifespan, the processes and goals associated with ACTDs, and will close with a brief review of the ACTD programs initiated between FY95 and FY02. This information will help the reader understand and appreciate the acquisition process and how ACTD programs interface and are integrated with DoD 5000.

A. THE DOD ACQUISITION PROCESS

The DoD 5000 acquisition process was begun over 20 years ago in 1971 with the establishment of the first DoD Directive 5000.1, "Acquisition of Major Defense Systems". Since that time it has been shaped and fashioned in attempts to not only improve the delivery of the final product to the warfighter but also to shorten the time required to provide an improved capability.

The defense acquisition system exists to secure and sustain the nation's investments in technologies, programs, and the product support necessary to achieve the National Security Strategy and support the United States Armed Forces. The Department's investment strategy must be postured to support not only today's warfighter, but also the next generation, and future war fighting forces beyond that. [DoDD 5000.1, Jan 2001]

The primary objective of defense acquisition is to acquire quality products that satisfy user needs with measurable improvements to mission accomplishment and operational support, in a timely manner, and at a fair and reasonable price. In so doing the DoD uses performance and results-based management practices to ensure an efficient and effective acquisition system. Successful acquisition programs are fundamentally dependent upon competent people, rational priorities, validated requirements, performance measurement, and clearly defined responsibilities. [DoDD 5000.1, Jan 2001]

The current guiding documents associated with the DoD acquisition process are the Department of Defense Directive (DoDD) 5000.1, "The Defense Acquisition System", DoD Instruction (DoDI) 5000.2, "Operation of the Defense Acquisition System", and DoDI 5000.2-R, "Mandatory Procedures for Major Defense Acquisition Programs (MDAPs) and Major Automated Information System (MAIS) Acquisition Programs". All of these documents were effective as of July 2002.

The Under Secretary of Defense (Acquisition, Technology, and Logistics) (USD(AT&L)), the Assistant Secretary of Defense (Command, Control, Communications, and Intelligence) (ASD(C3I)), and the Director of Operational Test and Evaluation (DOT&E) are the key officials responsible for the Defense Acquisition System. They may jointly issue DoD Instructions, DoD Publications, and one-time directive-type memoranda that implement the policies contained in DoDD 5000.1. [DoDD 5000.1, Jan 2001]

In April 2002 the milestones associated with the DoDI 5000.2 were modified. The relationship between the old milestones and the new milestones are presented in Table 2-1 below. A graphic representation of this relationship is provided in Figure 2-1 that follows.

Old Milestone	New Milestone
Milestone 0	Milestone A
Milestone 1	Program Initiation
Milestone 2	Milestone B
Low Rate Initial Production Decision Point	Milestone C
Milestone 3	Full Rate Production Review
Engineering, Manufacturing and Development	System Development & Demonstration

Table 2-1. Milestone Relationships [DoDI 5000.2, Apr 2002]

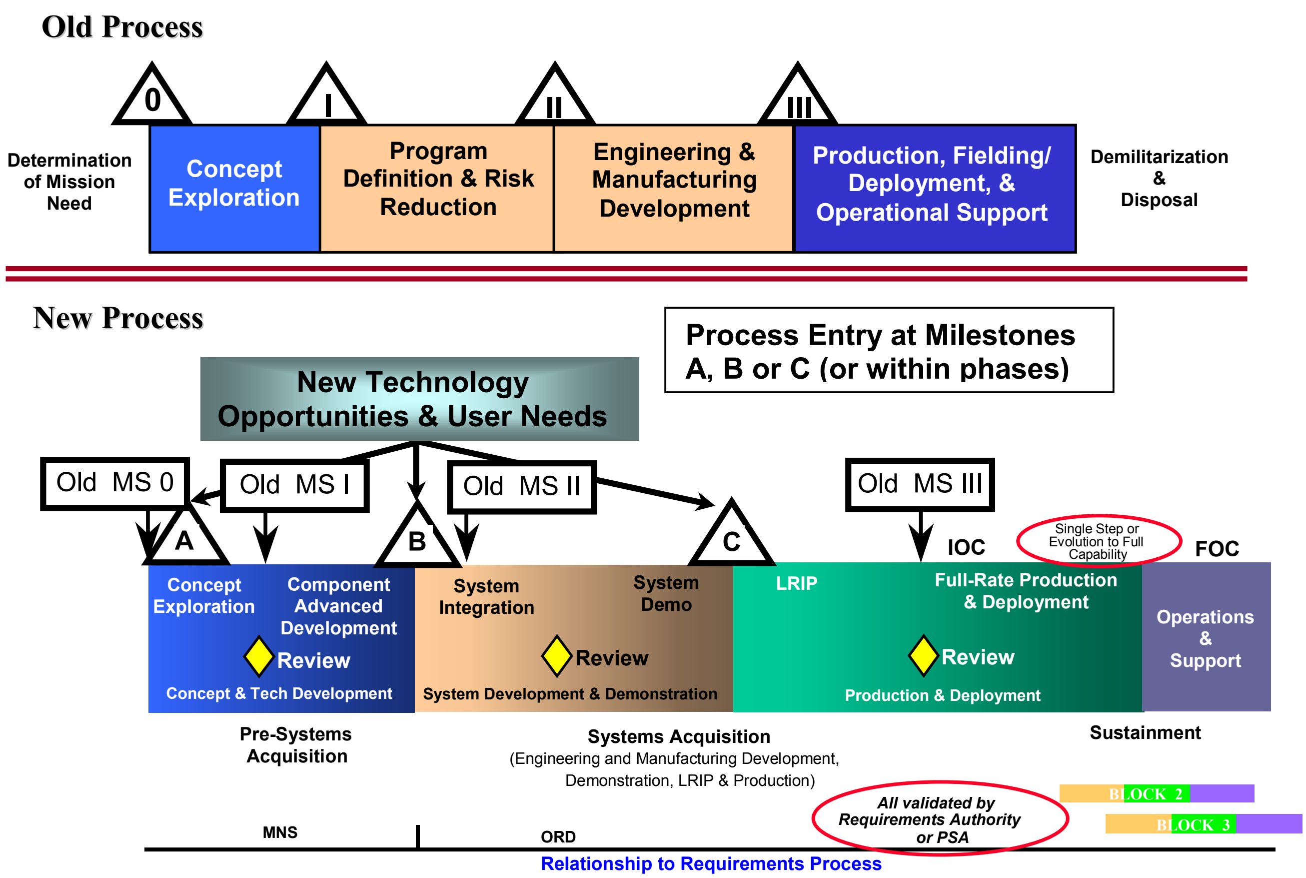

Figure 2-1. DoD 5000 Acquisition Process Comparison [DoDI 5000.2, Apr 2002]

Under this process, the Concept and Technology Development phase begins at Milestone A (MS A). This phase consists of Concept Exploration and Component Advanced Development, as depicted in Figure 2-1. Concept Exploration typically consists of competitive, parallel short term paper studies of alternative concepts for meeting a user need. For these studies, emphasis is placed on innovation and competition. Component Advanced Development includes the development of subsystems/components based on proven concepts. These subsystems/ components must be demonstrated before integration into a system or they must be part of a new system concept/technology demonstration(s). [DoDI 5000.2, Apr 2002]

Concept and Technology Development entrance criteria mandates that the requirements authority validate and approve a Mission Need Statement (MNS) and the Milestone Decision Authority (MDA) ensure a thorough analysis of multiple concepts has been completed, including Allied systems and cooperative opportunities, considering all possible technology issues (e.g., technologies demonstrated in ATDs). [DoDI 5000.2, Apr 2002] The statutory and regulatory requirements applicable to all Milestones are presented in Appendix A.

The System Development and Demonstration phase begins at Milestone B. This phase can be entered either directly out of a technology opportunity/user need activity or from Concept and Technology Development (MS A). Entrance into System Development and Demonstration is dependent on three things: technology maturity (including software), validated requirements, and funding. Prior to entering MS B, a Program Manager (PM) will be assigned, a system concept and design will have been selected for system-level development, there shall be an ORD validated by the requirements authority, and full funding (including a budget and out-year program life cycle costs) shall be programmed. [DoDI 5000.2, Apr 2002]

Milestone B approval can lead to either System Integration or System Demonstration, as indicated in Figure 2-1. System Integration is intended to reduce the integration risk of subsystems and components. It begins with a system architecture but no integrated subsystems. System Integration is complete when the integrated system has been demonstrated in a relevant environment using prototype hardware. System Demonstration occurs at the completion of system development and integration and is used to demonstrate engineering development models. It is intended to demonstrate the ability of the system to operate in a useful way consistent with the validated Operational Requirements Document (ORD). System Demonstration is complete when the system has been demonstrated in its intended environment, meeting validated requirements, using engineering development models, and the system meets or exceeds its exit criteria and the Milestone C entrance requirements. [DoDI 5000.2, Apr 2002]

MS B is the first point where acquisition strategy is considered. Strategy should include a planned approach and system designs sufficient to achieve full capability. Acquisition strategies include single step and evolutionary. The approach to be followed depends on the availability of time-phased requirements in the ORD, the maturity of system technologies, and the relative costs and benefits of executing the program in blocks versus a single step. In a single step to full capability approach, the full system capability is developed and demonstrated prior to Milestone C. Evolutionary acquisition is an approach that fields an operationally useful and supportable capability in as short a time as possible. Evolutionary acquisition delivers an initial capability with the explicit intent of delivering improved or updated capability in the future. An evolutionary approach, and the associated spiral development, is currently the preferred DoD acquisition approach. [DoDI 5000.2, Apr 2002]

The Production and Deployment phase, the third in the acquisition sequence, begins at Milestone C. Included in this phase are Low-Rate Initial Production (LRIP) and Full-Rate Production (FRP) and Deployment. The purpose of the Production and Deployment phase is to achieve an operational capability that satisfies mission needs. LRIP includes the Initial Operational Test and Evaluation (IOT&E) and Live Fire Test and Evaluation (LFT&E) activities using production representative articles. Additional objectives include the execution of low-rate production and establishing full manufacturing capability. FRP and Deployment includes the execution of production and deployment of the system. [DoDI 5000.2, Apr 2002]

Milestone C can be reached directly from pre-system acquisition (e.g., a commercial product) or from MS B. Initiation of Milestone C requires the following criteria being met (or a decision by the MDA to proceed): technology maturity, an approved ORD, compliance with the DoD Strategic Plan, demonstrated affordable life cycle, and acceptable interoperability, operational supportability, information assurance and anti-tamper provisions. A programs Initial Operational Capability (IOC) is typically established during the Production and Deployment stage. [DoDI 5000.2, Apr 2002]

The final acquisition phase is Operations and Support. The intent of this phase is to ensure that all elements necessary to maintain the readiness and operational capability of the system exist. No Milestones are associated with this phase. Program elements consist of Sustainment and Disposal. Sustainment will evolve and refine life cycle strategies ensuring a flexible, performance–oriented system for the user. This includes consideration for activities such as operations and maintenance, transportation and supply, configuration and data management, manpower and training, and disposal and security factors. A programs Full Operational Capability (FOC) is typically established during sustainment. Disposal will demilitarize and dispose of the system at the end of its useful life. This process is required to be performed in accordance with all legal and regulatory requirements relating to safety, security, and the environment. [DoDI 5000.2, Apr 2002]

B. CHANGING THE PROCESS - ACTD BEGINNINGS

While not originally called an Advanced Concept Technology Demonstration, efforts to move towards ACTD type practices were first identified by the Packard Commission in 1986. The Packard Commission presented their findings for improving DoD management and organization in a Presidential report [President's Blue Ribbon Commission on Defense Management, Jun 1986]. The report dealt extensively with improvements to the defense acquisition system and identified several means to obtain acquisition reform. Their findings were critical elements for the process changes that followed. The commission believed that through the use of demonstration platforms, or prototypes, the government could streamline procurement practices to reduce costs while at the same time gain a realistic assessment of operational suitability. [President's Blue Ribbon Commission on Defense Management, Jun 1986] This second item was the real advancement of their findings.

> The proper use of operational testing is critical to improving the operations performance of new weapons. We recommend that operational testing begin early in advanced development and continue through full–scale development, using prototype hardware. [President's Blue Ribbon Commission on Defense Management, Jun 1986]

In February 1992, Secretary of Defense Dick Cheney defined a new acquisition strategy in the DOD's Annual Report to the President and the Congress [Cheney, Feb 1992]. He changed the focus from production programs to an increased use of demonstration platforms to validate new concepts. One potential outcome would be to "shelve" a technology [Aspin, Feb1992] if it was not ready to proceed into production at the current time. Finally, to reduce procurement timelines, Cheney recommended that subsystems or technologies proven in prototype form be inserted into existing weapons platforms [Cheney, Feb 1992].

That same month Representative Les Aspin took Cheney's ideas one-step further in his "Rollover–Plus" proposal [Aspin, Feb 1992]. Aspin's concepts included a process called Rollover–Plus. [Aspin, Feb 1992]

> We would not commit to quantity production at the outset of the development. Instead, a prototype would not be brought into full-scale production until the resulting component or system met stringent criteria. Those criteria are a) the technology works, b) it is required by development of the threat, or c) represents a breakthrough that would alter battlefield operations. If the resulting prototype did not meet those criteria, however, we would "rollover" the new technologies and lessons learned from development into a further iteration of engineering, development, and prototyping. [Aspin, Feb 1992].

Aspin also advocated the requirement for Operational Test and Evaluation (OT&E) of the prototype [Aspin, Feb 1992].

In the 1993 Annual Report to the President and the Congress, Secretary Cheney's concepts took a new form, the Advanced Technology Demonstration (ATD) [Cheney, Jan 1993]. For the ATD concept guidelines were defined that would permit an ATD to proceed to production.

> The use of Advanced Technology Demonstrations (ATDs), along with simulations and exercises, will provide the tools to help ensure the technology is ready, manufacturing processes are available, and operating concepts are understood before any formal development program is considered. Each ATD will be designed to demonstrate to acquisition decision makers that the technology is feasible, affordable, and compatible with the operational concepts and envisioned force structure [Cheney, Jan 1993].

Through this process, the intent was to provide realistic demonstrations of the technology development weapons systems and involve the war fighter in the evaluation process prior to committing funds [Cheney, Jan 1993].

In January 1994, with Les Aspin now the Secretary of Defense, the term ACTD is first utilized in the Annual Report to the President and the Congress [Aspin, Jan 1994].

> Each Advanced Concept Technology Demonstration (ACTD) is an integrating effort involving very substantial cooperation and participation between the operational user and the Science and Technology (S&T) community. The user provides the operational context and concept of operations and manages the operational aspects of the demonstration; the S&T community provides the advanced technology elements. Thus the emphasis in the ACTD is to address operational utility and operational cost effectiveness with minimal technical risk. The goal is to refine operational requirements and concept designs adequately to facilitate insertion of the new capability into the formal acquisition process with minimal delay and cost [Aspin, Jan 1994].

Aspin's ACTD approach emphasized cooperation between the war fighting and S&T communities. The ACTD concept would provide the traditional role of technical and cost risk reduction, while also providing a vehicle for refining the operational concept. Concurrent with these efforts, Aspin created the position of Deputy Under Secretary of Defense (Advanced Technology) (DUSD(AT)) to effectively manage the ACTDs [Aspin, Jan 1994].

With the ACTDs concept in place, forethought was added to the process by the new Secretary of Defense William Perry. In September 1994 the Defense Science and Technology Strategy refined the ACTD. The major change was the ability of the war fighter to modify the operational concept as the ACTD system design evolved and the fielding of the ACTDs after operational testing by the user [Defense Science and Technology Strategy, Sep 1994].

> An important element of the ACTDs is that the user is left with a residual operational capability and the wherewithal to continue use. This provides the commander with a significant improvement in capability and the ability to continue to refine the doctrine and tactics to maximize the potential of new technologies [Defense Science and Technology Strategy, Sep 1994].

Perry's ACTDs were further refined in the Annual Report to the President and the Congress of 1995. Many of the concepts already laid out in the earlier Defense Science and Technology Strategy were retained; such as, early and significant involvement by the war fighters, refinement of operational concepts and requirements, fielding of the ACTD, and expeditious transition of laboratory technology to the field. In addition, the Report also defined the following four selection criteria for a system to become an ACTD [Perry, Feb 1995].

1. Offers a potential solution to a military problem or introduces a significant new capability. The Joint Requirements Oversight Council (JROC) and the unified commanders must approve an ACTD.
2. Is relatively mature and contributes to solving the problem.
3. Has an executable program and management plan.
4. Is a two to four year program that can be supported for two years in the field.

The Annual Report of 1995 also prescribed outcomes for ACTDs. If unsuccessful, ACTDs were to be terminated or shelved for future restructuring. Upon the war fighter's recommendation, an ACTD could be directly fielded with minor modifications or enter the formal acquisition process at an advanced milestone (MS B or MS C) [Perry, Feb 1995].

The Report also specified the flexible role that ACTDs play in the acquisition cycle.

> In some instances, the ACTD approach may be able to replace or accelerate the early formal steps of the acquisition process. In other cases, the ACTD may in itself become an acquisition path for items required in only small numbers [Perry, Feb 1995].

This rigor in defining ACTDs also extended to what the concept does not include.

> It [the ACTD process] is not, however, considered or intended to be a substitute for the formal acquisition system required to introduce large, complex weapons systems such as ships, tanks, or aircraft. Nor is it intended to support acquisition of new systems such as vehicles or munitions, which may be procured in large numbers and over a number of years, and which do not involve substantial modification of operational concepts or procedures [Perry, Feb 1995].

In this statement, Secretary Perry restricted ACTD programs from directly fielding the most visible and expensive defense acquisition programs—large, complex weapons systems.

So began the ACTD process. In 1995, the first twelve ACTD programs were initiated. ACTDs, since their inception, have been the subject of political interest due to the fact they are not required to follow the same procedures, and are not subject to the same oversight as typical defense acquisition programs (i.e. DoDD 5000.1). The Office of the Inspector General (OIG) audited the ACTD process in 1997 [OIG Report No. 97-120, Apr 1997] to review; (1) the criteria used to select current and pending ACTD efforts, (2) the process for determining the program's effectiveness, and (3) the transition of the program into the defense acquisition cycle. They also evaluated (4) the adequacy of the DoD management controls as they applied to the audit objectives. Using nine of the 22 ACTDs approved in FY95 and FY96, the OIG found that, based on their interpretation of the ACTD selection criteria, five were questionable choices as ACTD projects. OIG believed that these poorly defined processes presented unclear guidelines or conflicting terminology to the military departments on what type of potential ACTDs would make viable projects. They recommended that the DUSD(AT) develop clear and assessable selection criteria.

The OIG also found that four projects did not have mature technology. Three of the four relied significantly of software or Command, Control, Communications, Computers, and Intelligence (C4I) development and integration that clearly were not based on mature technology. All four ACTDs relied significantly on modeling and simulations because supporting programs were not mature. The OIG recommended that the DUSD(AT) develop clear and consistent criteria for defining mature technology.

Additionally, eight of the nine ACTDs assessed did not have a declared or documented urgent military need. OIG recognized that a military need may be declared by certain DoD officials but indicated that DUSD(AT) had not defined what constitutes an urgent military need or who may declare the urgent need for the ACTD candidates. In this case the OIG recommended that critical military need be clearly defined.

Congressional concerns about the ACTD process were identified in the National Defense Authorization Act for Fiscal Year 1997, 30 July 1996 through the statement "it appears that the Department is using the ACTD program to circumvent acquisition requirements, rather that to demonstrate new technologies on a limited basis." Additionally, the Senate Committee on Appropriations stated that the complex development required for some ACTDs may not be appropriate for the streamlined acquisition procedures used for ACTDs.

In 1998, at the request of the Chairman for the Subcommittee on Military Research and Development, within the House of Representatives, the General Accounting Office (GAO) assessed the ACTD process. Specifically, the GAO assessed:

1. Whether the selection process included criteria that were adequate to ensure that only mature technologies were selected for ACTD prototypes,

2. Whether guidance on transitioning to the normal acquisition process ensured that prototypes appropriately completed product and concept development and testing before entering production, and

3. Whether DOD was procuring more ACTD prototypes than needed to assess the military utility of a mature technology. [GAO Report GAO/NSIAD-99-4, Oct 1998]

As with any new process there was an indication of room for improvement. The GAO assessment results found that:

1. DOD's process for selecting ACTD candidates did not include adequate criteria for assessing the maturity of the proposed technology resulting in the approval of ACTD projects that included immature technology.

2. Guidance on entering technologies into the normal acquisition process was not sufficient to ensure that a prototype completed product and concept development and testing before entering production.

3. DOD's practice of procuring prototypes beyond those needed for the basic ACTD demonstration and before completing product and concept development and testing was unnecessarily risky. [GAO Report GAO/NSIAD-99-4, Oct 1998]

Based on these findings the GAO recommended the following actions be taken by the Secretary of Defense to clarify ACTD program processes:

1. Ensure the use of mature technology with few, if any, exceptions,

2. Describe when transition to the development phase of the acquisition cycle is necessary and the types of development activity that may be appropriate.

3. Limit the number of prototypes to be procured to the quantities needed for early user demonstrations of mature technology until the item's product and concept development and testing have been completed. [GAO Report GAO/NSIAD-99-4, Oct 1998]

Based on all these recommendations, a selection process was established creating guidelines for ACTD acceptance, the JROC was tasked to prioritize approved ACTDs so DoD dollars could be allocated wisely, and the definition of critical military need was identified. One method that could be used to define technology maturity or readiness has been identified in Appendix 6 of DoD 5000.2-R (5 Apr 2002). Table 2-2, a derivative of the DoD 5000.2-R table, lists the various Technology Readiness Levels (TRL) and descriptions from a systems approach for both hardware and software. This table was expanded by Jim Sheldon of DSMC (30 Aug 2002) to identify component/system level, equipment necessary to demonstrate capability and potential operation environment. Based on the TRLs, Levels 1 through 4 would not be acceptable levels for ACTDs. TRLs 5 and 6 could possibly be acceptable ACTDs. TRLs 7 through 9 would appear to directly satisfy the intentions of the ACTD technology maturity level.

Technology Readiness Levels	Description	Level	HW/SW Necessary to Demonstrate Capability	Environment
1) Basic principles observed and reported	Lowest level of technology readiness. Scientific research begins to be translated into applied research and development. Examples might include paper studies of a technology's basic properties	Studies	None	None
2) Technology concept and/or application formulated	Invention begins. Once basic principles are observed, practical applications can be invented. The application is speculative and there is no proof or detailed analysis to support the assumption. Examples are still limited to paper studies.	Studies	None	None
3) Analytical and experimental critical function and/or characteristic proof of concept	Active research and development is initiated. This includes analytical studies and laboratory studies to physically validate analytical predictions of separate elements of the technology. Examples include components that are not yet integrated or representative.	Component	Nonscale components (pieces of subsystem)	Lab
4) Component and/ or breadboard validation in lab environment.	Basic technological components are integrated to establish that the pieces will work together. This is relatively "low fidelity" compared to the eventual system. Examples include integration of "ad hoc" hardware in a laboratory.	Component / subsystem	Low fidelity breadboard (integration of nonscale components not fully functional or form and fit)	Lab
5) Component and/or breadboard validation in relevant environment	Fidelity of breadboard technology increases significantly. The basic technological components are integrated with reasonably realistic supporting elements so that the technology can be tested in a simulated environment. Examples include "high fidelity" laboratory integration of components.	Subsystem	High fidelity breadboard (functionally equivalent but not form and fit)	Lab or may include demonstration in surrogate platform

Technology Readiness Levels	Description	Level	HW/SW Necessary to Demonstrate Capability	Environment
6) System/ subsystem model or prototype demonstration in relevant environment	Representative model or prototype system, which is well beyond the breadboard tested for technology readiness level (TRL) 5, is tested in a relevant environment. Represents a major step up in a technology's demonstrated readiness. Examples include testing a prototype in a high fidelity laboratory environment or in a simulated operational environment.	Sub-system	Prototype (should be very close to form, fit and function)	Lab or limited demonstration
7) System prototype demonstration in an operational environment	Prototype near or at planned operational system. Represents a major step up from TRL 6, requiring the demonstration of an actual system prototype in an operational environment, such as in an aircraft, vehicle or space. Examples include testing the prototype in a test bed aircraft.	Sub-system	Prototype (form, fit and function)	Demonstration in representative environment such as test bed
8) Actual system completed and flight "qualified" through test and demonstration	Technology has been proven to work in its final form and under expected conditions. In almost all cases, this TRL represents the end of true system development. Examples include developmental test and evaluation of the system in its intended weapon system to determine if it meets design specifications.	System	Field qualified hardware	DT&E in actual system application
9) Actual system "flight proven" through successful mission operations	Actual application of the technology in its final form and under mission conditions, such as those encountered in operational test and evaluation. In almost all cases, this is the end of the last "bug fixing" aspects of true system development. Examples include using the system under operational mission conditions.	System	Actual system in final form	OT&E in operational mission conditions

Table 2-2. Technology Readiness Levels [Sheldon, Aug 2002]

Since its initiation the ACTD process has continued to incorporate improvements where needed. Originally, ACTDs had not established or required a Transition Manager. In most cases transition efforts were not defined until the successful completion of the ACTD program. Over the last few years this aspect of the ACTD program has been more proactively executed though not strictly enforced. For FY03 however, all ACTD programs must have an established Transition Manager before being considered for execution approval. Additionally, the Defense Systems Management College (DSMC) is including ACTD transition training in their curriculum material and the Office of the Secretary of Defense (OSD) is attempting to provide additional funds to transitioning ACTD programs to assist with the preparation of DoD 5000 required documentation.

The ACTD process evolved in 1994 in response to the recommendations of the Packard Commission of 1986 and the Defense Science Boards of 1987, 1990 and 1991. As can be seen it has been through many variations and continues to change as the global environment changes. While these changes have affected the process they have not effected its execution. Since its inception, a total of 98 ACTDs have been initiated from fiscal years 1995 through 2002.

C. ACTD GOALS AND PROCESSES

As presented in Figure 2-1, the ACTD segment fits into the DoD 5000 acquisition process via Technology Opportunities and User Needs. The elements of this DoD 5000 phase include User Needs and Technology Opportunities. User Needs, in the form of a MNS, shall identify and describe the projected needs of the user for the threat to be countered or business need to be met [DoDI 5000.2, Jan 2001]. Technology Opportunities are where DoD S&T programs have the opportunity to provide the warfighters of today and tomorrow with superior and affordable technology to support their missions, and to enable them to have revolutionary war-winning capabilities. For these activities the Deputy Under Secretary of Defense (Science & Technology) (DUSD(S&T)) is responsible for the overall direction, quality, content, and oversight of the DoD S&T Programs (including software capability) [DoDI 5000.2, Jan 2001]. S&T programs consist of basic research, applied research and advanced technology.

To ensure the transition of innovative concepts and superior technology to the user and acquisition customer, the DoD Component S&T Executives shall use three mechanisms: 1) Experiments, both joint and Service-specific, 2) Advanced Technology Demonstrations and 3) Advanced Concept Technology Demonstrations [DoDI 5000.2, Jan 2001]. Experiments are to be used to develop and assess concept-based hypotheses to identify and recommend the best value-added solutions for changes to doctrine, organizational structure, training and education, materiel, leadership, and people required to achieve significant advances in future joint operational capabilities [DoDI 5000.2, Jan 2001]. ATDs are used to demonstrate the maturity and potential of advanced technologies for enhanced military operational capability or cost effectiveness [DoDI 5000.2, Jan 2001]. ACTDs are used to determine military utility of proven technologies and to develop the Concept of Operations (CONOPS) that will optimize effectiveness [DoDI 5000.2, Jan 2001].

The goals of the ACTD processes are to accelerate and facilitate responses to priority military needs (counter a new threat, significantly improve performance of an existing mission, or introduce a fundamentally new approach to warfare) with a combination of new and fielded hardware and/or software, confirming that transformational technology is appropriate for military use, develop CONOPS through the employment of ACTD technology, satisfying operational requirements with residual resources, and creating an organizational structure that satisfies those needs.

To satisfy the goals of the ACTD, guidelines have been established which apply to both the proposed technology and to the program that is responsible for developing and evaluating that technology. These guidelines are intended to provide criteria for the formulation of candidate systems, as well as provide structure during the ACTD process. The criteria are as follows: [ACTD Guidelines, Sep 2001]

1. The timeframe for completing the evaluation of military utility is typically 2-4 years.

2. The technology should be sufficiently mature.

3. The technology provides a potentially effective response to a priority military need.

4. A lead service/agency has been designated.

5. The risks have been identified, are understood and accepted.

6. Demonstrations or exercises have been identified that will provide an adequate basis for the military utility assessment.

7. Funding is sufficient to complete the planned assessment of utility and to provide technical support for the first two years of fielding of the interim capability.

8. A developer is ready to prepare a plan that covers all essential aspects.

9. The final considerations are affordability, interoperability, and sustainability.

The initiation of the ACTD process begins with the definition of user needs. These needs can be provided through the JROC, Joint Warfighting Capability Assessment (JWCA), Commander in Chiefs (CINCs), or by the individual services. The needs are then correlated into potential technology solutions by the services, US government agencies, industry or our allies. These solutions provide the proposal framework for potential ACTD programs. Once the ACTD concept has been formulated, sponsors and developers must be established. With all elements of the ACTD proposal established it can be forwarded to Deputy Under Secretary of Defense for Advanced Systems and Concepts (DUSD(AS&C) for review. If it is accepted at this level it will be tabled at the 'Breakfast Club'. The Breakfast Club is an advisory group senior officials from the DUSD(AT); the Director, Defense Research and Engineering (DDR&E); the Deputy Assistant Secretary of Defense for Command, Control, Communications and Intelligence (DASD/C3I); and representatives from the Office of the Joint Chiefs of Staff, the Ballistic Missile Defense Organization (BMDO), the Defense Advanced Research Projects Agency (DARPA), and the Service Scientific and Technical (S&T) and Operations/ Requirements Offices of each military service. Following their review and down selection the final selection and prioritization is established by the JROC. With this process complete the final execution is initiated by the Under Secretary of Defense (Acquisition & Technology) (USD[A&T]) via an Implementation Directive [CBO Memorandum, Sep 1998]. The graphical representation of this process is presented in Figure 2-2.

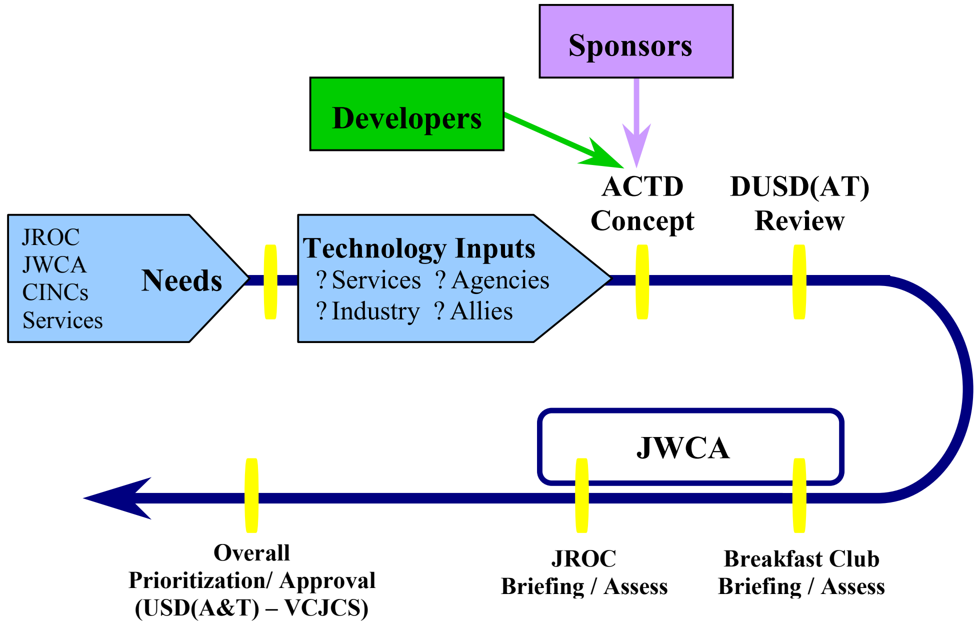

Figure 2-2. Establishment of ACTD Programs [ACTD Introduction, Sep 2001]

One of the key ACTD generated documents, which is required within 90 days or less of the Implementation Directive, is the ACTD Management Plan. It is the principal management tool for the ACTD program and is intended to define the program scope and baseline at an executive-level. The ACTD Management Plan is also to be flexible enough to provide an environment where operations and technical concepts can be traded off and refined prior to entering the formal acquisition process. Items that may be addressed within the ACTD management plan include the following: [ACTD Guidelines, Sep 2001]

1. The objectives that the ACTD must demonstrate.

2. The overall approach of the ACTD.

3. The concept and technical approach of the ACTD including:

a) Scenario(s) and initial concept of operation which provides the context of the demonstration.

b) Emerging technologies which are not included in the current force structure.

c) Measures of Effectiveness (MoE) and Measures of Performance (MoP) associated with military utility of the ACTD.

d) Technical risk assessment related to the maturity of the technology.

e) Affordability for acquisition and ownership costs to operate and support.

f) Interoperability of the ACTD system to effectively exchange required information with associated systems.

g) Equipment expected to be involved in the demonstration.

h) Training required for successful operator implementation.

i) Range facilities, test organizations, opposing forces and simulations.

4. The organizational approach, including key decision makers such as:

a) Oversight group.

b) Executive agent.

c) User sponsor(s).

d) ACTD managers.

5. The programmatic approach including:

a) The acquisition and contracting strategy.

b) Critical events.

c) ACTD completion.

d) Residual/interim capability.

e) Transition plan.

f) Safety/Environmental assessment.

g) Schedule.

h) Funding.

6. The approval agencies required to initiate the ACTD.

7. The endorsements of the planned ACTD participants.

8. Any significant modifications associated with the ACTD updated on a case-by-case basis through the life of the ACTD.

For this thesis, the most important section of the ACTD Management Plan is the programmatic approach, item 5, which includes the transition plan itself. Contributing items that impact the transition include successful ACTD completion, verification of military utility, residual/interim capability, creation of required documentation, funding availability and overall affordability of the acquisition and ownership costs to operate and support the system.

Once a user need has been matched with a mature technology and the candidate ACTD has been formulated, scoped and selected, as discussed above, the execution phase begins. The ACTD execution process is shown in Figure 2-3. Once the ACTD up-front planning (i.e., Management Plan) is complete, three distinct efforts are begun: Development strategy, Assessment strategy, and Transition strategy.

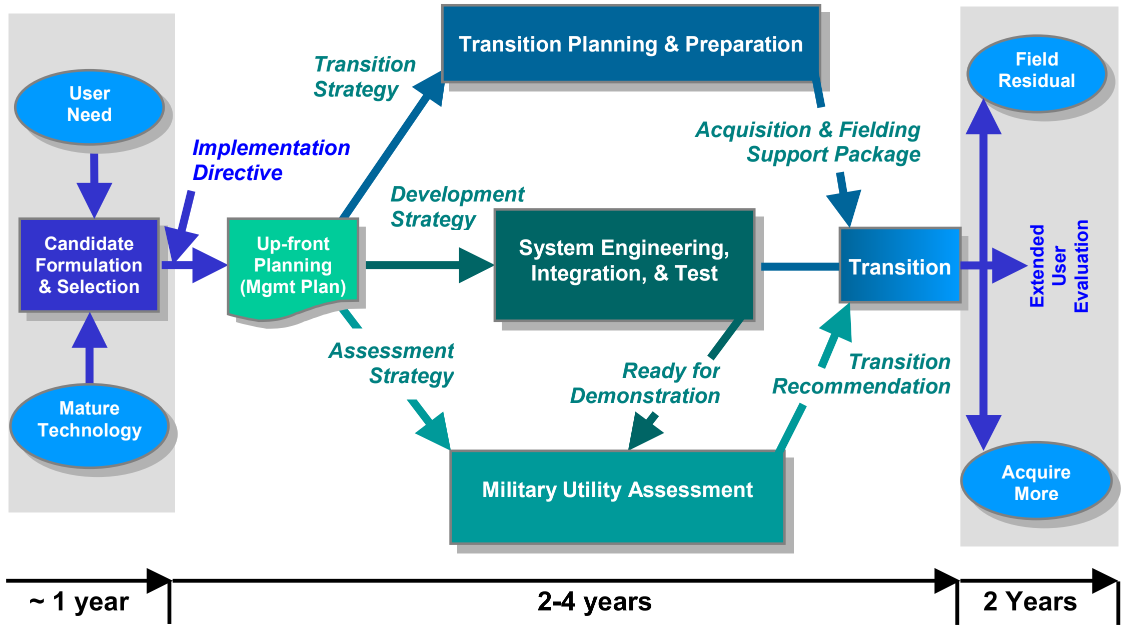

Figure 2-3. ACTD Execution Process [O'Connor, Sep 1999]

The development strategy encompasses System Engineering, Integration, and Test. At the initiation of this task, a Technical Manager (TM) is designated by the executing agent. While proceeding through the system engineering, integration and test efforts, the TM has to maintain continuous feedback with the transition and assessment efforts. For a number of ACTDs, the integration and assembly of technologies implies a complex undertaking requiring significant project management skills. System engineering, integration and test, by itself, requires careful planning and precise execution. For an ACTD program, system development (combining mature technologies to create a new capability) should not be confused with technology development (creating a new technology and demonstrating its maturity). The purpose of an ACTD is to combine mature technologies by means of system engineering and system integration to create a desired technical capability which, when combined with appropriate CONOPS, results in a new or improved military capability. The compilation of these efforts is to demonstrate military utility. Prior to committing to a MUA, the Technical Manager needs to ensure that the essential system level testing and characterization has been successfully performed. [O'Connor, Sep 1999]

In association with the system engineering, integration and test activities the Transition Manager (XM) must monitor and influence the decisions that affect transition planning and preparation. Concurrently, the user representative, the Operational Manager (OM), must ensure timely and effective user influence on the technology integration and implementation by instituting user participation in the systems engineering, integration, and test activities. Inclusion throughout the ACTD process of the operational user is critical to ensure that the development and integration cycle remains focused on military utility, not on technical performance. [O'Connor, Sep 1999]

The assessment strategy comprises the Military Utility Assessment (MUA). At the initiation of the ACTD program, an OM is designated by the User Sponsor. As with each ACTD execution activity, the MUA requires extensive planning and preparation. The focus of the MUA is to evaluate a significant new military capability in an operationally realistic setting (exercises or experiments), on a scale large enough to convincingly establish operational utility and system integrity while demonstrating operational concepts. Evaluation elements may incorporate modeling and simulation to evaluate Critical Operational Issues (COI), MoE and MoP. These activities are similar to an operational evaluation and should typically incorporate the use of an operational test agency at the outset. The MUA is the heart and sole of the ACTD process. Without a successful MUA, and the verification that the system works in its intended environment, an ACTD program has no hope of being fielded. The overall outcome of the MUA is either utility or no utility. [O'Connor, Sep 1999]

The transition strategy will involve transition planning and preparation. A XM is designated by the Lead Service for the ACTD program. Both the TM and OM work with the XM in transition matters. The purpose of transition planning and preparation is to ensure a smooth transition of residual assets and capabilities to operational use with minimum delay and loss of momentum concurrent with the hopes of a long-term follow-on acquisition. Preparation efforts include acquisition strategy, logistics, training, combat development, software support, and many other specialties. The process begins with candidate formulation and requires a fielding plan/package and an acquisition package. The overall goal of the transition planning and preparation efforts is to establish an LRIP capability, potentially followed by FRP. However, these actions must be synchronized with the appropriate budget cycle. The transition plan is used to define the ACTD transition path and gain system support. If the ACTD demonstrates significant military utility, there are two transition considerations. The first is to transition the residual capability to an operational unit (preferably to the unit(s) that participated in the demonstration and assessment) for operational use and extended user evaluation. The second consideration, if additional quantities are required for wider fielding, is to transition the program to formal acquisition, preferably at an advanced stage of the acquisition cycle such as Milestone C/LRIP. The ACTD establishes funding lines for the first two years of technical and sustaining engineering support. Subsequent residual Operation and Sustainment (O&S) costs must be programmed and budgeted by the service/user unit. The OM, when requested by the XM, may assume primary responsibility for coordinating residual fielding and sustainment requirements with the user and overseeing the actual transition of the residual equipment to operational use. [O'Connor, Sep 1999]

Transition planning and preparation efforts, as they currently relate to the ACTD process, are presented in Figure 2-4. Efforts actually begin prior to the Implementation Directive authorization. During the candidate formulation/selection cycle, efforts are focused on supporting the ACTD proposal and identifying the associated transition objectives. Once the Implementation Directive has been signed, efforts encompass up-front planning (i.e. Management Plan) along with preparation of the initial transition plan. With the initial transition plan in-hand, a lower level of activity is required to ensure that proper consideration is given to transition requirements during the MUA. The initial transition plan will be updated during the MUA as new or modified information is uncovered. Following the completion of the ACTD the most demanding transition efforts of the program begin. This is where the transition plan is actually implemented. Efforts focus on transitioning the residual capability to the using organization and preparing for the appropriate acquisition milestone decision. Residual fielding typically begins a year or two before the expected transition to acquisition depending on user needs and the associated lead times. Six months prior to the planned acquisition transition point a readiness review will be held. Pending transition approval the acquisition process will begin. [O'Connor, Sep 1999]

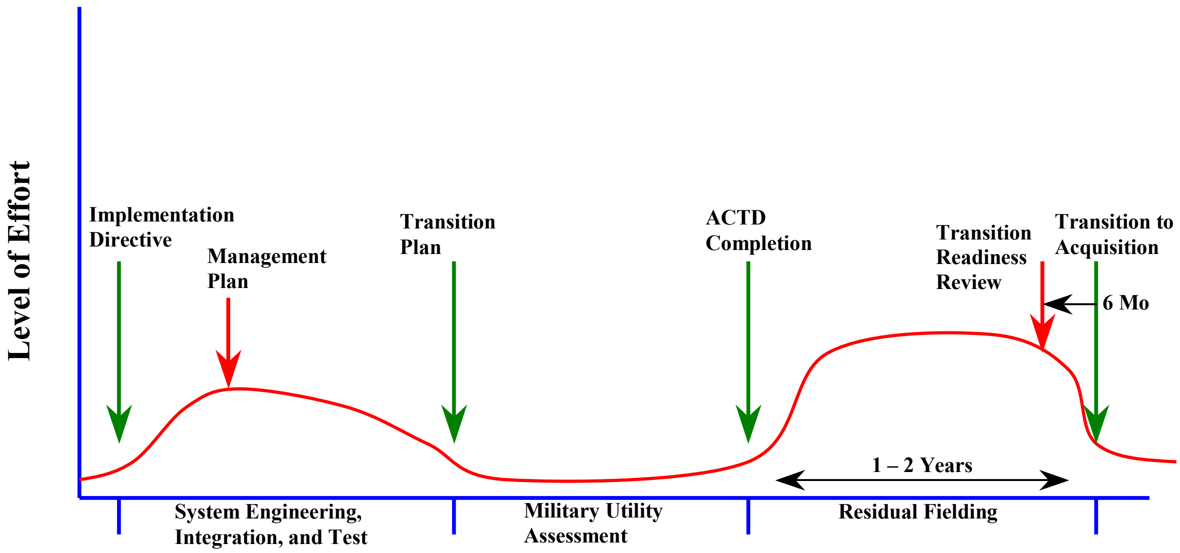

Figure 2-4. Transition Planning and Preparation Process [O'Connor, Sep 1999]

D. REVIEW OF ACTD PROGRAMS

ACTDs represent a bold departure from the traditional research and development acquisition cycle that can take 15 years [Kaminski, Mar 1997] to field a new weapon system. ACTDs typically have a two- to four-year life span as standalone demonstration activities. Since the inception of the ACTD process there have been 98 programs approved through FY02. Of these, 32 have successfully completed the demonstration and residual phases and 55 are still in process. Of those completed, 11 have been terminated due to lack of military utility or shelved due to technology immaturity. Thirty-two have demonstrated military utility and the residual equipment have been operationally placed in the field [Goodell, Jun 2002]. Of these, 32 have demonstrated sufficient military utility to warrant transitioning to an acquisition program [Harp, Sep 2003]. ACTDs initiated to date are presented in Table 2-3. Additional information related to each years ACTDs is provided in Appendix B.

FY95 ACTDs	FY96 ACTDs	FY97 ACTDs	FY98 ACTDs
Advanced Joint Planning	Battlefield Awareness and Data Dissemination	Integrated Collection Management	Migration Defense Intelligence Threat Data System
Precision SIGINT Targeting System	Semi-Automated IMINT Processing	Information Operations Planning Tool	Joint Continuous Strike Environment
Synthetic Theater of War	Joint Logistics	Consequence Management	Adaptive Course of Action
Low-Life-Cycle-Cost Medium-Lift Helicopter	Counter Sniper	Joint Advanced Health and Usage Monitoring System	C4I for Coalition Warfare
Kinetic Energy Boost-Phase Intercept	Miniature Air-Launched Decoy	Rapid Terrain Visualization	Space-Based Space Surveillance Operations
Medium-Altitude Endurance UAV (Predator)	Combat Vehicle Survivability	Chemical Add-On to Air Base/Port Biological Detection	Information Assurance: Automated Intrusion Detection Environment
High-Altitude Endurance UAV	Navigation Warfare	Military Operations in Urban Terrain	Theater Precision Strike Operations
Cruise Missile Defense, Phase I	Tactical High-Energy Laser	Extending the Littoral Battlespace	Unattended Ground Sensors
Precision/Rapid Counter-MRL	Tactical UAV	Counterproliferation II	Precision Targeting Identification
Joint Countermine	Air Base/Port Biological Detection		Joint Modular Lighter System
Rapid Force Projection Initiative	Combat Identification		Line-of-Sight Anti-Tank
	Counterproliferation I		Joint Biological Remote Early Warning System
			Link-16
11 Total	**12 Total**	**9 Total**	**13 Total**

Table 2-3. ACTDs Initiated by Fiscal Year [DoD News Release, 1995-2002]

FY99 ACTDs	FY00 ACTDs	FY01 ACTDs	FY02 ACTDs
Battle Damage Assessment in the Joint Targeting Toolbox	CINC 21	Active Network Intrusion Defense	Active Denial System
Coherent Analytical Computing Environment	Coalition Aerial Surveillance & Reconnaissance	Adaptive Battlespace Awareness	Advanced Notice
Common Spectral MASINT Exploitation	Comm/Nav Outage Forecast System	Advanced Tactical Laser	Agile Transportation
Compact Environmental Anomaly Sensor II	Computerized Operational MASINT Weather	Advanced Technology Ordnance Surveillance	Coalition Information Assurance Common Operational Picture
Force Medical Protection / Dosimeter	Content-Based Info Security	Area Cruise Missile Defense	Contamination Avoidance at Seaports of Debarkation
Human Intelligence Support Tools	Global Monitoring of Space ISR Systems	Coalition Combat ID	Expendable Unmanned Aerial Vehicle
Joint Medical Operations / Telemedicine	Ground-to-Air Passive Surveillance	Coalition Theater Logistics	Homeland Security Command and Control
Joint Theater Logistics	Joint Intelligence, Surveillance & Reconnaissance	Coastal Area Protection System	Hyperspectral Collection and Analysis
Personnel Recovery Mission Software	Multiple Link Antenna System	Hunter Standoff Killer Team	Joint Explosive Ordnance Disposal
Small Unit Logistics	Quick Bolt	Joint Area Clearance	Language and Speech Exploitation Resource
Theater Air & Missile Defense Interoperability	Restoration of Operations	Loitering Electronic Warfare Killer	Micro Air Vehicle
	Tri-Band Antenna Signal Combiner	Network-Centric Collaborative Targeting (formerly NCCIS&R)	Pathfinder
		Personnel Recovery Extraction Survivability aided by Smart Sensors	SIGINT Processing
		Tactical Missile System Penetrator	Space-Based MTI
		Theater Integrated Planning System	Thermobarics
11 Total	**12 Total**	**15 Total**	**15 Total**

Table 2-3 (Cont). ACTDs Initiated by Fiscal Year [DoD News Release, 1995-2002]

ACTDs typically fall into three classes, which are sometimes referred to as categories: Information Systems, Weapon or Sensor Systems, and System-of-Systems. Information systems (Class I ACTDs) typically consist of special purpose software, or software intensive operations, employed on commercial workstations. They typically are needed in small quantities and have requirements that can be satisfied without further development or production using the residual ACTD systems or installing a few additional systems at additional sites. Class I ACTDs are generally the easiest to manage from a transition perspective. [ACTD Guidelines: Transition, Sep 2001]

Weapon or sensor system ACTDs (Class II) are not unlike equipment typically acquired through the formal acquisition process. In many cases, a Class II ACTD will be planned to transition into LRIP or FRP (post MS C) following the ACTD, but there may be cases where it is more appropriate to plan for additional development following the ACTD. For example, if the cost of weaponization is high in comparison to all other costs of the ACTD, the best strategy may be to assess military utility before incurring the full cost of weaponization. In this case, the intended point of entry into the acquisition process could be the development portion of Engineering, Manufacturing and Development (EMD) (post MS B) to facilitate the completion of the weaponization. [ACTD Guidelines: Transition, Sep 2001]

"System-of-Systems." (Class III ACTDs) can consist of an individual element within an overall architecture of a fielded system, be a system already in acquisition, or be a system emerging from the technology base. A Class III ACTD may involve multiple Program Executive Officers (PEO), and perhaps multiple Military Departments. The challenge of Class III ACTDs may therefore be the integration and coordination of the various individual transitions required to achieve the system capability represented in the ACTD. [ACTD Guidelines: Transition, Sep 2001]

After their completion, ACTDs have two obvious exit paths – acquisition or non-acquisition. For the non-acquisition path the ACTD can be either: a) terminated due to a lack of military utility, b) shelved for further technology development, or c) fielded to establish a residual operational capacity. Formal acquisition is based on the level of technology maturity demonstrated and MUA success. Based on these elements the acquisition can begin during System Development and Demonstration (SD&D), Production and Deployment (P&D), or additional elements can be procured for Operations and Support (O&S). These paths are shown in Figure 2-5. Table 2-4 shows the three generic classes/categories of ACTDs and how they typically proceed down the transition exit paths.

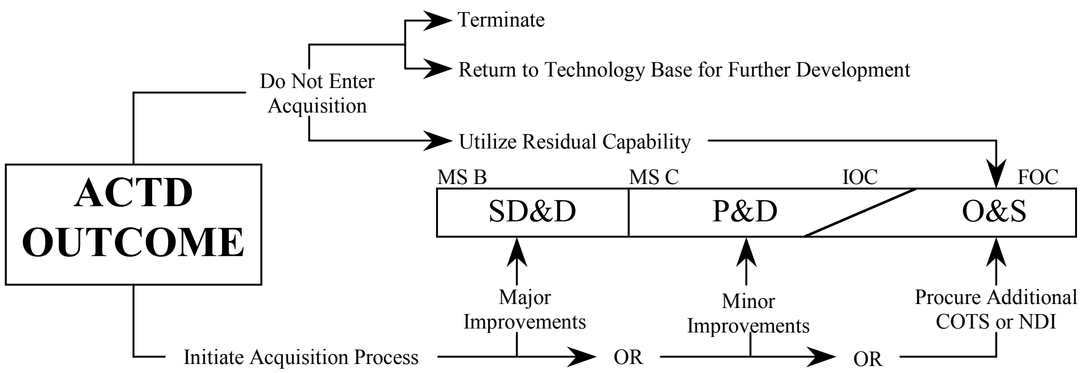

Figure 2-5. ACTD Exit Paths [ACTD Guidelines: Transition, Sep 2001]

ACTD Class / Category	**Post-ACTD Phase**		
	SD&D	P&D	O&S
I – Software, Workstations, Communications			**R/COTS**
II – Weapons, Sensors, C4I Systems	✓ OR	✓	**R**
III – System of Systems	✓ AND / OR	✓	**R**

Table 2-4. ACTD Classes and Exit Paths [ACTD Guidelines: Transition, Sep 2001]

In the two to four years that ACTDs are active, a new technology is demonstrated in an operational context, a limited operational capability is transferred to a warfighting unit, and a proven technology is ready to transition to an acquisition program. Because the ACTD itself is proof of the technology and CONOP, formal acquisition can start at a later stage of the acquisition cycle, thereby shaving three to five years off the time required to field a potential production system. [O'Connor, Mar-Apr 1997]

E. CHAPTER SUMMARY

This chapter began with a review of the DoD 5000 acquisition process initiated in 1971. A brief definition of the Milestone phases effective as of July 2002 was provided. With this background information the initiation, development and modifications associated with the ACTD processes were defined. This covered the initial conception by the Packard Commission through recent efforts designed to improve ACTD transition success. With the ACTD process defined, ACTD goals and event sequences were identified. The chapter closed with a brief synopsis of the ACTD programs executed in the first seven years.

The most significant items associated with the establishment and methods of a given ACTD program include:

1. ACTDs were initiated to reduce the acquisition cycle time and speed the delivery of advanced capabilities to the warfighter.

2. The processes utilized to establish and execute ACTDs have continually evolved since 1995 to increase the potential for success.

3. Technology maturity above readiness level 5, as defined in Table 2-2, is critical to the expectation an ACTD will successfully transition into acquisition.

4. Three categories of ACTDs exist: information systems, weapon and sensor systems, and system-of-systems. Of these, weapon and sensor systems tend to be the most common ACTDs transitioning to acquisition.

5. Exit paths available at the completion of an ACTD consist of: termination, return to technology base for further development, residual utilization, initiate acquisition at MS B with major improvements, initiate acquisition at MS C with minor improvements, initiate acquisition at FOC as COTS or NDI. The last of these is the desired goal of the ACTD process.

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III. ACTD SUCCESSES AND FAILURES

> Senior Pentagon leaders on Friday, 8 Aug 97, approved the Predator Unmanned Aerial Vehicle (UAV) for production, making it the first Advanced Concept Technology Demonstration (ACTD) to clear that milestone, according to DoD officials. Predator now holds the distinction of being the first ACTD to receive full production approval, officials said. "This is the first ACTD that has gone into production," said Pentagon spokesman Air Force Lt. Col. Bob Potter. "That is a significant milestone in the ACTD process." [Bender, Aug 1997]

The intent of the chapter is to review the history of the ACTD process, to identify typical ACTD contracting and cost goals, to define ACTD program management processes, to addresses ACTD development activities, to review the ACTD deployment practices, and to review ACTD transition to production events. Much of this information is contained in the OSD ACTD process related documentation.

A. ACQUISITION HISTORY

The ACTD process was originally conceived as a response to problems perceived to exist in the acquisition system. Acquisition cycle complexity, with its many levels of oversight and approval, created a series of problems identified in the Packard Commission's 1986 report "A Formula for Action":

> A serious result of this management environment is an unreasonably long acquisition cycle - ten to fifteen years for our major weapon systems. It is a central problem from which most other acquisition problems stem:
>
> - It leads to unnecessarily high cost of development
>
> - It leads to obsolete technology in our fielded equipment
>
> - And it aggravates the very gold plating that is one of its causes …
>
> [Notable Quotes, Sep1999]

The ACTD process was initiated in early 1994 as a response to these problems and others since identified with the DoD acquisition system. The intent of the ACTD is to speed the transition of technology to the warfighter. To perform this function the focus of ACTDs is not technology development, but the evaluation and implementation of existing technology. ACTDs are considered pre-acquisition activities. This provides a low-cost method of assessing the technology risks and uncertainties before the project becomes incorporated into a formal acquisition program. [Dehlinger, Sep 2001]

The ACTD process, while a pre-acquisition activity, is recognized by the acquisition system. Since FY95, there have been 98 ACTD programs. These programs were presented in Table 2-2. To date, 43 of these programs have completed the demonstration phases (due to the nature of ACTDs, those initiated in FY00 or later are typically still underway). Of those completed, 11 have been terminated, 32 have proceeded into residual utilization [Goodell, June 2002], and 32 have entered into the formal DoD 5000 acquisition process [Harp, Sep 2003]. While this number is only 33% of the total ACTD programs it should be kept in mind that several ACTDs consist of multiple potential acquisition products. Nearly three times as many products have been procured in association with the acquired ACTDs.

FY	ACTDs Initiated	Demo Phase Completed	Residual Phase Completed	ACTDs Terminated	ACTDs Acquired
95	11	11	11	0	11
96	12	12	9	3	9
97	9	6	4	2	4
98	13	9	5	4	5
99	11	4	2	2	2
00	12	0	0	0	0
01	15	1	1	0	1
02	15	0	0	0	0
Tot	**98**	**43**	**32**	**11**	**32**

Table 3-1. ACTD Execution History

The primary challenges that face an ACTD program in transitioning to acquisition and production are:

1. Devising a contracting strategy that motivates the contractor(s) to provide a ‘best value’ while transitioning to acquisition without loss of momentum,

2. Assessing affordability and application of a Cost as an Independent Variable (CAIV) strategy,

3. Defining, planning and preparing the documentation required prior to the acquisition decision,

4. Choosing the proper strategy for obtaining the resources necessary for acquisition funding,

5. Defining requirements starting from initial military need and evolving to a formal ORD/Spec based on warfighter insight from realistic military exercises,

6. Ensuring that the ACTD is interoperable with other systems on the battlefield,

7. Maintaining early and continuous participation of the operational testing community and throughout the ACTD process,

8. Ensuring that the fielded systems will be supportable.

[Transition of ACTDs to the Formal Acquisition Process – Executive Summary, Apr 2000]

B. CONTRACTING AND COST GOALS

1. Contracting Strategy

The process of preparing for ACTD transition must begin as soon as the DoD approves the ACTD Implementation Directive. One of the first topics to consider for the acquisition process is contracting strategy. It is important to obtain the benefits of competition early and to project those influences as far downstream into the acquisition sequence 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 down-select, the government may; 1) choose to request bids for a production option, 2) establish a unit price objective and make the production follow-on contingent upon meeting that objective, or 3) determine that entry into a development program, vice production, at the conclusion of the ACTD is more appropriate. [Perdue, Mar/Apr 1997]

Since each ACTD is different, the contracting strategy should be based on the circumstances associated with that particular ACTD. Considerations should include not only the contracting effort required during the ACTD, but also the post-ACTD contract requirements as well. Contract tasking should also provide some flexibility in case program results do not fully support the original ACTD objective. If the acquisition objective is to enter directly into production, the strategy should accommodate the intent to enter production with the expected ACTD design. However, the strategy should also be prepared for the possibility that further development efforts may be required following ACTD completion. At the completion of the ACTD program, a decision must be made on whether the system demonstrated sufficient military utility to justify acquisition of production assets, whether production with minor improvements is appropriate, whether further technology development is required, or whether termination is appropriate. [Transition of ACTDs to the Formal Acquisition Process – Transition Considerations, Apr 2000]

The contracting strategy for an ACTD program should address how the lead service or sponsor would procure additional units of the configuration that demonstrated military utility, if at the completion of the ACTD phase an acquisition decision is made, one contracting approach would be to obtain priced options for production quantities during the ACTD proposal phase. Obtaining priced options is a logical approach if the ACTD technology involved is fairly mature. This maturity implies that design changes during the ACTD process, or as part of the initial production, is likely to be low. Conditions for exercising the option should be clearly identified in the ACTD Management Plan, and in the ACTD solicitation. One advantage of priced options is that the prices will be competitively obtained as opposed to negotiated prices with the prime contractor on a sole source basis. The second advantage is that exercising options significantly reduces the administrative lead-time of the procurement and causes less disruption in program continuity/momentum. [Transition of ACTDs to the Formal Acquisition Process – Transition Considerations, Apr 2000]

The following factors should be used to help determine the priced options contract type. If an ACTD involves commercial systems already in production and no design changes are anticipate, firm fixed price options make sense. For a technology that is fairly mature but not in production and has the potential for additional development, cost reimbursement options may be a more appropriate approach. The type of contract priced options must consider the maturity of the technology involved to avoid placing unreasonable risks on contractors or the program. If the decision is made to procure systems identical to the ACTD hardware demonstrated, it can be done by merely exercising the option in the ACTD contract. [Transition of ACTDs to the Formal Acquisition Process – Transition Considerations, Apr 2000]

As an alternative to option prices, the program could solicit information on future production pricing (such as average unit production prices which are not binding on the contractor). The program could then use this pricing information as part of an affordability analysis during ACTD source selections. This approach may be more appropriate than obtaining priced options if it is likely that the procured configuration is similar to the hardware demonstrated during the ACTD program but not an identical. The ACTD Request for Proposal (RFP) should state that follow-on production contracts would be considered for contractors that propose acquisition prices equal to or lower than the prices they identified in the ACTD proposal. From the perspective of production prices benefiting from the initial ACTD competition, this approach is similar to obtaining option prices. Unlike option prices, this approach would still require obtaining proposals and negotiating prices during the acquisition phase. This should not be nearly as protracted or problematic as negotiating a typical sole source contract since the ground rules have been defined. However, it will probably take more effort and time than merely exercising an option since proposal data is not contractually binding. [Transition of ACTDs to the Formal Acquisition Process – Transition Considerations, Apr 2000]

Instead of entering the acquisition process as a procurement program, it may be more appropriate to enter as a development program at the completion of the ACTD. This could be either a planned post-ACTD objective or may occur because the results of the ACTD indicated that further development was required. The specific question is whether the program should openly compete such a development effort or simply negotiate a sole source contract with the ACTD contractor. While this question cannot be answered in advance, implying that implementing this as a planned post ACTD objective is not likely. The factors to consider include: determining whether competition exists, defining the magnitude of the development effort, identifying the number of systems that may ultimately be acquired, establishing the soundness of the ACTD system design, determining whether the government owns the design data and hardware from the ACTD, and estimating cost. In any event, the Competition in Contracting Act requires justification for not conducting a competition. [Transition of ACTDs to the Formal Acquisition Process – Transition Considerations, Apr 2000]

If the program determines that; a) significant development efforts are needed, b) decides to make significant changes to the system demonstrated during the ACTD phase, or c) desires an entirely new system, a new development competition should be conducted. Under these three conditions, there is no justification to award a sole source contract to the ACTD contractor and any pricing obtained as part of the ACTD contract would be invalid. [Transition of ACTDs to the Formal Acquisition Process – Transition Considerations, Apr 2000]

Regardless of the specific approach selected, the ACTD program should communicate its long-term acquisition strategy to the potential contractors up front. The contracting strategy alternatives, subsequent to ACTD contract award, must be specified in the solicitation. The possibility of continuing with the prime ACTD contractor into production should be clearly communicated to potential offerors. Requesting option prices or production pricing information helps communicate this possibility. The ACTD program should be as forthcoming as possible within the parameters of uncertainties that exist. Doing so will allow industry to judge both the risks and the rewards and to make their investment decisions accordingly. [Transition of ACTDs to the Formal Acquisition Process – Transition Considerations, Apr 2000]

2. Cost as an Independent Variable (CAIV)

The objective of an ACTD is to rapidly transition mature technologies into an operational force structure. One potential roadblock to the completion of a successful transition is a lack of understanding of the acquisition and ownership (Operation and Support--O&S) costs. Cost as an Independent Variable (CAIV) should be a consideration throughout the procurement process and may play a key role in the transition to, and progress within, the acquisition process. O&S costs and CAIV go hand-in-hand in determining acquisition affordability. [Transition of ACTDs to the Formal Acquisition Process – Transition Considerations, Apr 2000]

A key tenet of the CAIV approach for acquisition is a far stronger user role in the process through participation in setting and adjusting program goals throughout the program, particularly in the cost-performance tradeoff process. Since user participation is a prime requirement of any ACTD program, CAIV is a natural fit with any ACTD execution. CAIV objectives include:

1. Establishing realistic but aggressive cost objectives early in the program,

2. Managing risks to achieve cost, schedule and performance objectives,

3. Devising appropriate metrics for tracking progress in achieving cost objectives,

4. Motivating all managers to achieve program objectives,

5. Putting incentives in place to reduce operating and support costs. [Transition of ACTDs to the Formal Acquisition Process – Transition Considerations, Apr 2000]

Where applicable, these objectives should be addressed in the ACTD Management Plan and/or during ACTD implementation. With CAIV in place, execution of the ACTD should result in a more accurate assessment of ACTD performance by providing more robust cost-performance trades. As a minimum, proposed improvements to the production version of the ACTD need to be examined in light of life cycle cost implications. [Transition of ACTDs to the Formal Acquisition Process – Transition Considerations, Apr 2000]

3. Open Systems Architecture

An important part of reducing the Life Cycle Cost (LCC) of a system which transitions from an ACTD program to an acquisition program is the implementation of open systems architecture. An ACTD normally builds a fieldable prototype that is based on available components (e.g., engines, black boxes, etc.), allows the user to assess military utility, and then leaves the residual capability with the user. However, after transition to production and/or fielding, more capable or more cost-effective components may become available. Employing an open systems architecture during the design of the ACTD will allow the use of a greater range of components, thus resulting in a better support infrastructure and the rapid insertion of technology for product upgrades. [Transition of ACTDs to the Formal Acquisition Process – Transition Considerations, Apr 2000]

C. PROGRAM MANAGEMENT

The program management 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. Figure 3-1 gives the overall framework for transition planning. The strong role that transition planning plays during the ACTD formulation phase, the key issues addressed by the TIPT, and the reviews of both the acquisition and operational transition plans near the end of the ACTD are depicted. As shown, the TIPT serves as a bridge between the planning activities at the start of the ACTD and the decisions that will govern the fielding of the residuals and the transition to acquisition. [Perdue, Mar/Apr 1997]

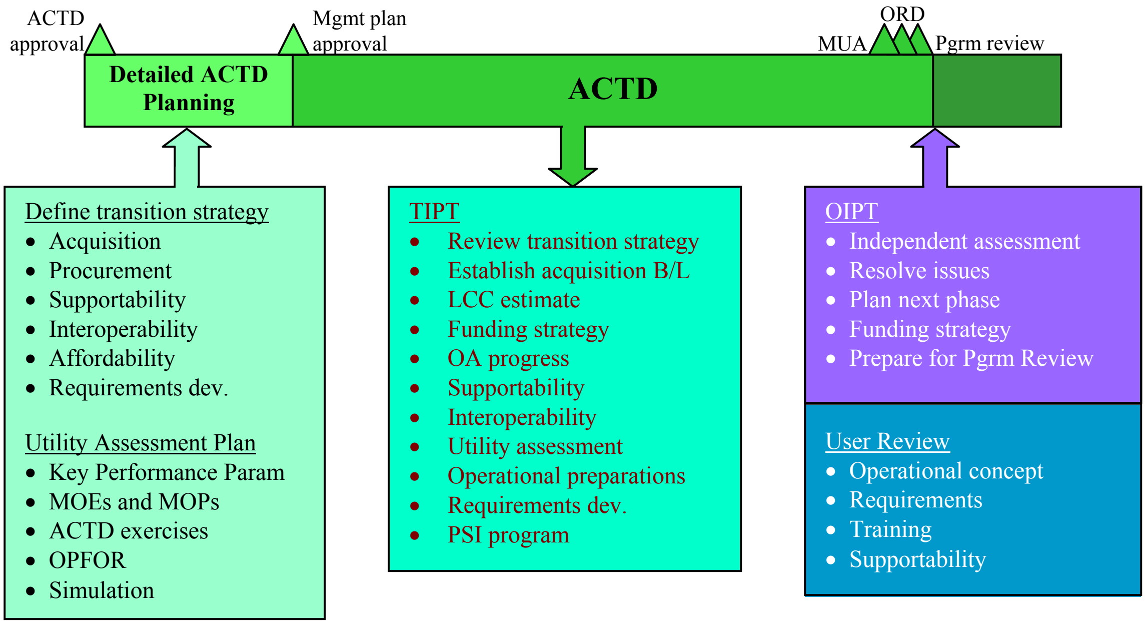

Figure 3-1. TIPT Preparations [Perdue, Mar/Apr 1997]

1. Acquisition Program Documentation

One of the major objectives of the current acquisition policy is to minimize the volume of mandatory guidance, particularly with respect to documentation for acquisition programs. DoDI 5000.2R contains mandatory documentation requirements that are applicable to major defense acquisition category (ACAT 1) programs. These documentation requirements are driven largely by legislation, but the milestone decision authority has flexibility to tailor those driven by DoD regulations. If a program is less than a category 1 program, the milestone decision authority has total flexibility to tailor documentation requirements. For this case, DoDI 5000.2R can be used as a guide. DoDI 5000.2R documentation requirements, provided as Appendix A of this thesis, is the reference guide that serves as a starting point for tailoring information through the TIPT process. It highlights the statutory and regulatory information requirements for ACAT 1 programs that enter the acquisition process, beginning at Low Rate Initial Production. [Transition of ACTDs to the Formal Acquisition Process – Transition Considerations, Apr 2000]

2. Funding Background

From the standpoint of developing, producing, fielding, and supporting traditional weapon system procurements, the Planning, Program, and Budgeting System (PPBS) is the DoD management system that ultimately produces DoD's portion of the President's Budget. It was originally introduced by Secretary of Defense Robert McNamara in 1962 and is unique to the DoD. The PPBS is a 14–16 month calendar-driven biennial cyclic process through which DoD prepares its annual budget. The PPBS objective is to provide operational commanders with the best mix of forces, equipment, and support attainable within fiscal constraints. [Introduction to Defense Acquisition Management, June 1999]

The process has three distinct but interrelated phases; planning, programming, and budgeting. These phases provide a formal, systematic structure for making decisions on policy, strategy, and the development of forces and capabilities to accomplish anticipated missions. The PPBS provides for a time-phased allocation of resources and submission of supporting documentation. PPBS also result in periodic updates to the Future Years Defense Program (FYDP). The FYDP reflects requirements for the out-years (years beyond the next budget year) based on DoD planning to meet national defense objectives. It represents those programs approved by the Secretary of Defense (SECDEF), via the Deputy Secretary of Defense (DEPSECDEF) and the Defense Resources Board (DRB). [Introduction to Defense Acquisition Management, June 1999]

The PPBS process produces a plan, a program, and finally a budget for the DoD. A summarized version of the budget is forwarded to the President for approval. The President's budget is then submitted to the Congress for authorization and appropriation. Congress then considers the President's budget and approves, modifies, or disapproves the recommendations. This entire budget cycle can take 18 to 24 months to react to major changes. Out-of-cycle reprogramming actions can be made, but they are the exception rather than the rule. This extended cycle makes it difficult for the acquisition communities to plan innovation, especially in fast-paced technologies, two years in advance. [A Manager's Guide to Technology Transition in an Evolutionary Acquisition Environment: A Contact Sport, August 2002.

At the time a proposed ACTD is approved, the DUSD(A&T) also approves its funding, to include any supplemental funding provided by OSD. The Executing Agent, the lead development organization for the ACTD, will designate an ACTD Demonstration Manager (DM), who is responsible for managing the execution of all funds associated with an ACTD. It is also the responsibility of the DM to develop a LCC estimate for the system to serve as a basis for planning, programming, and budgeting of the resources by the Lead Service for subsequent acquisition. [Transition of ACTDs to the Formal Acquisition Process – Transition Considerations, Apr 2000]

ACTD program managers must obtain ACTD funding, and any follow-on acquisition funding, through the PPBS just like traditional acquisition program managers. The PPBS method provides for a cyclic process that provides the operational commanders-in-chief the best mix of forces, equipment and support attainable within financial constraints [DODI 5000.2, Jan 2001]. While traditional acquisition programs should be fully funded in the FYDP, ACTD programs are not required to include funding for post-ACTD activity in the FYDP [ACTD Transition Guidelines, Dec 1997]. This lack of out-year planning will limit the ability of ACTDs to maintain momentum into the acquisition process.

As is apparent in the world we live in, technology advancements occur almost daily. Due to the technological intensity of ACTDs, a program must have the flexibility to adjust rapidly to these innovations, or fail to succeed as an initiative. Unfortunately the speed and flexibility of an ACTD program to leverage, exploit, and transition mature technologies into operational implementation can be severely hampered by resource and budget constraints-e.g., the inability to perform timely programming of funding during the Program Objective Memorandum (POM) process. RDT&E funding for ACTDs can currently be planned, programmed, and budgeted through two sources: 1) The Military Departments/Agencies supplying the underlying technologies can provide the funding associated with those technology programs, and 2) OSD can supplement the service/agency funding. OSD funding can cover cost in three areas: a) additional costs incurred when the technology programs are reoriented to support the ACTD; b) costs due to any requirement to provide additional quantities of hardware; and c) cost for technical support for two years of residual fielding operations following the completion of the ACTD. However, funding to support post ACTD activities (development, LRIP, full rate production, or purchase of additional quantities of commercial items) are not typically funded by OSD or the Service/Agency until the program demonstrates its military utility. This lack of follow-on funding creates a significant challenge that must be addressed as part of the transition effort. [Transition of ACTDs to the Formal Acquisition Process – Transition Considerations, Apr 2000]

The Lead Service, in an attempt to transition mature technologies smoothly to the warfighter, will define and establish a funding methodology for effective insertion of the ACTD acquisition into the DoD resource allocation process. Post-ACTD financial planning must be accomplished during the ACTD since the acquisition Milestone Decision Authority (MDA) will only transition the program from an ACTD to an acquisition program if the follow-on effort is fully funded [DoD 5000.2-R, October 1997]. This dichotomy is a recognized problem within the acquisition community since it affects not only the ACTD and its follow-on acquisition effort, but also other modernization programs competing for the same scarce funding. The appropriate time will depend upon the circumstances associated with the particular ACTD and the funding alternative that is selected.

3. Follow-on Funding Alternatives

The strategy for follow-on acquisition should be tailored to fit the circumstances of each individual ACTD. Currently, three alternative strategies for follow-on funding have been identified.

1.

ACTD Outcome	Funding Status	Action Required
Military Utility Established	No Resources Programmed	Programming Resources Causes Two-Year Delay

For ACTD programs transitioning to acquisition, this is the normal execution process. Following the completion of the ACTD, the Lead Service programs for resources, based on the successful demonstration of military utility. Under the formal

PPBS/POM cycles, this alternative results in acquisition funds becoming available two years after completion of the ACTD. In the interim, the residual capability from the ACTD is left with the user to provide a limited operational capability. While this method maintains efficiency in the PPBS process, it means that the continuity and momentum from an ACTD to an acquisition program may be lost. [Transition of ACTDs to the Formal Acquisition Process – Transition Considerations, Apr 2000]

2.

ACTD Outcome	Funding Status	Action Required
Assumed Success For Some ACTDs	Program Resources In Anticipation Of Follow-On Acquisition	Acquire System

The most appealing way to minimize the break in continuity between the ACTD and the acquisition program is for the Lead Service to establish, at some point during the ACTD, a PPBS/POM funding budget line, dedicated solely to acquisition of the ACTD. This approach would be best suited to an ACTD for which the military utility is expected to be high, and where there are early indications that the expectations will be met. However, it means the services must insert an acquisition cost estimate into the PPBS process before the ACTD testing is complete and before the user has had an opportunity to make an operational assessment. Unfortunately, this will build uncertainty into the cost estimate as the last year or two of the ACTD are arguably the most cost relevant. If it is possible to establish this budget line two years prior to the anticipated decision point to enter development or LRIP, the break in continuity may be avoided altogether. This strategy, of establishing early ACTD specific funding in a RDT&E (for development) or procurement line (for production), provides an appropriate funding transition bridge to maintain program continuity and support system acquisition. If the program becomes a joint program, the Lead Service can transfer the appropriate resources to the designated Joint Program Lead Service for execution. This funding approach will also contribute to overall defense program stability, not having to decrement ongoing programs to "find" necessary resources. [Transition of ACTDs to the Formal Acquisition Process – Transition Considerations, Apr 2000]

The Army established a Warfighter Rapid Acquisition Program (WRAP) to address the gap in funding that exists because of the time required to plan, program, budget and receive appropriations for procuring a new technology. WRAP was designed top shorten the acquisition cycle time and be a bridge between experimentation and system acquisition. The goal was to put new weapons in the hands of soldiers faster and cheaper. Candidates for WRAP were selected according to urgency of need, technical maturity, affordability, and effectiveness. To promote program stability, candidates received funding for the first 2 years, which allowed time to build them into the overall budget cycle. [Manager's Guide to Technology Transition in an Evolutionary Acquisition Environment, January 2003]

The Air Force has a similar process called Warfighter Rapid Acquisition Process (AF WRAP), which is an ongoing program. It is a rigorous process that speeds the initial acquisition decision and allocation of funds for a small number of competitively selected projects that either increase the warfighter capability or significantly reduce costs. AF WRAP quickly makes available newly matured, often pivotal technology. The AF WRAP candidate review ensured the smooth transition of selected candidates to operational capabilities that are acquired and sustained as part of the baseline Air Force program. WRAP funding is allocated in the execution year to support projects for as long as two years. [Manager's Guide to Technology Transition in an Evolutionary Acquisition Environment, January 2003]

While the Army is no longer funding their WRAP, it has developed other initiatives to rapidly transition technology to the warfighter. During the development of the FY98-03 POM, the Army established a budget line, referred to as Task Force XXI, with RDT&E funds identified and submitted in the FY98 budget request. The establishment of the RDT&E line, to support Task Force XXI requirements, provides the Service the flexibility to leverage, exploit and transition new technologies, buy prototype systems, and put them in the hands of the soldiers quickly. [Transition of ACTDs to the Formal Acquisition Process – Transition Considerations, Apr 2000]

3.

ACTD Outcome	Funding Status	Action Required
High Military Utility	No Resources Programmed	Decrement Another Program(s)

When an ACTD is judged to provide a significant and compelling enhancement in military capability and no resources have been provided to support the effort, the follow-on funding issue can be presented to the OSD Defense Resource Board (DRB) or Enhanced Defense Resource Board (ERDB) (for intelligence programs) for discussion and resolution. The funding request would ask the board to support follow-on acquisition funding of the ACTD. Ongoing programs would have to be decremented in order to provide the necessary funding to support the ACTD acquisition efforts. This type of funding strategy should only be used when the "urgency of need" warrants rapid acquisition and overrides the formal PPBS cycle. This strategy disrupts the formal PPBS process by inserting new funding requirements very late in the process. The priority and funding issues previously resolved within the services would be disrupted to the detriment of the program. [Transition of ACTDs to the Formal Acquisition Process – Transition Considerations, Apr 2000]

So, in the end, although the funding rules are different between the ACTDs and standard acquisitions, PPBS reality dictates that ACTD programs must plan and program acquisition funding in the FYDP to maintain program stability and momentum. ACTD program managers and the service headquarters must incorporate their budgets into the PPBS—just like traditional acquisition programs [Mol, April 1998]. The earlier this can be done, the more likely an ACTD acquisition will transition smoothly to the warfighter.

D. DEVELOPMENT

The developer and user need to address the quantity of residuals during the development stages of the ACTD program. 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, manmachine interface, and designing for proper operation. These are the primary differences that distinguish the ACTD fieldable prototype from a more common functional prototype. [Perdue, Mar/Apr 1997]

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, safety, manning, and training. In many cases, the approaches used during the ACTD program can be extended either as an interim or a long-term solution. For example, contractor logistics support outside of the combat area may be a cost-effective alternative to organic maintenance by the user prior to the fielding of a fully operational capability. The specific solution to each of these issues will need to be defined jointly between the developer and user organizations and tailored to the individual ACTD. [Perdue, Mar/Apr 1997]

1. Defining Operational Requirements

ACTDs are initiated on the basis of a broad statement of need rather than a detailed set of operational requirements. However, entering the formal acquisition process requires preparation of an ORD as defined by DoDI 5000.2R. An ACTD is designed to give the user the opportunity to gain experience with a system, to develop a concept of operations that fully exploits the system capability, and to then develop a set of operational requirements that reflects the benefit of that experience. When DoD approves an ACTD, it also designates a lead Service. The Lead Service designated at the origination of the ACTD will coordinate the development of the appropriate requirements documentation, such as an ORD with Key Performance Parameters (KPPs), and recommend an organization to execute the proposed acquisition. A system performance specification, based on the ORD, will then be developed to serve as the functional configuration baseline for initiation of the follow-on efforts. [Transition of ACTDs to the Formal Acquisition Process – Transition Considerations, Apr 2000] Although the ACTD process provides unique and very valuable inputs to the ORD development effort, it can also introduce complications. These 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 preferred approach is to create a draft ORD early in the ACTD cycle that reflects the expected capability of the system. If concerns exist with certain capabilities of the system, these capabilities could be flagged for detailed evaluation during the ACTD [Perdue, Mar/Apr 1997]. From this baseline, the user can assess specific changes in the operational requirements, in terms of utility, cost, schedule, and risk; and can develop an ORD that reflects a good understanding of the tradeoffs involved. [Transition of ACTDs to the Formal Acquisition Process – Transition Considerations, Apr 2000]

As noted earlier, the ACTD provides the user with a fieldable prototype to assess military utility and refine the operational requirements of the system. The draft ORD reflects the ACTD configuration and identifies areas where assessment is required. Similarly, the Operational Test Agency (OTA) participating in the ACTD produces a characterization of the prototype system. During the military exercises, the user then has an opportunity to review and assess each of the identified areas to determine the value of increasing or decreasing the requirements. The lead service can then make better decisions on the operational requirements because they are based on a much better understanding of the implications than is normally available. At the same time the ORD is completed, an Acquisition Strategy and an Operational Assessment can be completed, based on the same set of requirements. [Transition of ACTDs to the Formal Acquisition Process – Transition Considerations, Apr 2000]

2. Interoperability

In managing 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 may provide less than optimum solutions, they typically establish an early capability that can be improved upon over time. This type of excursion fits well with the spiral development process currently being incorporated by the services in DoD acquisition. It is important that this initial capability recognizes and responds to the need for interoperability. The preferred management strategy is to define the interoperability for the objective or final system, to determine how many of those requirements are appropriate for the initial system, and then to define a credible growth path that leads to full interoperability. [Perdue, Mar/Apr 1997]

To ensure that the elements generated by ACTD programs consider interoperability during deployment, an interoperability approach should be defined at the onset of the ACTD. This approach should be developed for those interfaces that will be included in the ACTD configuration. It should define:

1. Those systems with which the ACTD products are expected to interoperate;

2. The types of information to be transferred over the ACTD interfaces;

3. The testing approach for the interfaces (e.g., simulated or operational),

4. The organizational responsibilities for maintaining the interfaces (e.g., the ACTD or operational system),

5. The degree of compliance with applicable interoperability standards, such as the Joint Technical Architecture. [Transition of ACTDs to the Formal Acquisition Process – Transition Considerations, Apr 2000]

An ACTD may or may not address all interoperability requirements of the final objective system. If there is required evolution beyond the ACTD configuration, that evolution should be defined, to include:

1. Those systems with which the final objective system is expected to interoperate,

2. The strategy for the evolution to the final objective system interoperability,

3. The planned timeframe for incorporation should be shown in relationship to the overall acquisition strategy for those interfaces not included in the ACTD configuration. [Transition of ACTDs to the Formal Acquisition Process – Transition Considerations, Apr 2000]

The ACTD Management Plan should reflect the interoperability approach and the interface management and evaluation responsibilities. The Operational Manager should review the status of system interoperability with all interested parties periodically to discuss and review problems, and actions to ensure connectivity, compatibility, and synchronization of the effort. [Transition of ACTDs to the Formal Acquisition Process – Transition Considerations, Apr 2000]

E. DEPLOYMENT

1. Assessing Military Utility

The objective of every ACTD is to respond to a current military need by putting a fieldable prototype into the hands of the warfighter and letting them assess its utility. This MUA is the central question of each ACTDs proposed solution. Three key parts comprise the assessment:

1. Does the systems capabilities effectively perform the job it was designed to do?

2. Is the system suitable for use by the intended operators?

3. How important is the system to the overall warfighting capability? [Perdue, Mar/Apr 1997]

The users determine the answers to all three of these questions and in so doing determine military utility. They also ensure that the military exercises used in making that determination are appropriate and representative of the expected operational environments. Operational testers can assist the user on the first two questions based on their experience and expertise in evaluating effectiveness and suitability (i.e., availability, sustainability, reliability, maintainability, software, ILS). The operational testers can assist in structuring the exercise, defining the data needs, and in characterizing the performance of the system [Perdue, Mar/Apr 1997]. These efforts begin during the initial planning stages of the ACTD. At this point, the ACTD Operations Manager (OM) should initiate the development of MOEs, Measures of Suitability (MOS), MOPs, and COIs as appropriate indicators of military utility. These measures will also be important when the demonstrations or military exercises are being planned or being selected from large-scale exercises that are already planned for other purposes. Concentrating on these measures will ensure that the exercises, scenarios, and data collection plans will allow a “characterization" of the system. These efforts should provide sufficient information to answer the first two questions. [Transition of ACTDs to the Formal Acquisition Process – Transition Considerations, Apr 2000]

The third question, the systems importance to the overall warfighting capability, is a more subjective determination that must be made by the operational users. This last question provides support to the expenditure of acquisition funds. Demonstrating that the system is effective and suitable is a necessary task, but it is not sufficient to justify funding. To obtain support for acquisition funding, users must also show that the new system makes a significant contribution to our total warfighting capability. [Perdue, Mar/Apr 1997]

2. Operational Assessment

As an input to an acquisition decision to proceed into LRIP or beyond, an operational assessment is needed from the operational community to confirm that the system or capability in question is potentially effective and suitable. This assessment typically begins with the characterization of performance. The assessment development by the operational community continues in parallel and perhaps iteratively with the development of user requirements. This gives a complete picture of cost, schedule, and risk implications associated with such requirements and allows the user to make an informed choice between acquiring a capability quickly that provides the ACTD performance level, or requiring a higher performance level and incurring the increased cost, schedule and/or risk inherent in a standard procurement cycle. Once the operational user completes these tradeoffs and prepares the ORD, the operational tester can issue the operational assessment against those requirements. This assessment will be provided to the acquisition decision maker as a formal part of the transition process. [Transition of ACTDs to the Formal Acquisition Process – Transition Considerations, Apr 2000]

3. Supportability Strategy

Those requirements that must be addressed early in the ACTD because they impact the design of the system (e.g., reliability, availability, built-in diagnostics, maintenance capability, operation in harsh environments) can be included within the basic contract and activities that can and should be deferred until there is adequate information available (e.g., tech manuals, training programs) can be put into an option, or a contract line item, that will be initiated at a later date. It may be acceptable to delay the exercise of this option until very late in the ACTD, when the likelihood of proceeding into acquisition is better understood. It may be acceptable for this later option to overlap with LRIP if there are other means for addressing support of the residuals. For example, a strategy may include using contractor logistic support for the residuals to significantly reduce the level of effort that must be devoted to such areas as documentation and development of training programs. [Transition of ACTDs to the Formal Acquisition Process – Transition Considerations, Apr 2000]

Planning to proceed into production 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 already exist to be included in the design of the system. These issues include support equipment, initial spares, built-in-test, logistics, facilities, training, technical manuals, etc that must be developed and tested as an integral part of the ACTD. The supportability of the residual capability that is to remain with the user at the conclusion of the ACTD also needs to be addressed. There will be no later opportunities to add capability prior to the start of production. The RFP for the system development/production contract should clearly define the goal of entry into production and should ask the bidders to describe their approach to ensure that supportability of both the residual equipment and the production configuration are adequately addressed in the ACTD. [Perdue, Mar/Apr 1997]

It is particularly important to communicate the basic supportability requirements and the supportability strategy to the bidders and to let them propose solutions. For systems that will undergo a single cycle of development to produce fieldable prototypes, and then enter production, it is extremely important that the selected contractor demonstrate the level of understanding of supportability necessary to meet those demands. The RFP should require offerors to provide recommendations on the support concept as well as the source of support (contractor or organic) based upon their assessment of cost and mission requirements. The level of definition should be adequate to allow procurement of the support elements concurrent with the end items. The offerors should be asked to provide support throughout the ACTD phase and to define an initial support plan for the residual capability and the objective capability. The offerors also should plan to demonstrate the on-equipment capability during the ACTD using planned personnel and equipment, and to refine their recommended support approach based upon experience gained during the ACTD. This not only provides insight into the support requirements of an offeror's proposal, but also provides the capability to evaluate proposals based on LCC. [Transition of ACTDs to the Formal Acquisition Process – Transition Considerations, Apr 2000]

If the system is to enter the development phase of EMD at the completion of the ACTD, the supportability effort is significantly reduced and is focused primarily on the support during the ACTD and during field operation of the residual capability. Regardless of approach, the supportability strategy should be reflected in the ACTD Management Plan and in the major procurement for the ACTD. [Transition of ACTDs to the Formal Acquisition Process – Transition Considerations, Apr 2000]

F. TRANSITION TO PRODUCTION

An ACTD becomes a candidate for acquisition only after the military utility of the system has been successfully demonstrated. It is important that the transition to acquisition and production occur smoothly and without undue loss of momentum. To enable this, the transition objective must be identified at the time the ACTD is approved, and the transition strategy must be developed during the detailed planning for the ACTD, reflected in the ACTD Management and Transition Plans, and executed as a major procurement action for the ACTD. [Transition of ACTDs to the Formal Acquisition Process – Transition Strategy, Apr 2000]

The objective is not to encumber the ACTD to the point that it cannot be executed in two to four years, but rather to define what must be done, what can be deferred, and when the deferred activity will be completed. The transition goal and the associated strategy for an ACTD should be specified in the ACTD Management Plan and reflected in the program content. It is critical to identify during the planning stage whether the ACTD would, if successful transition to development or to production. Much more advance planning is required for the latter case. The transition strategy provides a readiness posture that goes beyond the ACTD. The decision to proceed will first be based on the assessment of military utility and then on the relative priorities within the DoD. [Transition of ACTDs to the Formal Acquisition Process – Transition Strategy, Apr 2000]

The goal in planning the transition should not be to completely "normalize" the operational aspects of the system. ACTDs are intentionally introducing significant changes to the traditional acquisition process, and they, in some cases, should exert similar influences in the operational community. Considering non-traditional approaches is appropriate. For example, using contractor logistic support on a long term basis, or at least on an interim basis following initial fielding, may help significantly to reduce the burden on the ACTD and expedite the schedule for achieving an operational capability. [Transition of ACTDs to the Formal Acquisition Process – Transition Strategy, Apr 2000]

1. Oversight of Transition Preparations

If a program enters the formal acquisition process as a major defense acquisition (ACAT 1) program, DoD 5000 specifies that an Overarching Integrated Product Team (OIPT) structure needs to be in place. For less than major programs, some form of the Integrated Product Team (IPT) should also be used, as specified by the MDA. The point at which this happens will vary, but a general rule-of-thumb is that this transition occurs when a Program Manager is appointed. Prior to that, the ACTD OM will act in accordance with the approved Management Plan. [Transition of ACTDs to the Formal Acquisition Process – Transition Strategy, Apr 2000]

When the transition strategy of an ACTD indicates that a significant level of transition preparation effort is required, a TIPT is normally established soon after approval is given to initiate the ACTD. The TIPT is co-chaired by a representative from ODUSD/AT and the ACTD OM. (Lead Service representation is required, especially if the ACTD is going to transition to a Service-managed program.) The TIPT includes representation from all of the stakeholders in the ACTD to include the User Sponsor, the Lead Service, the developer(s), the supportability community, the Joint Staff, ODOT&E and the operational test agencies, as well as the OSD and service staff elements that will be involved in the formal milestone review that occurs at the end of the ACTD. [Transition of ACTDs to the Formal Acquisition Process – Transition Strategy, Apr 2000]

The purpose of the TIPT is to ensure that the necessary preparations are made during the formulation and execution of an ACTD to allow effective transition into the next phase with a quality product and without a loss of momentum. A TIPT is typically supported by a number of working level IPTs to focus on preparations in the areas of acquisition, test and evaluation, supportability, and requirements. Cross-functional representation is needed to keep preparations coordinated across the board. It is important that working level IPTs address the preparations needed to accomplish the operational transition as well as the acquisition transition. [Transition of ACTDs to the Formal Acquisition Process – Transition Strategy, Apr 2000]

It is also advisable to conduct a major review with the Lead Service organization that will be accepting both the residual assets from the ACTD and the objective system. This review, often referred to as a transition readiness review, should occur at least six months prior to the end of the ACTD and should address the status of preparations for operational support (i.e., manning, logistics, training, operational concepts). [Transition of ACTDs to the Formal Acquisition Process – Transition Strategy, Apr 2000]

As the ACTD nears completion, with useful assessments having been made and preparations for transition coming to a conclusion, the focus in the process shifts to the preparations for a formal milestone (or program review) that will determine the future of the program. At this juncture, the TIPT hands off oversight responsibility to the OIPT to prepare for the formal review in accordance with the procedures defined in DODI

5000.2R for Major Programs. Note that the program should be fully funded at this point since the OIPT and Defense Acquisition Board (DAB) do not normally review activities that have not been funded by a component. [Transition of ACTDs to the Formal Acquisition Process – Transition Strategy, Apr 2000]

In support of a milestone decision, the user must then choose from among several possible outcomes for the ACTD. These outcomes are defined below and depicted in Figure 3-2.

• If the system proves to be effective and suitable, the preferred course of action is to proceed directly into production, preferably beginning at or beyond MS C. 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 system is useful, but that specified upgrades could significantly improve its utility. Here, the approach could be to proceed directly into production with the existing configuration (and minor modifications if needed) (MS B), and to accomplish the upgrades via Preplanned Product Improvements (P3I).

• The third outcome could result from a conclusion that the system provides a useful capability, but additional acquisition is not required. The system residuals could be fielded with the user and received limited additional support.

• A fourth outcome could result from a conclusion that the system does not currently have the ability to provide a useful capability, but with further development, it could be made effective and suitable. The system could be shelved to await further technology development or it could be used to initiate a standard EMD program as a follow-on activity.

• The final outcome reflects the conclusions that the system does not provide military utility and it does not offer sufficient potential to justify further development. [Perdue, Mar/Apr 1997]

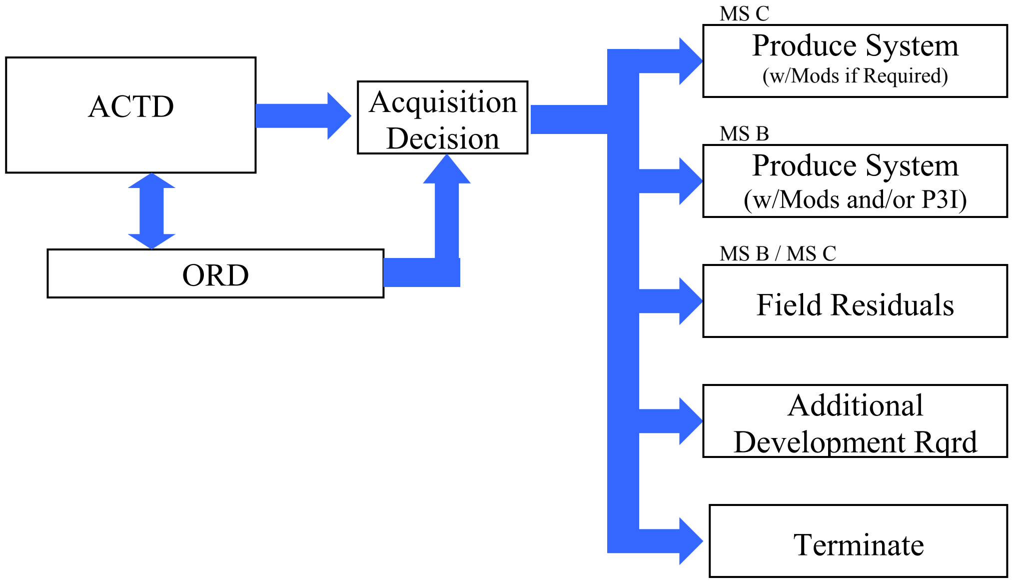

Figure 3-2. Possible ACTD Outcomes

2. ACTDs Selected for Analysis

The ACTD process began in 1995. With a potential 3-4 year cycle time required for the execution of a given ACTD to complete the first ACTD programs would begin acquisition transition in 1998. Programs begun from 1998 and beyond would then have the opportunity to gain lessons learned from earlier programs. These lessons learned could then be implemented into an ACTD programs processes and execution. For the purposes of this thesis, programs would have to be completed by 2001 to have the ability to provide a 'second generation' of ACTD lessons learned. Tracing back 3-4 years from 2001 implies ACTD start dates of 1997 or 1998. To provide adequate separation and knowledge acquisition between ACTD programs only those programs begun in 1998 were considered for this thesis. These programs are identified in Table 3-2.

ACTDs Authorized In Fiscal Year 1998

Title	Class[a]	Total Expected Cost, 1995-2003 (M of $)	User/Sponsor	Lead Service or Agency
Link 16	I	3.3	Atlantic Command	Navy
Migration Defense Intelligence Threat Data System	I	11.4	European Command	DIA
Joint Continuous Strike Environment	I	15.9	European Command	DISA
Adaptive Course of Action	I	19.3	Atlantic Command, Pacific Command	DISA
C4I for Coalition Warfare	I	20.0	European Command	Army
Space-Based Space Surveillance Operations	I	21.5	Space Command	Air Force
Information Assurance: Automated Intrusion Detection Environment	I	75.1	Strategic Command	DISA
Theater Precision Strike Operations	I	93.4	U.S. Forces Korea	Army
Unattended Ground Sensors	II	20.8	Central Command, Special Operations Command	Air Force
Precision Targeting Identification	II	23.0[b]	Joint Inter-Agency Task Force - East	Navy
Joint Modular Lighter System	II	26.5	Atlantic Command	Navy
Line-of-Sight Anti-Tank	II	257.9	Central Command	Army
Joint Biological Remote Early Warning System	III	125.7	European Command	Army

NOTES:
a. Class I = software development projects; Class II = traditional platforms; Class III = systems-of-systems.
b. Excludes an additional $2.4 million to be provided by the United Kingdom.

DISA = Defense Information Systems Agency;
DIA = Defense Intelligence Agency;
C4I = Command, Control, Communication, Computer and Information.

SOURCE:
Compiled by the Congressional Budget Office based on data from the Department of Defense. Sorted by Class and Expected Cost.

Table 3-2. ACTD Programs Considered For Analysis
[CBO Memorandum, September1998]

Software development projects (Class I) and Systems-of-Systems projects (Class III) were excluded from consideration due to the nature of their post ACTD acquisition processes. The systems that remained included Unattended Ground Sensors, Precision Targeting Identification, Joint Modular Lighter System and Line-of-Sight Anti-Tank. These programs were all Class II ACTDs, traditional platform acquisitions. Of these four programs, the Line-of-Sight Anti-Tank ACTD was not considered due to extreme program costs (high). The Precision Targeting Identification ACTD was excluded due to its international nature, potentially complicating the acquisition transition process. The Unattended Ground Sensors and Joint Modular Lighter System ACTDs were used for this thesis due to their common starting points. Both are Class II ACTDs. Both were begun in 1998, following the completion of some of the initial ACTD programs. Both were 20-30 million dollar total expected cost ACTDs.

3. ACTDs Analysis Criteria

Chapter II discussed the ACTD goals and selection processes. As identified by the Deputy Under Secretary of Defense for Advanced Systems and Concepts (DUSD(AS&C)), and used by ACTD mangers and users, the following list of criteria are used to determine approval/implementation of a purposed ACTD program:

1. The ACTD provides a response to a priority need.

2. The purposed ACTD is adequately mature.

3. ACTD demonstrations/exercises have been identified to provide military assessment.

4. The ACTD developer has met the essential ACTD submission criteria.

5. The ACTD lead service has been designated.

6. ACTD sponsorship has been identified and assigned.

7. The ACTD execution window is forecasted to be two to four years.

8. The risks associated with the ACTD have been identified.

9. ACTD funding is sufficient to defined meet program requirements.

10. The ACTD has indicated that preparations to transition into acquisition are underway. [USEUCOM, July 2002]

Using these criteria and the ACTD practices discussed previously in this chapter, evaluation points for the advancement or termination of a given ACTD into the formal acquisition process can be defined. The indicators of success are provided in Table 3-3:

Criteria	**Indicators of Success**
1. The ACTD met a priority military need. (C-1)	a. The proposed solution incorporated intense user involvement to evaluate the ability to meet military needs. b. ACTDs users had realistic and extensive military exercise opportunities to evaluate utility and gain experience with capabilities. c. Users refined their operational requirements, developed CONOPS, and developed a sound understanding of the military utility.
2. The ACTD was adequately mature. (C-2)	a. ACTD was a mature or nearly mature technology based on Technology Readiness Level (TRL) scale (minimum level 5 or above). b. ACTD maturity reduced the time and risks associated with the demonstration. c. ACTD activities focused on integration and demonstration activities not technology development.
3. The ACTD demonstrations / exercises were adequate to provide a military utility assessment. (C-3)	a. Adequate quantities of ACTD were procured to provide a valid assessment of its capabilities. b. ACTD demonstration was sized and structured to provide a clear evaluation of military capability. c. ACTD integrated / executed both developmental and operational T&E swiftly and economically to ensure that requirements were met and the system was operationally satisfactory and useful. d. The user defined the MOEs and MOPs that allowed effectiveness and suitability to be characterized. e. User planned the operational exercises, typically including red and blue forces.
4. The ACTD developer demonstrated the essential ACTD criteria. (C-4)	a. The potential or projected effectiveness was sufficient to warrant consideration as an ACTD. b. The available capability addressed a need for which there was no suitable solution. c. The ability of the technology to be interoperable with other systems on the battlefield was verified. d. The fielded system would maintain a high state of readiness and safety, using trained operators and maintainers, and do so economically and with the smallest possible logistical footprint.
5. The ACTD lead service executed the program appropriately. (C-5)	a. The lead service/agency ensured the necessary planning for transition to formal acquisition was accomplished. b. The lead service/agency ensured transition of the residual assets to the user organization and for all aspects of their support.
6. ACTD sponsorship was executed appropriately. (C-6)	a. The JROC recommendation for lead service/user sponsor was accepted by DUSD(AS&C). b. The user sponsor was a Unified Commander (general rule, not as a requirement). c. Affordability goals were set for acquisition and life-cycle costs that permitted CAIV trade-offs and later design-to-cost (DTC) tradeoffs.
7. The ACTD execution window completed within two to four years. (C-7)	a. The ACTD completed all activities within the expected time (2 – 4 yrs). b. No significant schedule or configuration changes were required to meet objectives.
8. The risks associated with the ACTD were appropriately identified. (C-8)	a. Risks were identified and accepted by the primary stakeholders of the ACTD. b. Programmatic risks (e.g. cost and schedule) and the operational risks related to the acceptability of the operational concepts necessary to realize the full benefit of the proposed capability were minimized. c. System complexity (low to high) was related to risk level (low to high), respectively.

Criteria	Indicators of Success
9. ACTD funding was sufficient to meet program requirements. (C-9)	a. A budget was developed and submitted as a part of the proposed ACTD. b. The proper strategy was chosen for obtaining the resources necessary for acquiring the technology. c. All costs associated with the design and development of the prototype system was identified (this includes all additional units required in the ACTD, all exercises that must be paid for by the project, and test support costs including any modeling simulation and analysis needed to support the utility assessment). d. The ACTD budget included transition costs related to the planning and preparations for acquisition, as well as the cost to provide technical support for the first two years of fielding the residuals.
10. The ACTD executed its transition plans to initiate acquisition. (C-10)	a. The ACTD did not lose momentum in transitioning to the acquisition process (assuming the user made a positive determination of military utility). b. A clear acquisition goal was set for the post ACTD phases. c. Requirements were evolved from mission need and performance goals to formal operational requirements documents; interoperability documents; system performance specifications; and total ownership costs (manning, training and sustainability related to applying the technology) estimates. d. A contracting strategy was established that motivated the contractor to provide a best-value solution (in terms of overall life-cycle cost-effectiveness) and permitted transition into procurement without the loss of momentum.

Table 3-3. ACTD Criteria and Indicators of Success

This table is compiled from the Office of the Secretary of Defense ACTD Guidelines [ACTD Guidelines, September 2001], the Office of the Secretary of Defense Focus on ACTDs [Focus of ACTDs, May 2001], and the Office of the Secretary of Defense Manager's Guide to Technology Transition [Managers Guide, January 2003]

G. CHAPTER SUMMARY

As of FY02, 98 ACTD programs had been initiated. This chapter has addressed the history of the ACTD process, identified typical contracting strategies and cost goals that could be used in association with ACTDs to motivate prime contractor(s) while concurrently obtaining 'best value' for the warfighter, including the aspects of CAIV and Open Systems Architecture. The program management process / development activities required to define, plan and prepare ACTD acquisition related documentation and funding processes / acquisition funding alternatives were addressed. ACTD deployment practices were reviewed. We discussed operational requirements, based on military needs and derived from realistic military exercises, along with establishing system interoperability and supportability. Finally, we reviewed transition oversight preparations and possible transition paths for ACTD programs, either termination, residual fielding or acquisition. A brief description of the selection criteria for the ACTD programs to be evaluated was provided along with a listing of all the ACTD programs that occurred that year. At the completion of the chapter, the criteria to be used as evaluation points for the success or failure of the ACTDs under analysis were defined.

Of these items the critical elements include the fact that:

1. Only 32 of 98 ACTDs have successfully transitioned to the acquisition process.

2. A TIPT can serve as an important bridge between the ACTD and the acquisition process.

3. The lack of out year funding plans will limit the ability of the ACTD to maintain momentum into the acquisition process by as much as 2 years.

4. The verification of military utility and the judgment that the ACTD provides a significant and compelling enhancement in military capability is the true test of a valid acquisition.

5. Successfully accomplishing a majority of the ten identified criteria of Table 3-3 will place the ACTD in the proper position to transition to an acquisition program.

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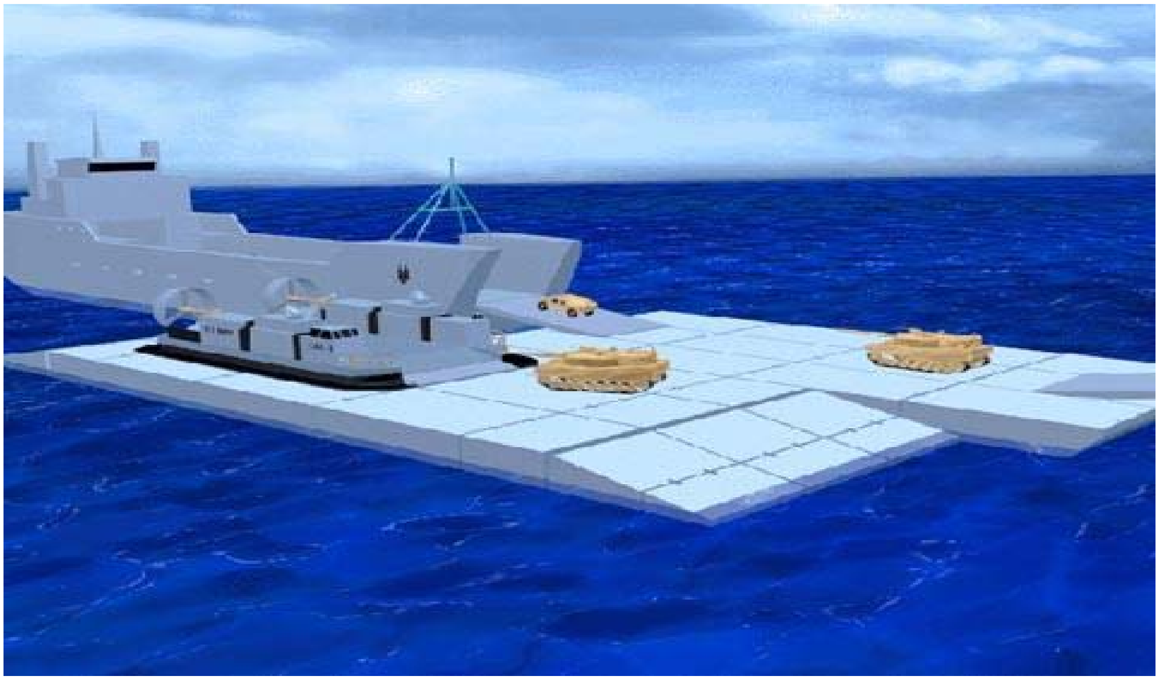
IV. ACTD ANALYSIS - JOINT MODULAR LIGHTER SYSTEM



This chapter will review the Joint Modular Lighter System (JMLS) ACTD. Topics will include the objective(s) of the ACTD, a description of the ACTD element(s), the chronicles and progress of the ACTD, along with the associated cost and schedule. Following these items are the post-ACTD activities. At the completion of the chapter the JMLS ACTD will be reviewed in relationship to Table 3-3. The advantages of the ACTD process, the disadvantages of the ACTD process, and their overall impacts on the JMLS ACTD will be discussed.

The JMLS ACTD program was initiated to improve Joint Logistics Over The Shore (JLOTS) operations. JLOTS is a Unified Commanders joint employment of Army and Navy Logistics Over The Shore (LOTS) assets to deploy and sustain combat forces. JLOTS operations allow US strategic sealift ships to discharge through inadequate or damaged ports, or over a bare beach. JLOTS watercraft can also be used to preposition units and material within a theater. The ability to conduct JLOTS in Sea State 3 (3.5 to 5 foot wave height) accompanied by winds to 16 knots is essential for successful military utility and is the goal of the JMLS. [Joint Modular Lighter System, Jan 2001]

The Navy Lighterage (NL) and the Army's Modular Causeway System (MCS) currently provide logistic support for amphibious operations. However, these two systems are currently restricted to Sea State 2 conditions (3 foot seas) and have minimal service interoperability. The NL system is used for primarily offloading Maritime Pre-positioned Force (MPF) ships and as part of the Assault Follow-On Echelon phase of an amphibious operation. The MCS is primarily associated with offload of Army Unit Equipment and sustainment through unimproved or damaged ports. [Joint Modular Lighter System, Jan 2001]

For MPF operations, the Navy planned to deploy the JMLS on the deck of its transport ships. In this situation, JMLS would be used primarily for Lift-on/Lift-off (LO/LO) activity. For Afloat Pre-positioning Stocks operations, the Army planned to deploy JMLS in cells of Transport-Auxiliary Crane Ships (T-ACS). In this situation, JMLS would be used primarily for Roll-On/Roll-Off (RO/RO) of Large, Medium Speed Roll-on/Roll-off (LMSR). [Sullivan, May 1999]

The JMLS ACTD program was initiated in 1998. JMLS was slated for implementation from Mar 98 to Mar 01, a 3-year execution cycle. Its goal was to develop and demonstrate a technology that would provide a US Army and US Navy interoperable causeway lighterage system for JLOTS operations by FY05 (as defined by Defense Planning Guidance). This lighterage system was to be capable of safe assembly and operation (in a loaded condition) through Sea State 3 (3.5 ft to 5.0 ft waves with 16 knot winds). This performance point is defined in the JLOTS MNS. [RDT&E Project Justification Sheet, Feb 2000]

The prototype JLMS element was 8 feet wide by 8 feet high. It utilized grit-impregnated Ultra-High Molecular Weight (UHMW) deck sheathing, and employed an innovative system to connect the modules side-to-side and/or end-to-end to form various powered and non-powered configurations. JLMS elements could be assembled into 16 ft x 40 ft modules aboard ship or in the water without the use of a marriage bridle. While the JMLS used a rigid connection system, its innovative ball-lock connector was the key to its technology advancement. Various JMLS functional configurations are presented in Figure 4-1. The program schedule is provided as Figure 4-2.

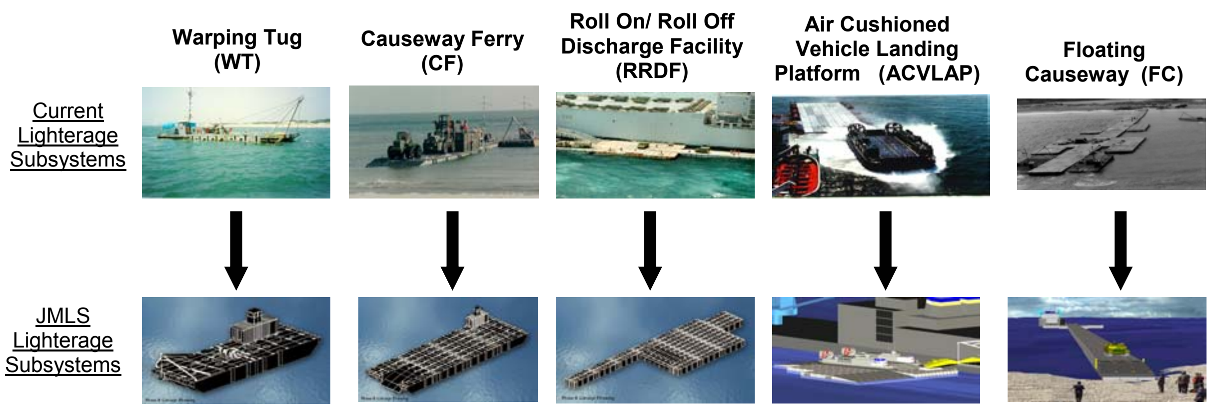


Figure 4-1. JMLS Functional Configurations [Sullivan, May 1999]

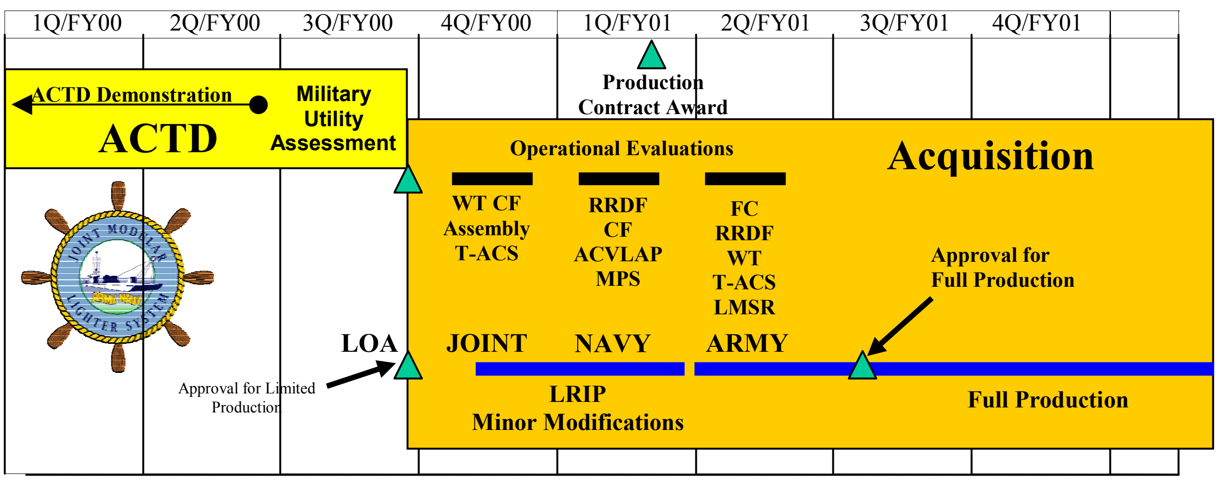


Figure 4-2. JMLS Program Schedule [Sullivan, May 1999]

The JMLS was intended to be service interoperable, replacing both the Navy Lightered (NL) and Army Modular Causeway System (MCS) lighters. ACTD participation included the Army, Navy and OSD. The Navy was the lead service with the Atlantic Command acting as the sponsor for this ACTD. The Naval Facilities Engineering Command (NAVFAC) took responsibility as the Technical Manager to develop and test the prototypes. The US Joint Forces Command (USJFCOM) acted as the Operational Manager to operationally assess the prototypes. At the completion of the ACTD program the JMLS program was slated to transition into a formal participatory acquisition program with the Navy as the lead service. The Joint Army and Navy program was expected to require in excess of $650M procurement dollars between FY01 - FY05. Expected Acquisition Category (ACAT) was ACAT II. Entry point was to be Milestone B, System Development and Demonstration. [McCluskey, Jan 2001]

A. JMLS ACCOMPLISHMENTS, 1998 THROUGH 2002

In FY98 the JMLS ACTD was initiated. Proposals for design of a lightweight, affordable, Sea State 3 (SS3) capable system were evaluated and multiple contracts for most promising designs were awarded in March 1998. The intent was to provide an operational capability to move warfighting materiel from ship-to-shore under Sea State 3 conditions with a significantly increased system life and reduce maintenance requirements. [RDT&E Budget Item Justification Sheet, Feb 1999]

During FY99 the concept design was matured via an integrated multidisciplinary approach. To reduce program risk a full-scale engineering mockup of the connector was fabricated and tested. Additionally, a 1:5 scale propulsor element was modeled and tested to evaluate potential thrust degradation characteristics while underway. A system critical design review was performed and the final designs were released to fabrication. Concurrent with these efforts, manufacturing plans were developed, the required jigs and fixtures were built, and fabrication was begun. Initial deliveries supported engineering tests consisting of a set of in-water assembly trials followed by unit level training. Demonstrations of the connection system were performed in open water near Fort Story, Virginia. [RDT&E Budget Item Justification Sheet, Feb 2000]

In FY00 the fabrication of both a powered and non-powered eight foot-wide modules and ancillary hardware were completed. The hardware was delivered to the Little Creek Naval Amphibious Base. The contractor conducted a Test and Demonstration (T&D) program including technical testing of JMLS hardware and sea trials of the powered subsystems, supported by government furnished equipment

(3QFY00). Technical testing addressed system performance and interface issues. Following the T&D efforts, corrections were made to the system that addressed reliability and safety discrepancies. The government then conducted its Test and Evaluation (T&E) program to obtain Army safety releases prior to military personnel operating the craft in SS3 and to support a military utility assessment scheduled for 2QFY01. Unit level training was performed to support unit and joint demonstrations. While safety releases were obtained for several subsystem capabilities, the Army and Navy decided that fielding would require a wider 24-foot module, to support Navy missions, instead of the current eight foot-wide module. This assessment was based on the overall test results of performance, operations and structures. In FY00, these configuration change efforts were initiated, the original JMLS interim support capability period began, and the original ACTD development period was ended. [RDT&E Budget Item Justification Sheet, Jun 2001]

FY01 was the official ACTD year of completion (3QFY01). JMLS program documentation, including an Operational Requirements Document (ORD) and a Test and Evaluation Master Plan (TEMP), were drafted. Concurrently, specification development and a Proof of Concept contract were established for contractor support of the design, manufacture, and testing of the 24' wide module. Additional efforts included throughput evaluations and ship interface studies. While this was to have been the transition point for the ACTD, the Army withdrew from the program and the JMLS ACTD was terminated short of a MUA. Due to a lack of funding during the FY03 Procurement Request (PR03), the JMLS resource sponsor zeroed all procurement funds for the program. [RDT&E Budget Item Justification Sheet, Feb 2002]

While the Army chose to leave the JMLS ACTD, FY02 saw the Navy proceeding with the manufacturing and testing of a 24’ prototype. Previous program POM indications showed the 8’ module efforts costing $67.04M. The 24’ module program is expected to cost $125.28M. The Navy initiated efforts to establish an MS A program decision and begin concept definition and technical development. The current project includes resolution of technical issues identified during the technical evaluation and completion of all current design and development requirements for a program closeout.

The program has been restructured so that out-year efforts focus on incorporating connector technology developed during the ACTD into a wider 24' module and establishing a Proof of Concept contract to design, manufacture, and test the new units. Plans are to proceed through the standard acquisition process with a future MS B decision for system development and demonstration in 1QFY03. This will be followed by a MS C decision authorizing the procurement of 24' LRIP hardware sections to conduct a full Operational Evaluation (OPEVAL) in 2Q-3QFY05. OPEVAL results will be used to support a Full Production milestone decision in FY05. [McCluskey, Jan 2001]

As defined by the Army Watercraft Restructuring Concept Plan (AWRCP), the proposed Navy program will include six Roll-on/Roll-off (RO/RO) discharge facilities, three causeway ferries, three floating causeways, twelve warping tugs, and three barges. These requirements reflect three deployment packages: 1) a Continental United States (CONUS) training system with possible United States Southern Command (SOUTHCOM) use, 2) a United States Pacific Command (PACOM) pre-positioned package, and 3) a United States Central Command (CENTCOM) pre-positioned package. [Keith, Jan 2001]

B. JMLS ACTD ANALYSIS

In reviewing the JMLS ACTD it is apparent it was designed to determined the utility of a new, joint system to perform two critical Joint Logistics Over the Shore (JLOTS) functions: cargo transfer and ship-to-shore movement. To perform these functions a Joint Modular Lighter System was assessed. The subsystems performing these functions included the Warping Tug (WT), Causeway Ferry (CF), RO/RO Discharge Facility (RRDF), and Floating Causeway (FC). The preliminary demonstration and evaluation determined that the prototype design (8-foot-wide by 40-foot-long modules) would not meet SS3 requirements. The decision was made to complete the ACTD in the first quarter of FY00, before completing the Joint Military Utility Assessment. JMLS components were then transitioned back for further engineering development. Based on the results of the ACTD, the JMLS has been redesigned (24-foot-wide by 80-foot-long modules), using both rigid and flexible connectors. [Joint Warfighting Science and Technology Plan, Feb 2002].

Based on criteria of Table 3-3, the following ACTD analysis for success/failure indications is provided:

1. Successes Within the JMLS ACTD Process

The JMLS ACTD supported meeting a priority military need. The users were provided the opportunity to refine their operational requirements, permitting the development of a JMLS ORD and TEMP, Criteria 1.c (C-1c).

Since the JMLS ACTD was selected for execution, it is assumed the sponsorship was executed appropriately with the JROC recommendation for lead service/user sponsor being accepted by DUSD(AS&C) (C-6a).

The JMLS ACTD identified and minimized the operational risks related to the acceptability of the operational concepts by fabricating and testing a full-scale engineering mockup of the connector (C-8b). A 1:5 scale propulsor element was also modeled and tested.

The JMLS ACTD process executed its transition plan to initiate acquisition by providing the opportunity to evolve JMLS ORD, TEMP and specification documents and establish a proof of concept contract for the development of the enlarged JMLS modules (C-10c).

2. Failures Within the JMLS ACTD Process

The JMLS ACTD was not adequately mature. Initial testing showed that a larger module was required to adequately meet the sea state requirements. This deviation drew ACTD activities away from the integration and demonstration efforts and focused them on technology development (C-2c).

The JMLS ACTD demonstrations / exercises were not adequate to provide a MUA. The ACTD developmental T&D, once executed, indicated a limited military utility of the initial design. The original configuration would not meet the desired requirements and was not operationally satisfactory or useful. (C-3c).

The JMLS ACTD did not demonstrate essential ACTD criteria when the joint aspect of the program was lost. The potential for future Army/Navy interoperability operations/capabilities are unknown (C-4c).

Under the JMLS ACTD the Navy was assigned the lead service role. Due to the progression to a larger sectional configuration, the Navy was unable to execute the program appropriately. It could not transition the smaller residual assets to a user organization or provide for all aspects of support for the smaller sections (C-5b). An independent GAO analysis determined that the technologies supporting the JMLS failed during their demonstrations because they had not been properly designed to withstand real world sea conditions. Consequently, at the outcome of the JMLS ACTD, there were no residual assets in use and there was no acquisition. [GAO-03-05, Dec 2002]

The JMLS ACTD was not completed within a two to four year window. While the original intent was a 3-year ACTD, significant configuration changes were required to meet the desired objectives (C-7b).

While the initial JMLS ACTD funding plans may have been sufficient to meet initial program requirements, the strategy was insufficient to account for the resources necessary to acquire the desired final technology configuration. Because all costs associated with the design and development of a modified prototype system were not identified, PR03 funding was not available and the program sponsor zeroized funds (C-9b/c).

3. Joint Modular Lighter System Summary of Impacts

Based on Table 3-3 criteria, it has been shown that the JMLS ACTD failed 60% of the desired success indicators. These items included a lack of system maturity, an failure to demonstrate military utility, a loss of interoperability, an inability to execute the program as planned or within the recommended time frame, and insufficient funding to sustain the required changes. While 40% of the criteria were met: meeting a priority military need, appropriate sponsorship execution and risk identification, and executing a transition plan: it was not sufficient to warrant an entirely successful ACTD. What the ACTD process did show, in this case, was the need for a sizing change in the JMLS elements. While the interlocking technology would support the operational need, the scale of the components would not provide the capabilities desired under higher sea states. The JMLS program will now initiate a standard acquisition approach beginning at MS B, System Development and Demonstration, as a Navy single service project.

C. CHAPTER SUMMARY

In this chapter, we investigated the JMLS ACTD. Topics included the ACTD objectives, a description of the ACTD elements, the chronicles and progress of the ACTD program, along with the associated JMLS cost and schedule. Following the completion of the JMLS ACTD, we reviewed the post-ACTD activities. With these items in mind the successes of the ACTD process, the failures of the ACTD process, and their overall impacts on the JMLS ACTD were discussed.

These discussions showed that while an ACTD program can meet a priority military need, obtain appropriate sponsorship, identify risks and execute a transition processes plan, this may not be enough to justify acceptance as an acquisition program. Elements that must additionally be successfully executed include: ensuring system maturity, demonstrating military utility, maintaining service interoperability, executing the program as planned and within the recommended time frame, and establishing sufficient funding to sustain possible execution changes.

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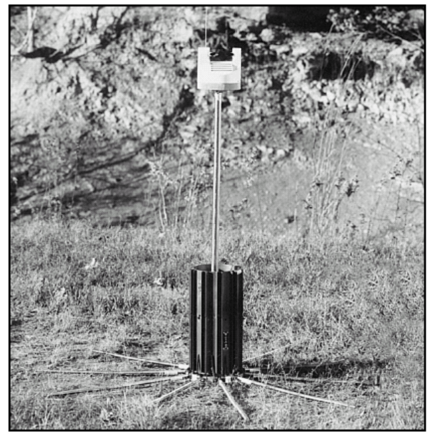
V. ACTD ANALYSIS – UNATTENDED GROUND SENSORS

STEEL RATTLER

STEEL EAGLE



Remote Miniature
Weather Station

This chapter will review the Unattended Ground Sensor (UGS) ACTD. Topics will include the objective(s) of the ACTD, a description of the ACTD element(s), the chronicles and progress of the ACTD, along with the associated cost and schedule. Following these items are the post-ACTD activities. At the completion of the chapter the UGS will be reviewed in relationship to Table 3-3. The advantages of the ACTD process, the disadvantages of the ACTD process, and their overall impacts on the UGS ACTD will be discussed.

The UGS ACTD grew out of requirements that can be traced back to a MNS drafted jointly by US Central Command (USCENTCOM) and US Special Operations Command (USSOCOM) in late 1992. This led to the Unattended Measurement and Signatures Intelligence (MASINT) Sensor (UMS) Advanced Technology Demonstration (ATD) program sponsored in July 1994 by the Defense Intelligence Agency's (DIA) Central MASINT Office (CMO), with Sandia National Laboratories acting as principal developer. Between 1996 and 1999 DIA/CMO expended ~$20M on UGS development.

The UMS program included the STEEL RATTLER effort, which consisted of a hand-emplaced sensor that acquired thermal images of targets and compressed the data to less than 1 Kbyte each for transmission. STEEL RATTLER underwent a full-scale field demonstration in March 1996 and transitioned to USSOCOM the following year. [Hewish, Jun 2001]

The UGS ACTD program was initiated in 1998 based on these previous efforts. The UGS ACTD was slated for implementation from FY98 to the end of FY99, a 2-year execution cycle. It's intent was to: (1) develop the use of UGSs for deep strike by monitoring choke points, lines of communications, and fixed sites, (2) demonstrate the use of UGSs for environmental measurement, (3) improve the base for use of UGSs by demonstrating emplacement means, long haul communications options and processing nodes, and (4) address affordability issues to increase the quantity of UGSs to meaningful levels. The UGS ACTD was designed to evaluate two distinct unattended ground sensors: the Unattended MASINT Sensor (UMS) and the Remote Miniature Weather Station (RMWS). In support of this ACTD, the program consisted three types of UGSs products: 1) A hand delivered acoustic/seismic UMS (STEEL RATTLER), 2) An F-15 certified, air deliverable acoustic/seismic UMS (STEEL EAGLE), and 3) An air or hand delivered weather sensor (RMWS). The UGS products were intended to be integrated into a coherent ensemble for use on the battlefield. To do this, communication paths and processing software needed to be developed. Through the use of existing technology, the UGS ACTD promised to add new dimensions to battlefield sensing which were not available with previous sensors. The services/agencies associated with the UGS ACTD were the Defense Advanced Research Project Agency (DARPA), CMO, and the Air Force. UGS ACTD sponsors were USSOCOM and USCENTCOM. [www.fas.org, Apr 2003] Approximately $20.61 M was invested on the UGS ACTD. This included approximately $4.15 M from the Deputy Under Secretary of Defense Acquisition and Technology (DUSD(A&T)) appropriated by Congress specifically for ACTDs. [Unattended MASINT Sensors Transition Plan, Jan 1999]

A. STEEL RATTLER

STEEL RATTLER was initiated in July 1994 as a UMS ATD program. It was developed by CMO/ Tactical Combat Operations (TCO) to validated requirements for improved battlefield surveillance to remotely detect, track, identify and report the presence of ground-moving targets such as Transporter, Erector, and Launch (TEL) vehicles, Surface-to-Air Missile (SAM) launchers, tracked vehicles and Time Sensitive Targets (TST) in support of Theater Missile Defense (TMD). STEEL RATTLER was designed to be emplaced by hand, then operated remotely and autonomously for up to a year. Once emplaced, the sensors would remain inactive until triggered by potential targets. The sensors then report, in Near-Real-Time (NRT), the relevant target data based on a correlation between target seismic/acoustic signatures and target range. The viability of the technology was demonstrated in ROVING SANDS 97 under Special Project Sandstorm. In FY98, at the completion of the UMS ATD, the program was transferred to the US Army's Night Vision Laboratory's (NVL) Electronic Systems Directorate. The NVL reverse engineered the STEEL RATTLER prototype, fabricating a "proof-of-production" sensor and deploying it to field units for future procurement consideration. [Unattended MASINT Sensors Transition Plan, Jan 1999]

STEEL RATTLER is approximately 7.25 in wide by 4 in tall by 5.5 in deep for a total volume of 160 cu in. It weighs 15 pounds and is transported by one individual. Sensor elements include seismic and acoustic detectors, low voltage electronics, communications transceiver, battery, and sensor container. It is intended to fit in a medium All-purpose, Lightweight, Individual Carrying Equipment (ALICE) package. All separate components and small parts, which detach or require assembly, must be provided with an individual soft case or bag to facilitate packing in the same medium ALICE pack. [ARGUS ORD, April 2000]. As a proven technology, STEEL RATTLER became an easy addition to the UGS ACTD based on its UMS ATD success.

B. STEEL EAGLE

The STEEL EAGLE portion of the UGS ACTD, a follow-on development program to the first generation STEEL RATTLER UMS ATD, is an air delivered seismic/acoustic unattended, autonomous sensor designed to detect, track, and identify ground mobile/Time Critical Targets (TCTs). TCTs have been identified by the Combat Air Forces as one of its highest priority target sets. The STEEL EAGLE program was initiated in FY97. It was then nominated to DUSD(A&T) as a potential ACTD candidate and approved and funded as part of the UGS ACTD program in FY98. [Unattended MASINT Sensors Transition Plan, Jan 1999]

The objectives of the STEEL EAGLE portion of the UGS ACTD program was to:

1. Upgrade and repackage the STEEL RATTLER sensors and processing electronics.

2. Integrate them into a "missile" body for air delivery via a high performance aircraft.

3. Evaluate the performance of air delivered STEEL EAGLE. [Unattended MASINT Sensors Transition Plan, Jan 1999]

The STEEL EAGLE portion of the UGS ACTD program also included the capabilities to provide:

1. Satellite communications for worldwide, end-to-end, data transfer and reporting.

2. A remote monitoring station.

3. Mission planning tools necessary to demonstrate a complete system.

4. A simulation designed to enhance system development and testing. [Unattended MASINT Sensors Transition Plan, Jan 1999]

To accomplish these objectives and obtain these capabilities the STEEL EAGLE design incorporated upgrades to the acoustic and seismic sensors and signal processing technology developed in the STEEL RATTLER program. STEEL EAGLE is approximately 5 feet long and 4 inches in diameter. It weighs 84 pounds. Sensor elements include seismic and acoustic detectors, low voltage electronics, communications transceiver, battery, sensor container, aerodynamic delivery body and air brake subsystems. The overall layout of components is presented in Figure 5-1. In addition, a remote monitoring station, communications interface, mission-planning tools, and pre-deployment checkout equipment have also been developed. [Thomas, Mar 2002]

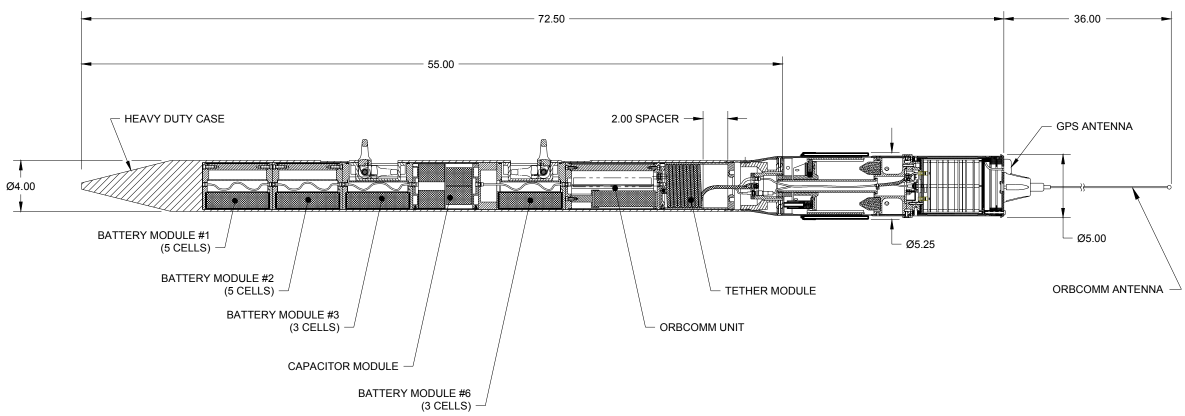


Figure 5-1. STEEL EAGLE Layout

To date, STEEL EAGLE has undergone extensive laboratory and field-testing. Exercises have included ROVING SANDS, EFX-98, ASIERT, and operations at Tonopah. [Unattended MASINT Sensors Transition Plan, Jan 1999]

Technology maturity permitted testing to be completed by the end of FY99. By providing system design, software, and user evaluation documentation to the appropriate acquisition authorities, the STEEL EAGLE UGS ACTD planned to transition to at least Milestone B in accordance with DoDI 5000.1. [Unattended MASINT Sensors Transition Plan, Jan 1999]

C. REMOTE MINIATURE WEATHER STATION

The RMWS portion of the UGS ACTD was intended to develop a hand emplaced man-portable weather sensor, along with an airdrop capable package. Both systems would include an integrated RF transmission system for remote access. The miniaturized sensor package was designed to measure temperature, humidity, barometric pressure, wind speed/direction, and visibility. A separate micro-ceilometer was developed with the sensor package. The RMWS capabilities are included in Table 5-1:

Temperature	-40° F (-40° C) to +150° F (66° C) @ ±2°F (1° C)
Humidity	0 to 100% @ ±5%
Barometric Pressure	14.75 to 32.45 in of Hg @ ±0.06 in of Hg
Wind Speed	0-45 Knots @ ±2 Knots; Higher wind speeds can be measured with an accuracy of ±10%
Wind Direction	360 Degrees @±10 degrees
Visibility	0.06 to 5.0 nmi @ ±10% of range

Table 5-1. RMWS Measurand [RMWS Specification Sheet, June 1999]

Similar to the STEEL RATTLER program, the RMWS program was initiated as a Special Operations Special Technology (SOST) ATD new start, the RMWS project began in FY95 as a joint effort with DARPA. The RMWS SOST/ATD program was completed in Sep 97. RMWS was recommended by USSOCOM for consideration as an FY97 ACTD and was approved and funded as part of the UGS ACTD program in FY98. The RMWS portion of the UGS ACTD program was intended to resolve SOST/ATD critical issues including electronics performance (flash memory calibration, circuit board delivery and control subsystem anomalies), communication architecture implementation (transceiver development and antenna tuning) and improving the range and performance of the ceilometer backscatter and visibility sensors. Prototype deliveries of four systems (a system consists of five RMWS sensor packs and a ceilometer) were made in 2QFY98. Consideration was given to the development of ten total systems in support of the ACTD program. [Transition Strategy, Apr 1997]

The hand-emplaced RMWS has an electronics section that is 9 by 11 by 4.5 inches. The sensor pod has a 5.5-inch diameter and is 7.5 inches high. The hand-emplaced unit weighs 15 pounds. The air dropped configuration has an 8-inch diameter, is 15 inches high and weighs 15 pounds. The airdropped RMWS can be dispensed from an aircraft or helicopter from altitudes above 300 feet and at speeds up to 200 knots. Once dispensed, the RMWS free falls to the ground where it automatically uprights itself and begins making weather measurements. The RMWS comes with a Low Earth Orbit (LEO) Satellite Communications (SATCOM) system for sending data and receiving reprogramming instructions, allowing for totally wireless operation anywhere in the world. The SATCOM data is delivered via any standard Internet connection to a personal computer where the RMWS data is displayed and command communications are performed. Data can be displayed in both tabular and graphic formats. Data from any number of RMWS and ceilometer systems may be presented simultaneously as a function of time. The display unit software also provides a variety of user support features such as data archiving, RMWS schedule changes/reprogramming and tools for analyzing RMWS system performance. All weather measurements can be independently programmed for the desired measurement interval and data-reporting interval. Ultra low-power consumption is available for SATCOM transceiver tracking and waking for satellite passes. SATCOM operations include bi-directional communications for receiving meteorological data from and sending commands to the RMWS. A 12 VDC battery provides up to six months of field life [RMWS Specification Sheet, June 1999]. The RMWS relays its information via commercial SATCOM channels to a USSOCOM command and control node and/or the US Air Force Weather Agency. Figure 5-2 depicts the typical RMWS communication paths.

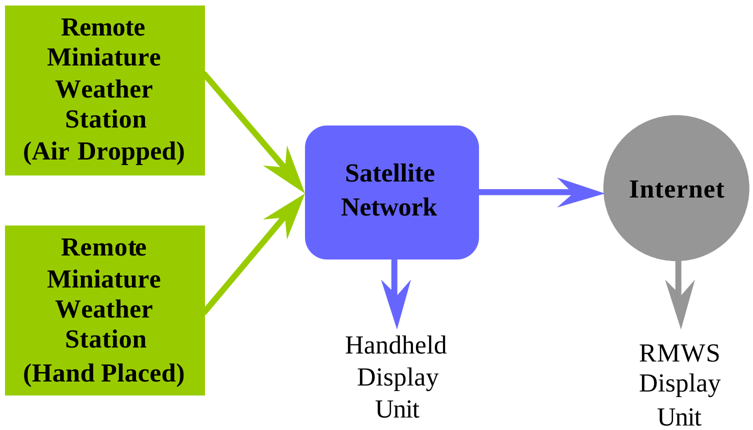


Figure 5-2. RMWS Communication Paths [RMWS Specification Sheet, June 1999]

For 24 months, the UGS ACTD demonstrated and fielded improvements in the capabilities of the UMS to detect, locate, identify, and report time-critical targets, primarily theater ballistic missiles [Joint Warfighting Science and Technology Plan, Feb 2002]. STEEL EAGLE was successfully delivered by an F-15E fighter in January 1998. The capabilities of the UGSs were demonstrated in Roving Sands 00, the Joint Warrior Interoperability Demonstration exercises and in support of Operation Allied Force [Perkins, Sept 2001].

When exercised in conjunction with Special Forces (SF) detachments, UMS proved themselves to be force multipliers and allowed SF to make operational decisions, for the first time, based on UMS reports. In addition, the RMWS portion of the UGC ACTD program, through close coordination with multiple users and during multiple demonstrations over 24 months, proved its utility when requested by U.S. European Command in support of the Kosovo Operation Noble Anvil. The RMWS portion of the UGS ACTD program proved itself to operational forces through reports that helped them to determine the safest routes of travel and transit [Joint Warfighting Science and Technology Plan, Feb 2002]. The conceptual operation of the UGS ACTD is presented in Figure 5-3.

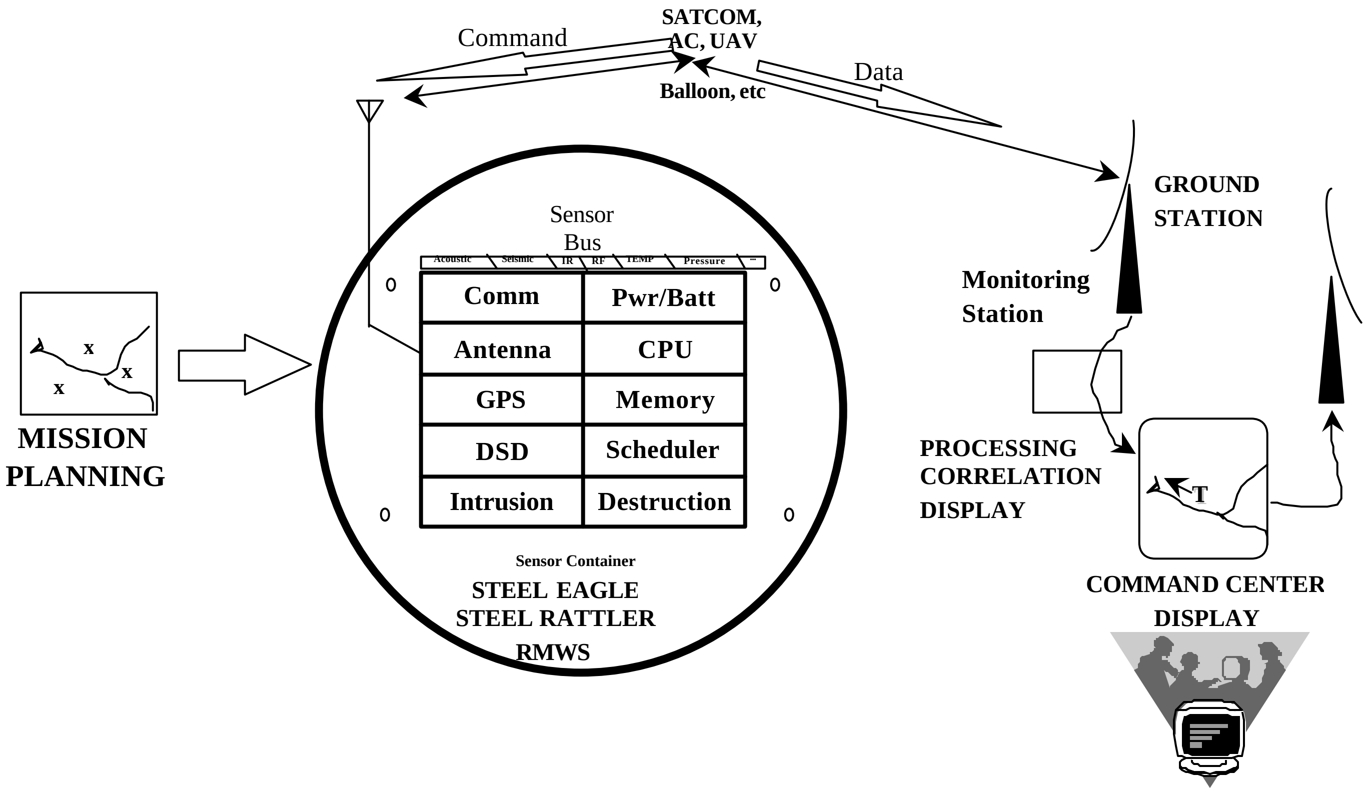
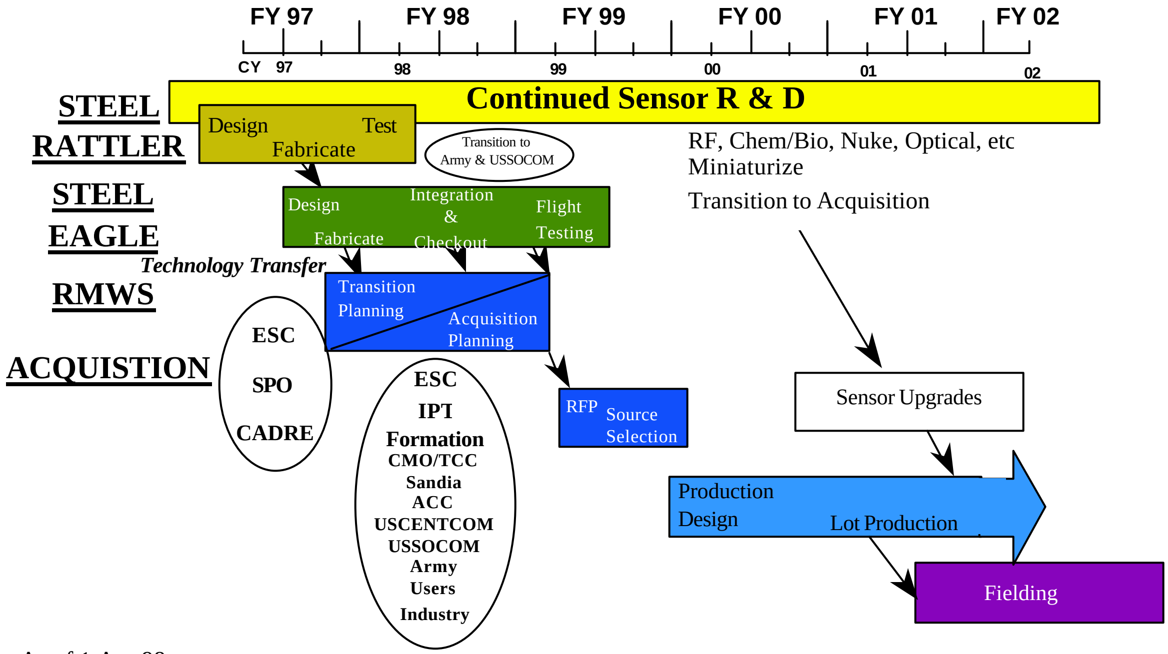


Figure 5-3. UGS Conceptual Operation
[Unattended MASINT Sensors Transition Plan, Jan 1999]

At the completion of the UGS ACTD both USCENTCOM and USSOCOM reported positive results from their military user assessments of the equipment demonstrated during the ACTD [Hewish, Jun 2001]. The STEEL RATTLER residual hardware was transitioned to USSOCOM. STEEL EAGLE residual hardware was transitioned to USCENTCOM. An additional twenty-five UMS sensors were produced under an urgent and compelling requirement and will be used at the National Training Range to better understand CONOPS. RMWS, in addition to the Kosovo deployment, will have its residual hardware transitioned to the Air Force & SOCOM Weather [Perkins, Sept 2001]. UMS is currently in transition to acquisition with the U.S. Air Force. RMWS is in the process of becoming a standard US Air Force Weather Agency program through Air Force OS21. [Joint Warfighting Science and Technology Plan, Feb 2002]. The UGS ACTD schedule is presented in Figure 5-4.



As of 1 Apr 98

Figure 5-4. UGS Program Schedule
[Unattended MASINT Sensors Transition Plan, Jan 1999]

1. UGS Accomplishments, 1998 through 2001

The UGS ACTD was initiated in FY98. This ACTD program was a combination of two UMS technologies (STEEL RATTLER and STEEL EAGLE) and a RMWS technology. Following a series of sensor improvements/upgrades, demonstrations were conducted using the hand-employed STEEL RATLER sensors. [RDT&E Budget Item Justification Sheet, Feb 1999]

During FY99, the UGS ACTD conducted both hand-emplaced and airdropped sensor demonstrations and field tests. January of 1998 marked the first successful STEEL EAGLE air-delivery demonstration via a F-15E. RMWS activities included deployment into the Kosovo operational theater for warfighter support. Concurrent with these activities the UGS ACTD completed its acquisition transition plan and CONOPS for sensor use. [RDT&E Budget Item Justification Sheet, Feb 2000]

In FY00 the UGS ACTD commenced its interim capability period. Efforts were initiated to transition to an acquisition program. Residual sensors were refurbished for use in exercises and operations. Additional communications development was performed. [RDT&E Budget Item Justification Sheet, Jun 2001]

FY01 saw the completion of the UGS ACTD transition to acquisition, the conclusion of the UGS ACTD interim capability period and the end the UGS ACTD. [RDT&E Budget Item Justification Sheet, Feb 2002]

Since the completion of the UGS ACTD, the UMS portion of the program has been transitioned to an acquisition program by the U.S. Air Force. The Air Force's program, named Advanced Remote Ground Unattended Sensor (ARGUS), consists of both air-deployed and hand-emplaced sensors (Air Deployable Unit (ADU)/Ground Deployable Unit (GDU)). ARGUS is an ACAT III program with Program Element number 35148F. The mission need, originated in 1992 from DESERT STORM operations, highlighted the inability of present military systems to locate and kill TCTs. In 1999 the European Command (EUCOM) drafted a Combat Mission Need Statement (C-MNS) with the requirement to locate and identify "Tanks Under Trees". In FY00, following the UGS ACTD, the Air Force Electronic Systems Center (ESC) expended ~ $1.9M to transition the UMS portion of the ACTD to production. Following the attacks of 11 Sep 01, $15M of Defense Emergency Relief Funding (DERF) was allocated to ESC to procure 25 ACTD clones and accelerate ARGUS procurements. [Campbell, July 2002]

The initial ARGUS Operation Requirements Document, AC2ISRC 001-99-I/II, was drafted 15 May 00 and approved by the Air Force Requirements Oversight Council (AFROC) on 29 Jun 00. Since that time the action officers identified the need for significant revisions. Air Combat Command / Director of Requirements (ACC/DR) was the lead for these revisions, which included integrated aircraft requirements. These revisions were completed on 15 July 02. Based on these revisions, the ORD will be updated and the Test and Evaluation Master Plan (TEMP) will be drafted. The CONOPS is currently in coordination. [Campbell, July 2002]

The ARGUS acquisition entry point is expected to be MS B, System Development and Demonstration. The desire is to provide a basic capability to detect and identify TCTs for the user as quickly as possible. The Air Force intends to use a spiral development process, another recent acquisition reform element, to add continuous sensor technology improvements while concurrently providing capability to the warfighter. By incorporating a flexible, open architecture (Defense Information Infrastructure Common Operating Environment (DII-COE) and Joint Technical Architecture (JTA) compliant) future growth areas could include infrared imaging, radio frequency monitoring, and sensing for spectral, weather, chemical, biological, nuclear and other parameters. [Campbell, July 2002]

The ARGUS program anticipates cost reimbursement pricing for system development and demonstration with consideration for award fees using cost, schedule and performance as the evaluation criteria. With advances in commercial technology since the UGS ACTD STEEL RATTLER / STEEL EAGLE design freeze, the ARGUS program expects some improvements in system performance, reliability, and other effected areas. For MS C, Production and Deployment, the ARGUS program anticipates that LRIP would utilize fixed price incentive contracts with full-scale production using fixed price contract pricing. The intent is to maximize competitive pricing throughout the production phase. Cost goals for the ARGUS system are $25,000 per unit at Initial Operational Capability (IOC) and $15,000 per unit at Full Operational Capability (FOC). 2,500 units are anticipated to be required for FOC. Currently funding levels are not defined. The Secretary of the Air Force / Acquisition Information (SAF/AQI) is attempting to move procurement funds to FY05. [Campbell, July 2002]

While the RMWS portion of the UGS ACTD has not transitioned to an acquisition program yet, it is being considered for inclusion in the Air Force Observing System for the 21st Century (OS21). Thresholds demonstrated in the RMWS element of the UGA ACTD have been incorporated into the OS21 ORD as have cost of ownership estimates. Elemental thresholds that were accurately sampled and reported during the UGS ACTD demonstrations included the following elements [OS21 ORD, Sep 1999]:

• **Temperature**	• **Date / Time of Observation**
• **Relative Humidity**	• **Station Identifier**
• **Pressure (Surface)**	• **Geographic Location / Elevation Above / Below MSL**
• **Wind (Speed) / Wind (Gust)**	• **Automated Directional Orientation**
• **Wind (Direction)**	• **Sky Condition (Cloud Base Height)**
• **Visibility (Prevailing)**	• **Dew Point**

Table 5-2: RMWS Parameters [OS21 ORD, Sep 1999]

The remote, expendable observing system required for OS21 is not expected to cost more than $50,000 for the air dropped micro ceilometer unit. This cost is based on the air dropped RMWS. A cost of $15,000 is expected for the hand emplaced micro weather station based on FY99 dollars and a purchase of 558 units. [OS21 ORD, Sep 1999]

2. UGS ACTD Analysis

In reviewing the UGS ACTD it is apparent the intended was to provide unattended deep strike surveillance of choke points, fixed sites and Time Critical Targets along with battlefield weather phenomena. This was to be accomplished in an affordable manner while still providing long haul communication options and processing nodes. To perform these functions an Unattended Ground Sensor concept was assessed. The subsystems performing these functions included the STEEL RATTLER hand emplaced acoustic/seismic sensor, the STEEL EAGLE air-dropped acoustic/seismic sensor and the Remote Miniature Weather Station, which could be either hand emplaced or air-dropped. For 24 months, the UGS ACTD demonstrated and fielded improvements in the UMS's capability to detect, locate, identify, and report time-critical targets, primarily theater ballistic missiles. In exercises with Special Forces (SF) detachments, UMS proved itself to be a force multiplier and allowed SF to make operational decisions, for the first time, based on the UMS reports. As stated, UMS is currently in transition to acquisition with the U.S. Air Force. In addition, the RMWS portion of the UGS ACTD, through close coordination with multiple users and during multiple demonstrations over 24 months, proved its utility when requested by U.S. European Command in support of the Kosovo

Operation Noble Anvil. RMWS proved itself to operational forces through reports that helped them to determine safest routes of travel and transit. As indicated, the RMWS portion of the USGS ACTD is in the process of becoming a standard Air Force program through Air Force OS21. [Joint Warfighting Science and Technology Plan, Feb 2002].

Based on the criteria of Table 3-3, the following ACTD analysis for success/failure indications is provided:

a. Successes Within the UGS ACTD Process

The UGS ACTD met a priority military need (C-1c) by providing its users the opportunity to refined their operational requirements, developed CONOPS based on actual theatre operations, and developed a sound understanding of the systems military utility.

The UGS ACTD was initiated with a nearly mature technology (TRL level 5 or above) (C-2a). This maturity reduced the time and risk associated with the demonstrations and, once a critical need was at hand, permitted a rapid induction into the acquisition process.

The UGS ACTD had adequate exercises to demonstrate military utility. The user planned/ employed the UMS in several demonstration exercises while the RMWS was demonstrated in theatre in the Kosovo Operation Noble Anvil (C–3e), a true red/blue force evaluation. At the completion of the UGS ACTD both USCENTCOM and USSOCOM reported positive results from their military user assessments of the equipment demonstrated during the ACTD.

The UGS ACTD demonstrated a potential or projected effectiveness that was sufficient to warrant consideration as an ACTD (C-4a). The previous STEEL RATTLER and RMWS ATDs supported the essential technology maturity criteria required to initiate an ACTD.

The UGS ACTD established the Air Force as the lead service. The Air Force executed the program appropriately (C-5a) by performing the necessary planning, including evaluation documentation and a transition plan, for establishment of a formal acquisition process.

The UGS ACTD was completed within a two to four year window (C-7a). The UGS ACTD completed all activities within the planned 2-year window with no significant schedule or configuration changes.

The UGS ACTD system complexity risks were low based on the previous ATD activities (C-8c). This lowered the related program risk levels.

The UGS ACTD had funding sufficient to meet program requirements. Through the use of previous ATD programs, and their associated expenditures, the proper strategy could be chosen for obtaining the resources necessary for acquiring the technology (C-9b).

b. Failures Within the UGS ACTD Process

Since the UGS ACTD was selected for execution, it is assumed the JROC recommendation for lead service/user sponsor was accepted by DUSD(AS&C). However, the merging of the UMS and RMWS ATDs into the UGS ACTD impacted the program due to the differences in data products and goals. Additionally, split program/project teams prohibited ACTD sponsorship to be executed appropriately (C-6a) resulting in disjointed efforts.

The UGS ACTD did not execute its transition plans to initiate acquisition. Even with an ‘urgent need’, momentum was lost during the acquisition start-up process due to ‘long lead’ preparations required to establish the minimum mandatory documentation (C-10a). This is a strong indication the ACTD did not execute its transition plans, or the acquisition strategy changed.

c. Unattended Ground Sensor Summary of Impacts

Based on Table 3-3 criteria, it has been shown that the UGS ACTD effectively completed 80% of the desired success indicators. These items included meeting a priority military need, having an adequately mature technology, performing exercises that permitted an acceptable military utility assessment, having a developer capable of demonstrating the essential ACTD criteria, performing the appropriate lead service execution, completing the ACTD within a 2 year window, identifying and minimizing potential risk, and having sufficient funding to meet program requirements. The 20% that were not met consisted of incorrectly executed sponsorship and a lack of transition plan execution. What the ACTD process showed in this case was that with an appropriately mature technology, a MUA could be successfully executed, permitting the fulfillment of a priority military need. While the overall programmatics were disjointed based on the separate nature of the combined elements and the initial transition to acquisition was questionable, a GAO analysis indicates that, at the outcome of the UGS ACTD, the program moved, in whole or in part, into the acquisition process. [GAO-03-52, Dec 2002]

D. CHAPTER SUMMARY

In this chapter, we investigated the UGS ACTD. Topics included the ACTD objectives, a description of the ACTD elements, the chronicles and progress of the ACTD program, along with the associated UGS cost and schedule. Following the completion of the UGS ACTD, we reviewed the post-ACTD activities. With these items in mind the successes of the ACTD process, the failures of the ACTD process, and their overall impacts on the UGS ACTD were discussed.

These discussions showed that if an ACTD program can meet a priority military need, be adequately mature, and successfully complete a MUA it has a good potential to transition to an acquisition program, as would be expected. Elements that assist in the justification of this transition include having a capable developer, appropriately leading and executing the program in a timely fashion, maintaining low risk, and having sufficient funds. With these abilities in hand an ACTD should have the capability to transition to acquisition.

VI. THE ACTD ACQUISITION TRANSITION PROCESS CONCLUSIONS AND RECOMMENDATIONS

> I have determined that the current DoD Directive 5000.1, The Defense Acquisition System, and DoD Instruction 5000.2, The Operation of the Defense Acquisition System, are overly prescriptive and do not constitute an acquisition policy environment that fosters efficiency, creativity, and innovation. Therefore, by separate memorandum, I have cancelled those documents effective immediately. [SecDef Memorandum, The Defense Acquisition System, 29 Aug 02]

One year ago the Secretary of Defense decided the DoD 5000 acquisition system was overly cumbersome and inefficient. One of the catalyst' implemented during the last few years of the acquisition process was the ACTD. While still requiring a degree of oversight, the ACTD was designed to cultivate efficiency and ingenuity. With minor corrections to its implementation, the ACTD process can provide the creative and innovative approach the Secretary of Defense seeks, thus becoming a cornerstone of the procurement architecture.

The intent of this chapter is to resolve the initial ACTD research questions of Chapter I. This will be accomplished through a summation of the ACTD process, the identification of the ACTD aspects that contribute to a successful acquisition transition and those that hinder transition. The aspects that influenced the ability of ACTD programs to transition to a formal acquisition process will be considered in relationship with Table 3-3. Following this review, the conclusions and recommendations associated with the ACTD acquisition transition process will be encapsulated establishing considerations for future ACTD program.

A. THE ACTD ACQUISITION PROCESS

The second research question of Chapter I asked 'When was the ACTD process initiated and what was the original intent?' As indicated in this thesis, the ACTD process was officially initiated in 1994 in response to the recommendations of the Packard Commission and the Defense Science Board. The intent of the ACTD process was to add efficiency to the formal acquisition process by reducing the acquisition cycle time while accelerating the delivery and implementation of advanced technologies for the warfighter. Since its inception the processes utilized to establish and execute ACTDs has continued to evolve thus increasing the potential for success. Technology maturity above readiness level 5, as defined in Table 2-2, is critical to the expectation an ACTD will successfully transition into acquisition.

Three categories of ACTDs exist: information systems, weapon and sensor systems, and system-of-systems. Of these, weapon and sensor systems tend to be the most common ACTDs transitioning to acquisition. In response to research question number three, 'What ACTD programs have been initiated to date?' this thesis established that between FY 1995 and 2002 a total of 98 ACTDs were initiated. These programs are identified in Table 2-3. Exit paths available for these ACTDs consist of: termination, return to the technology base for further development, utilize the residual assets, or initiate acquisition at MS B, MS C, or FOC. An opportunity to enter at MS A also exists, however entry at this point does nothing to accelerate the acquisition process.

For successful programs to accelerate the acquisition process, they must enter at one of the following three locations. Entry at MS B implies that potentially major improvements are required in the overall system. Entry at this point provides some degree of acquisition acceleration. Entry at MS C indicates that only minor improvements will be required to the overall system to make it effective and suitable. Entry at this point provides a good degree of acquisition acceleration. Optimally the transition to acquisition could occur at the FOC point, as COTS or NDI equipment. In this case no system modifications are required. This is the desired intent of the ACTD process. Transition at FOC puts the technology into the hands of the warfighter almost immediately.

Establishing a successful ACTD program transition however is not always easy. It is apparent that a lack of out year funding plans can slow an ACTDs momentum by as much as two years as it attempts to transition into the acquisition process. Assistance can be gained through the establishment of a TIPT. The TIPT can serve as an important bridge between the ACTD and the acquisition process. Including the items above, Chapter III, Table 3-3 has identified a total of ten criteria that, if completed successfully, should place an ACTD program in the proper position to transition to acquisition. Of these, the true test of a valid acquisition is the verification of military utility and the judgment that the ACTD provides a significant and compelling enhancement in military capability. Research question number four of Chapter I asked 'Which ACTD programs have successfully transitioned/not transitioned to an acquisition program?' While not specifically cataloged in this thesis, Table 3-1 indicated the ACTD transition history between 1995 and 2002. Since the inception of the ACTD process 32 of 98 ACTD programs have demonstrated sufficient military utility to warrant transitioning to an acquisition program at the various milestones identified.

The ACTD process evolved in 1994 in response to the recommendations of the Packard Commission and since that time has been through many variations, continuing to change as the global environment changes. As indicated in Chapter II, the processes utilized to establish and execute ACTDs have continually evolved since 1995 to increase the potential for success. Changes have included establishing a selection process and guidelines for ACTD acceptance, prioritizing the approved ACTDs so DoD dollars can be allocated wisely, and providing a definition of critical military need. Recent changes have included the need for the establishment of a Transition Manager before being considered for execution approval, the Office of the Secretary of Defense providing greater funds to transitioning ACTD programs to assist with the preparation of DoD 5000 required documentation and the Defense Systems Management College including ACTD transition training in their curriculum material.

B. ACQUISITION STIMULUS DERIVED FROM THE ACTD PROCESS

The fifth research question asked 'Why have programs managed to successfully transition? ACTDs that transition, if they enter the acquisition process at MS B, C or beyond, bring with them the knowledge that their technologies are mature, they have demonstrated an ability to meet a priority military need, and if executed properly, user requirements and CONOPS have been generated that closely match system capabilities. The compilation of these elements implies a lower risk of failure upon entry into the acquisition cycle.

In response to research question number six of Chapter I, 'What comparisons and contrasts exist between transitioned ACTD programs?', the two case study programs were reviewed. It was apparent that both were able to meet a priority military need by providing the users the opportunity to refine operational requirements and develop ORDs, TEMPs and CONOPS. They also minimized programmatic risks through the use of prototypes and leveraging previous development activities. Individually the UGS ACTD also demonstrated extensive technology maturity and the ability to operate in an actual combat environment. The first of these having the greatest benefit associated with the overall acquisition process.

Research question number seven of Chapter I asked 'What aspects of the acquisition process enhance program transition?' The DoD, through the use of ACTDs and other technology advancing programs, has attempted to enhance the acquisition process. The intended stimulus associated with these processes are shorter programmatic life cycles, a reduction in formal initialization paperwork, an accelerated delivery of new technologies to the warfighter, implied programmatic overall cost reductions, an opportunity to define user requirements consistent with system capabilities, an opportunity to resolve a priority military need, and a potential lower risk execution path.

For the first half of research question number eight, 'What strengths can be associated with an ACTD transition?', we'll use the two ACTD case study programs from this thesis as our source. From these cases the following potential stimulus can be associated with transitioning ACTD programs to acquisition.

1. ACTD programs that meet a priority military need and demonstrate military utility will typically receive favorably transition consideration.

2. ACTD programs provide the users an opportunity to refine operational requirements and develop ORDs, TEMPs and CONOPS.

3. ACTD programs can reduce the risk of failure and increase the level of technology maturity through the use of prototypes and leveraging previous development activities.

4. ACTD programs that have the fortune to be demonstrated in the field under actual wartime conditions provide the best opportunity for the user to perform a valid assessment of capability and define MOEs and MOPs.

C. ACQUISITION IMPEDIMENTS DERIVED FROM THE ACTD PROCESS

The fifth research question asked 'Why have programs not managed to successfully transition? While DoD is attempting, through the use of several evolutionary acquisition enhancements to improve the overall procurement process, there are still hindrances that impact ACTD program transitions. The first and most momentum killing is the PPBS system itself. Without the adequate establishment of two years worth of program sustainment funding pending introduction into the POM cycle no ACTD program can maintain execution continuity. However, due to the short 2-4 year demonstration schedule and the inability to verify success till the end of this window most sponsors are unwilling to commit service dollars on unproven technology. While the OSD has attempted to reduce this burden by selectively funding programs during the technology transition gap and individual services have devised methods to fund transitions to the warfighter current laws still drive the funding process.

Associated with question number six of Chapter I, 'What comparisons and contrasts exist between transitioned ACTD programs?', the two case study programs were reviewed. The apparent impacts included a lack of developmental maturity through implied MUA constraints, impacted joint service or interoperability functionality, and funding limitations associated with program execution/acquisition transition strategy. The last of these having the most significant impact related to the acquisition process.

Research question number seven of Chapter I also posed a contrasting query, 'What aspects of the acquisition process hinder program transition?' Through an extensive system of checks and balances the federal government, in its own way, is the largest single hindrance to the transition of technology to acquisition. The documentation required at various program milestones, the planning, programming, and budgeting requirements of the FYDP, along with a continued commitment by the systems management and users to support a needed product through its acquisition life cycle can make or break an acquisition transition.

For the second half of research question number eight, ‘What weaknesses can be associated with an ACTD transition?’, we’ll use the two ACTD case study programs from this thesis as our source. From these cases the following potential impediments can be associated with transitioning ACTD programs to acquisition.

1. ACTD programs may have an inability to be interoperable with the equipment or systems it was designed to support or enhance.

2. ACTD programs that don’t account for potential developmental issues due to technology limitations could encounter funding constraints that would preclude program completion/acquisition transition strategy execution.

Other factors have been identified in this thesis that can have a positive or a negative impact on the ability of an ACTD to successfully transition to the acquisition process. The factors include:

1. ACTD program out year funding plans. If these plans are established correctly there will be no impact on acquisition transition. However if these plans are not established properly the program can loose momentum or be stalled to the point of no longer being of value by the time procurement funds become available two years later.

2. ACTD program technology maturity level. In this case the determining factor in transitioning an ACTD program to acquisition is decided at TRL 5. ACTDs that lie below TRL 5 will be less likely to be successful at transitioning to acquisition than those that lie above TRL 5.

D. CONCLUSIONS AND RECOMMENDATIONS FOR FUTURE ACTD PROCESSES

The first research question considered for this thesis was 'What potential improvements to the ACTD transition process can be indicated by comparing two ACTD programs?' This chapter, the two ACTD case study programs, and this thesis, have identified acquisition stimulus and impediments that can be experienced by ACTD programs. These aspects were based on the ability of ACTD programs to transition to a formal acquisition process. With these items under consideration the following conclusions and recommendations can be made for the ACTD transition process:

Maintain the following existing criteria.

1. Ensure a priority military need exists. ACTD programs that meet a priority military need and demonstrate military utility will typically receive favorably transition consideration.

2. Ensure the appropriate interoperability is provided and the technology is mature. ACTD programs can reduce the risk of failure through the confirmation of interoperability and can increase the level of technology maturity through the use of prototypes and leveraging previous development activities.

3. Provide ample opportunity to verify military utility. ACTD programs that have the fortune to be demonstrated in the field under actual wartime conditions provide the best opportunity for the user to perform a valid assessment of capability and define MOEs and MOPs.

4. Develop required documentation concurrent with demonstrations and exercises. ACTD programs provide the users an opportunity to refine operational requirements and develop ORDs, TEMPs and CONOPS.

5. Ensure adequate funding is available to account for the unexpected. ACTD programs that don't account for potential developmental issues due to technology limitations could encounter funding constraints that would preclude program completion/acquisition transition strategy execution.

Incorporate the following additions.

1. Require lead service/user to establish out year funding plans in conjunction with ACTD authorization. These plans would required the program to initiate a request for Planning, Program and Budgeting System funds associated with the expected Fiscal Year of transition. Correct establishment of these will prevent the program from loosing momentum or being stalled to the point of no longer being of value once procurement funds become available 2 years later. If transition is not warranted these funds would be reallocated to other priority military needs.

2. Require all ACTD programs to be at or above Technology Readiness Level 5 identified in Table 2-2. This table defines the TRL as it relates to equipment capabilities, hardware level, resources necessary to demonstrate capabilities and potential operational environment. ACTDs that lie below TRL 5 will be less likely to be successful at transitioning to acquisition than those that lie above TRL 5.

3. Require program sponsor, lead service and user communities to remain constant through the systems life cycle. Transition from one sponsoring organization, lead service or user community to another similar group during acquisition transition leads to programmatic discontinuity and reduces or entirely changes ACTD momentum.

4. Require only critical procurement related documentation prior to the initial acquisition milestone transition. Permit secondary required documentation to be delayed by up to one year from the establishment of the acquisition milestone. A delay in the development of some of these documents prior milestone entry for initial transitions would benefit every program.

Research question number nine of Chapter I posed a similar query 'What processes or procedures could be implemented to enhance future transitions?' Based on this research it can be concluded that the following recommended processes or procedures could be implemented to enhance future transitions:

1. The acceptance and implementation of the Technology Readiness Levels identified in Table 2-2. This table defines the TRL as it relates to equipment capabilities, hardware level, resources necessary to demonstrate capabilities and potential operational environment.

2. Upon ACTD initiation the lead service/user should be require to put in place out year funding plans. These plans would required the program to initiate a request for Planning, Program and Budgeting System funds associated with the expected Fiscal Year of transition. If transition is not warranted these funds would be reallocated to other priority military needs. The current two-year sustainment process does not provide adequate funds to perform the needed acquisition activities to maintain program momentum.

3. ACTD program sponsor, lead service and user community should constant through the systems life cycle. Transition from one sponsoring organization, lead service or user community to another similar group during acquisition transition leads to programmatic discontinuity and reduces or entirely changes ACTD momentum.

4. Current procurement processes require in excess of 30 acquisition related documents being generated as a function of a given milestone. A delay in the development of all of these documents prior milestone entry for initial transitions would benefit every program. OSD has acknowledged this hurdle by applying additional funds to support ACTD transition preparation. If funding is not going to become available for up to two years due to the PPBS, full program documentation should not be required for up to two years.

In May of 2003 new acquisition instructions were approved for implementation following the Secretary of Defenses August 2002 cancellation. Associated with these processes are mechanisms that are designed to foster efficiency and innovation in conjunction with future Evolutionary Acquisition Strategies. Evolutionary acquisition strategies are the preferred approach to satisfying operational needs. The two mechanisms that have been identified include incremental development and spiral development. Under incremental development the end-state requirement is known and will be met over time through several system increments, or configurations. Under spiral development the desired capabilities are identified but the end-state capabilities/ requirements are not specifically known at program initiation. Spiral development is an iterative process that links users to developers through an approach of continuous development and deployment of both software and hardware. The end-state capabilities/ requirements for the future increments are dependent upon technology maturation and user feedback from the initial increments. Of these two mechanisms, spiral development shall be the preferred process. [DoDI 5000.2, May 2003]

The final research question, question number ten asked 'How can ACTD programs be used more extensively in the future?' ACTDs fit well into both the incremental or spiral development processes as the first step of any Evolutionary Acquisition Strategy. However, since spiral developments are dependent upon technology maturation and user feedback from the initial increment, they have a more direct connection to the ACTD process. The first leg of a given spiral could explore technology options via ACTDs. If these efforts demonstrate promise, they can be rapidly deployed to the field in limited quantities as "Block 1" systems. In the spiral development process it is more likely that the systems will contain some weaknesses in the Block 1 deployment, but capabilities will increase with the fielding of subsequent 'blocks' through a continuous development process. [Defense Science Board, May 2002]

The advantages of spiral development teamed with ACTDs are many: more rapid deployment of advanced systems, lower cost development at lower risk, and a lager number of generated and demonstrated technology options. Spiral development has been institutionalized in directives by the USD (AT&L) and the Vice Chairman, Joint Chiefs of Staff. Teamed with the ACTD processes that are currently in place and with the inclusion of the above recommendations, spiral developments initiated through ACTDs can become the cornerstone of every DoD acquisition.

APPENDIX A. STATUTORY AND REGULATORY REQUIREMENTS

Statutory Information Requirements (Table 1)								
INFORMATION REQUIRED	APPLICABLE STATUTE	MILESTONE REQUIRED					
		TO	A	CAD DR	B	C	FRP DR
Consideration of Technology Issues	10 U.S.C. §2364 (reference a)		X		X	X	
Market Research	10 U.S.C. §2377 (reference b)	X	X		X		
Acquisition Program Baseline (APB)	10 U.S.C. §2435 (reference c)			X (if PI)	X	X	X
Compliance with Strategic Plan (as part of the analysis of alternatives, whenever practical)	5 U.S.C. §306 (reference d)				X	X	
Selected Acquisition Report (SAR) (MDAPs only) Unit Cost Report (UCR) (MDAPs only)	10 U.S.C. §2432 10 U.S.C. §2433 (references e, f)			X (if PI)	X	X	X
Live Fire Waiver & alternate LFT&E Plan (Covered Systems only)	10 U.S.C. §2366 (reference g)				X		
Industrial Capabilities (part of acquisition strategy) (N/A for AISs)	10 U.S.C. §2440 (reference h)				X	X	
LRIP Quantities (N/A for AISs)	10 U.S.C. §2400 (reference i)				X		
Independent Cost Estimate and Manpower Estimate (N/A for AISs) (MDAPs Only)	10 U.S.C. §2434 (reference j) DoDI 5000.2				X	X	X
Operational Test Plan (DOT&E Oversight Programs only)	10 U.S.C. §2399 (reference k)				X**	X**	
Cooperative Opportunities (part of acquisition strategy)	10 U.S.C. §2350a (reference l)				X	X	
Post-Deployment Performance Review	5 U.S.C. §306 40 U.S.C. §1401 et seq. (references d, m)						X
Beyond-LRIP Report (OSD T&E Oversight programs only)	10 U.S.C. §2399 (reference k)						X
LFT&E Report (OSD-covered programs only)	10 U.S.C. §2366 (reference g)						X
Clinger-Cohen Act (CCA) Compliance (All IT – including NSS) (See Table 3)	40 U.S.C. §1401 et seq. (reference m)			X	X	X	X
CCA Certification to Congressional Defense Committees for MAIS	Pub. L. 106-259, Section 8102 (reference n)			X (if PI)	X	X	X
Registration of mission-critical and mission-essential information systems	Pub.L. 106-259, Section 8102 (reference n) Pub.L. 106-398, Section 811 (reference o)			X (if PI)	X (if PI)	X (if PI)	
Application for Frequency Allocation (DD Form 1494) (applicable to all systems/equipment that require utilization of the electromagnetic spectrum)	47 U.S.C. §305 Pub. L. 102-538, §104 47 U.S.C. §901-904 (references p, q, r)				X	X (if no MS B)	
National Environmental Policy Act Schedule	42 U.S.C. §4321 (reference s)			X (if PI)	X	X	X
Core Logistics Analysis/Source of Repair Analysis (part of acquisition strategy)	10 U.S.C. §2464 10 U.S.C. §2460 10 U.S.C. §2466 (references t, u, v)				X	X (if no MS B)	
Competition Analysis (Depot-level Maintenance $3M rule) (part of acquisition strategy)	10.U.S.C. §2469 (reference w)				X	X (if no MS B)	

Note: TO - Technology Opportunity, CAD DR – Component Advanced Development Design Review,
FRP DR – Full Rate Production Design Review, PI – Program Initiation
** - Prior to start of operational test and evaluation

Ref: DoDI 5000.2, 5 Apr 02, Enclosure 1 (references), Enclosure 3 (tables 1 and 2)

APPENDIX A. STATUTORY AND REGULATORY REQUIREMENTS

Regulatory Information Requirements (Table 2)

INFORMATION REQUIRED	REQUIREMENT SOURCE	MILESTONE REQUIRED					
		TO	A	CAD DR	B	C	FRP DR
Validated Mission Need Statement (MNS)	CJCS Instruction 3170.01B (reference x)		X				
Validated Operational Requirements Document (ORD)	CJCS Instruction 3170.01B (reference x)			X (if PI)	X	X	
Acquisition Strategy				X (if PI)	X	X	X
Analysis of Multiple Concepts			X				
Analysis of Alternatives (AoA)					X	X (if no MS B)	
System Threat Assessment (as required for AISs) (validated by DIA for ACAT ID programs)	DoD Directive 5105.21 (reference y)				X	X	
Independent Technology Assessment					X	X	
C4ISP (also summarized in the acquisition strategy)				X (if PI)	X	X	
C4I Supportability Certification							X
Interoperability Certification							X
Affordability Assessment					X	X	
Economic Analysis (MAISs only)					X		
Component Cost Analysis (mandatory for MAIS; as requested by CAE for MDAP)					X (MAIS)		X (MDAP)
Cost Analysis Requirements Description (MDAPs and MAIS Acquisition Programs only)					X	X	X
Test and Evaluation Master Plan (TEMP)			X		X	X	X
Operational Test Activity Report of Operational Test and Evaluation Results					X	X	X
Component Live Fire Test and Evaluation Report (Covered Systems Only)		Completion of Live Fire Test and Evaluation					
Program Protection Plan (PPP) (also summarized in the acquisition strategy)	DoD Directive 5200.1-M (reference z)				X	X	
Exit Criteria			X		X	X	
ADM			X		X	X	

Note: TO - Technology Opportunity, CAD DR – Component Advanced Development Design Review, FRP DR – Full Rate Production Design Review, PI – Program Initiation

Ref: DoDI 5000.2, 5 Apr 02, Enclosure 1 (references), Enclosure 3 (tables 1 and 2)

APPENDIX A. STATUTORY AND REGULATORY REQUIREMENTS

References for Tables 1 and 2

(a) Section 2364 of title 10, United States Code, "Coordination and Communication of Defense Research Activities”
(b) Section 2377 of title 10, United States Code, "Preference for Acquisition of Commercial Items"
(c) Section 2435 of title 10, United States Code, "Baseline Description"
(d) Section 306 of title 5, United States Code, "Strategic Plans" (part of the Government Performance and Results Act)
(e) Section 2432 of title 10, United States Code, "Selected Acquisition Reports"
(f) Section 2433 of title 10, United States Code, "Unit Cost Reports"
(g) Section 2366 of title 10, United States Code, "Major Systems and Munitions Programs: Survivability and Lethality Testing Required Before Full-scale Production"
(h) Section 2440 of title 10, United States Code, "Technology and Industrial Base Plans"
(i) Section 2400 of title 10, United States Code, "Low-rate Initial Production of New Systems"
(j) Section 2434 of title 10, United States Code, "Independent Cost Estimates; Operational Manpower Requirements"
(k) Section 2399 of title 10, United States Code, "Operational Test and Evaluation of Defense Acquisition Programs"
(l) Section 2350a of title 10, United States Code, "Cooperative Research and Development Programs: Allied Countries"
(m) Section 1401 et seq. of title 40, United States Code, "Clinger-Cohen Act of 1996"
(n) Fiscal Year 2001 DoD Appropriations Act, Section 8102
(o) Section 811 of the National Defense Authorization Act for Fiscal Year 2001
(p) Section 305 of title 47, United States Code, "Government-Owned Stations"
(q) Section 104 of the National Telecommunications and Information Organization Act, "Spectrum Management Activities"
(r) Sections 901, 902, 903, and 904 of title 47, United States Code
(s) Section 4321 et seq. of title 42, United States Code, "National Environmental Policy Act"
(t) Section 2464 of title 10, United States Code, "Core "Logistics Functions"
(u) Section 2460 of title 10, United States Code, "Definition of Depot-Level Maintenance and Repair"
(v) Section 2466 of title 10, United States Code, "Limitations on the Performance of Depot-Level Maintenance of Material"
(w) Section 2469 of title 10, United States Code, "Contracts to Perform Workloads Previously Performed by Depot-Level Activities of the Department of Defense: Requirement of Competition"
(x) Chairman of the Joint Chiefs of Staff (CJCS) Instruction 3170.01B, "Requirements Generation System," April 15, 2001
(y) DoD Directive 5105.21, "Defense Intelligence Agency," February 18, 1997
(z) DoD 5200.1-M, "Acquisition System Program Protection," March 16, 1994

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APPENDIX B. ACTDS – 1995 THROUGH 2002

FY1995

Advanced Joint Planning (AJP)

Purpose: To enhance joint operational planning capabilities by leveraging, refining, and integrating emerging technologies. This ACTD, including the Joint Readiness Extension, was completed in the first quarter of FY98, after developing and demonstrating a capability to integrate, organize, analyze, and present joint readiness data for all CONUS-based forces. The Joint Planning and Execution Tool (JPET) Kit and the Joint Readiness Automated Management System (JRAMS) provide a comprehensive set of distributed planning tools, for mission planning, course-of-action development and evaluation, and logistics and transportation assessment. The Map-Based Planner software application was deemed in need of additional development before it could provide adequate military utility. Some of the software tools from this ACTD have been operational at USACOM for almost 2 years and have resulted in a reduction of planning times between the CINC and his components from a period of approximately 7 days to several hours. The JPET, JRAMS, and Automated Joint Monthly Readiness Review (AJMRR) tools have been incorporated into the Global Command and Control System and the Readiness Assessment System (RAS).

Cruise Missile Defense—Phase I (CMD)

Purpose: To detect, track, and successfully engage cruise missiles at ranges beyond the radar horizon of ship- and land-based air defense units, and to assess joint doctrine and concepts of air defense operations. This ACTD demonstrated the first-ever beyond-radar-horizon engagements of cruise missile targets. The Phase I demonstration was completed in January 1996 with four live intercepts of targets simulating land attack cruise missiles by ship-launched air defense missiles directed by a surrogate airborne radar located on the top of a nearby mountain. This concept of an elevated sensor has been a central element of cruise missile defense architectures since that time, and is continuing development by the Ballistic Missile Defense Organization and Joint Theater Air Missile Defense Organization.

High-Altitude Endurance Unmanned Aerial Vehicle (HAE UAV)

Purpose: To demonstrate that an affordable, long endurance high altitude, autonomous unmanned aerial vehicle (UAV) could be fielded to satisfy critical imagery intelligence, surveillance, reconnaissance (ISR) deficiencies identified during the Gulf War. The Global Hawk was designed to respond to Broad Area Coverage and long endurance reconnaissance, surveillance, and target acquisition requirements. This ACTD had two objectives: (1) satisfy collection shortfalls with an affordable autonomous UAV system in a short period of time, and (2) develop a concept for employing Global Hawk to support theater and joint task force (JTF) commanders. The Global Hawk ACTD demonstrated military utility and was recommended by Joint Forces Command to be expeditiously fielded in an ‘operationalized’ version. Global Hawk is currently in transition to a formal Engineering, Manufacturing and Design (EMD) Phase with USAF as lead service. The system exits the ACTD with over 60 flights, totaling over 720 hours, and operationally available for worldwide ISR support.

Ref: ACTD Descriptions, www.acq.osd.mil/actd/descript.html, updated April 2003

Joint Countermine (JCM)
Purpose: To demonstrate the capability to conduct effective, seamless amphibious mine countermeasure operations from sea to land; to provide simulation tools for Joint Countermine operations; and to define a Joint Countermine command, control, communications, and intelligence (C^3I) architecture. The initial demonstration occurred in summer 1997 under U.S. Atlantic Command sponsorship. JCM integrated 13 novel systems for both detecting and clearing mines and minefields. These systems were integrated with operational countermine systems under an umbrella including a JCM C^4ISR architecture, JCM common operational picture software, and a JCM operational simulation system. Two major demonstrations were conducted in conjunction with JTF exercises in FY97 and FY98. Four of the original systems have completed transition to acquisition phases. The Near-Term Mine Reconnaissance System (NMRS) and Airborne Standoff Mine Detection System (ASTAMIDS) have entered LRIP. The Coastal Battlefield Reconnaissance and Analysis (COBRA) system and Explosive Neutralization (EN–ATD) technology have entered the EMD phase. The minefield breaching and clearing systems demonstrated minimal utility and none were recommended for acquisition.

KE Boost-Phase Intercept (BPI)
Purpose: To assess the operational utility, mission effectiveness, and affordability of air-launched kinetic energy (KE), boost-phase intercept (BPI) systems. The KE BPI ACTD proposal was partitioned into two ACTDs at the recommendation of the Vice Chairman of the Joint Chiefs of Staff. The objective was to intercept ballistic missiles before they could deploy submunitions or other countermeasures. The 12-month, $40 million KE BPI Phase I ACTD was structured as a joint Air Force/Navy effort to develop the concept of operations, establish a force-level simulation of system performance, conduct pilot-in-the-loop simulations to measure pilot responses to threat detection, and assess performance as a function of the number of aircraft equipped with BPI capability. The assessment indicated that the BPI system would be feasible and would not place excessive demands on the pilot. However, the number of aircraft required to provide an effective defense capability was excessive. A decision was made not to proceed with the Phase II ACTD, a $400 million prototype system demonstration.

Low-Life-Cycle Cost, Medium-Lift Helicopter (LLC Helo) (VERTREP)
Purpose: To evaluate the military utility of employing a commercial-off-the-shelf helicopter to perform the Military Sealift Command fleet vertical lift support mission. This ACTD, originally planned for FY96, was executed during August–October 1995 with a very successful demonstration of leased commercial helicopters and crews on Military Sealift Command ships. As a result of the demonstration, the Navy has concluded that leasing helicopters may be a viable alternative for vertical replenishment. The Navy completed a 6-month follow-on demonstration in the Indian and Atlantic Oceans and is considering privatization options for the rest of the Military Sealift Command fleet.

Medium-Altitude Endurance Unmanned Aerial Vehicle (MAE UAV)
Purpose: To provide a rapidly deployable, medium-altitude reconnaissance and surveillance capability. Predator progressed from a concept to a three-system operational capability in less than 30 months. The Predator ACTD was initiated in 1993, and the first flight occurred in 1994. Predator first deployed to Gjader Field, Albania, from June to October 1995 in support of Operation Provide Promise, flying 77 operational missions and logging 753 hours. From March 1996 through September 1998, it has flown 625 operational flights totaling 4,644 hours in support of Implementation Force (IFOR)/Security Force (SFOR) tasking in the Bosnian theater. Overall, Predator has logged (through September 1998) 2,210 flights totaling 9,834 hours. Predator was also deployed to Southwest Asian operations in February 1999. Operational lead and program acquisition have undergone transition to the Air Force. Twelve systems, each containing four air vehicles, are being procured.

Ref: ACTD Descriptions, www.acq.osd.mil/actd/descript.html, updated April 2003

Precision/Rapid Counter-Multiple Rocket Launcher (P/RCMRL)

Purpose: To develop and demonstrate an adverse-weather, day/night, end-to-end, sensor-to-shooter, precision deep-strike capability against North Korean long-range artillery. The P/RCMRL ACTD addressed the North Korean multiple rocket launcher threat along the DMZ in Korea. In 24 months, the ACTD demonstrated and fielded significant improvements in capability related to rocket launch detection, command and control, and counterfire necessary to effectively neutralize the threat. By reducing sensor-to-shooter timelines by a factor of three, increasing counterfire accuracy, and providing orchestration of air and naval forces, P/RCMRL significantly reduces the threat to Seoul and to deployed U.S. and coalition forces. The ACTD contributed to an overall understanding of short sensor-to-shooter timeline concepts of operation in all Army areas of responsibility. The systems developed and deployed in P/RCMRL are standing watch with the 2nd Infantry Division in Korea. The technology is being transitioned into Army baseline systems.

Precision Signals Intelligence Targeting System (PSTS)

Purpose: To develop and demonstrate a near-real-time, precision targeting, sensor-to-shooter capability using existing national and tactical assets. PSTS developed advanced cooperative precision targeting algorithms, processing enhancements, site interfaces necessary for cooperative operation, and a concept of operations for asset cooperative utilization and minimal operational impact. This ACTD was executed as a series of demonstrations that incrementally improve the overall capability in terms of complexity of emitters that can be targeted, degree of engineer versus operator involvement, and tactical utility. A demonstration in Korea was completed in September 1998. The SIGINT data were collected by assets in Korea and by national means, processed in CONUS, and transmitted to warfighters in Korea over existing SIGINT dissemination communication links. PSTS systems have begun limited operational use with U.S. Forces in Korea.

Rapid Force Projection Initiative (RFPI)

Purpose: To demonstrate sensor-to-standoff killer capability for light early-entry forces. The RFPI ACTD demonstrated a hunter/standoff killer (HSOK) concept for extending the early-entry brigade deep and close fights. The HSOK concept uses long-range precision sensors, weapon systems, munitions, and digital C^2 systems to defeat an enemy armored force and its associated indirect-fire systems before it can decisively engage friendly forces. With the HSOK concept, the fight is essentially completed, with the fewest possible friendly losses, beyond enemy direct-fire weapon ranges. A series of partial demonstrations led up to a full-scale, free-play demonstration in the fourth quarter of FY98. This final demonstration occurred at Fort Benning, Georgia, and included both live and virtual forces. The ACTD was completed in FY98. Two of its systems, the High-Mobility Artillery Rocket System (HIMARS) and the 155–mm Automated Howitzer with Digital Fire Control System, have entered the EMD phase. The Hunter Sensor Suite has been operationally fielded.

Synthetic Theater of War (STOW)

Purpose: To provide an operational demonstration of advanced distributed simulation technologies that will directly support joint training and mission rehearsal. STOW demonstrated and evaluated the capabilities of advanced distributed simulation technology to improve joint training and mission rehearsal. Specific objectives achieved in Unified Endeavor 98–1, a Joint Task Force-level exercise in October 1997, included a demonstration of enhanced simulation fidelity based on combat resolution at the weapon system level; realistic simulation of command and control behavior; networking and information flow technology; and the capability to provide knowledge-based autonomous forces in simulation with man-in-the-loop participation wherever desired. The system supported up to 8,000 entities illustrating a new milestone in simulation scalability. The combination of STOW's successes with C4I, knowledge-based force integration, and the common data infrastructure demonstrates a significant potential for using simulation with lower cost and greater efficiency in the training, mission rehearsal, and analysis required by Joint Vision 2010. STOW is providing many of the baseline capabilities for DoD's next-generation Joint Simulation System (JSIMS), and STOW technologies, tools, and applications are being transitioned to JSIMS, JWARS, and the services (e.g., Army STOW–A, Navy BFTT, Air Force Distributed Mission Training, and USMC at the schoolhouse at Quantico). The STOW technologies and prototype are supporting USACOM exercises and events, and the possibility of using STOW as the simulation engine with which to bring other ACTDs to ACOM through simulation to help in assessment of military utility is being explored. USACOM is employing STOW in its first joint experiment. Work on simulation-based acquisition has been initiated via an agreement with the Joint Strike Fighter (JSF) program on how STOW can help the JTF with its life-cycle simulation requirements. STOW continues to import technology developed by the U.K. in the areas of chemical/biological and command agents, which continues STOW's successes in the international arena. Finally, the project is transitioning technology to industry. It is already in industry proposals, which is a very good indication that the commercial sector respects and believes in the technology.

Ref: ACTD Descriptions, www.acq.osd.mil/actd/descript.html, updated April 2003

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FY1996

Airbase/Port Biological Detection (ABP Bio Det)

This ACTD is demonstrating an interim capability to automatically detect and identify a biological attack on an airbase or port facility. The system is capable of detecting and identifying up to eight biological warfare (BW) agents. This capability can potentially prevent mass casualties and maintain operational effectiveness at the facility. The system has a modular design with 'plug and play' capability, so it can be upgraded as new technology/components become available. A prototype system was deployed ahead of schedule in Kuwait in support of Operation Desert Thunder. Residual assets are currently deployed in two theater locations within U.S. Central Command and Korea. This ACTD received the 1998 David Packard Excellence in Acquisition Award for Program Management.
The U.S. Pacific and Central Commands are dual operational sponsors.

Battlefield Awareness and Data Dissemination (BADD)

Purpose: To demonstrate the ability to provide the right data when and where it is needed. This software product allows users to subscribe to information sources so a product like a weather report can be "pushed" to users when THEY need it. BADD employs a number of software agents to characterize and advertise the availability of data in several, SECRET level national databases. As a result, search results are far more accurate, which reduces the load on bandwidth limited communications links. BADD also provides the commander for the first time the ability to allocate and prioritize communications resources, and to filter data being requested by subordinate units. BADD utilized a spiral development approach involving users in three collaborative assessments prior to the final, PACOM sponsored Tempo Brave 00-1 exercise, Nov-Dec 99. BADD's major Information Dissemination and Battlefield Visualization software has been transitioned into Global Command and Control System (GCCS) and GCCS I 3 programs respectively. ACTD prototype software is still being used by PACOM until the official DISA version is released late FY 01.

Combat Identification (CID)

Purpose: To demonstrate system alternatives that can enhance the capability of our combat forces to positively identify friendly and hostile platforms during air-to-ground and ground-to-ground operations in order to preclude fratricide due to misidentification and to maximize combat effectiveness. The Battlefield Combat Identification System (BCIS) was installed on the vehicles of the 4th Infantry Division to provide training during the Task Force XXI exercise. The CID ACTD provided a mechanism to improve the most deficient combat identification mission areas: air-to-surface and surface-to-surface combat identification of hostile forces. CID's dual approach of improving situational awareness and positive, immediate target identification provided synergistic solutions for increasing combat effectiveness while minimizing fratricide on future battlefields. Concurrently, the CID ACTD enabled refinement of joint/service CID tactics, techniques, and procedures. Success of the Army's BCIS resulted in an FY99 LRIP contract award for 2,620 units to be procured in the FY99–05 timeframe, with fielding beginning in FY01. The Situational Awareness Data Link (SADL) is being fielded by the Air National Guard for close air support missions.

Combat Vehicle Survivability (CVS)

Purpose: To demonstrate low-cost Advanced Survivability Technology (AST) on an Abrams tank that will significantly increase the survivability of combat vehicles on the battlefield. This ACTD demonstrated reduced vulnerability of a platoon-size element equipped with AST. Its residual equipment will be used by the 4th Infantry Division, and its exhaust treatment technology will be integrated into the Abrams System Enhancement Program.

Counterproliferation I (CP I)

Purpose: To develop, integrate, demonstrate, and deliver to warfighters a militarily ready capability to characterize, destroy, and disrupt fixed nuclear, biological, and chemical (NBC) facilities and minimize collateral effects. The program delivered an end-to-end system of sensors, target planning systems, and advanced weapons to improve warfighting capabilities against NBC targets. USEUCOM is the operational sponsor. Phase I consisted of a series of attacks on earth-mounded concrete masonry simulated biological storage facilities. Phase I was completed in February 1997 with the successful demonstration of a target attack planning and collateral effects prediction system, and the Hard Target Smart Fuze (HTSF). An interim demonstration series called Dipole Tiger (DT) was conducted in response to the sponsor's need to understand the baseline capability of current weapons to attack an aboveground, soft, chemical production facility while minimizing collateral effects. The DT tests highlighted the need to keep weapon fragmentation patterns away from agent storage vessels. Phase II will consist of a series of attacks on a hardened, reinforced concrete facility with a burster slab protecting a simulated chemical weapon production capability. Sensors, target planning tools, and advanced weapon systems were demonstrated during the final demonstration testing, conducted from January through July 1998. ACTD elements were deployed to Kosovo. Current USAF, USN, and USSOCOM procurement plans include fuzes, sensors and penetrators.

Counter-Sniper (CS)

Purpose: To rapidly provide counter-sniper sensor systems for evaluation by Army, Marine, and Special Forces users; provide training for users who will be prepared to quickly deploy sniper detection technology; and provide feedback to system developers. This ACTD enabled various DoD users the opportunity to evaluate a variety of state-of-the-art sniper detection capabilities. Over a short term (4-month) period ending in November 1996, the Army, Navy, and Marine Corps cooperated in evaluations of four developing counter-sniper system concepts. Evaluations were performed over a range of circumstances, with the primary goal to determine the soundness of the technical approach and the utility of each system. Three of the systems were judged to have military utility, and 10 prototype systems are available for rapid deployment. One of the systems was deployed in the Olympic Village at Ft. Benning for the duration of the 1996 Olympic Games in Atlanta. The ACTD achieved the goal of quickly providing an interim counter-sniper capability consisting of sensor systems, tactical procedures, and trained users. In addition to the fieldable prototypes introduced during the ACTD, and based on ACTD results, the Army and DARPA are examining more mobile vehicle-mounted and helmet-mounted counter–sniper detection systems for further development.

Joint Logistics (JL)

JL has developed and is migrating interoperable web-based logistics joint decision support tools (JDSTs) to the Global Combat Support System (GCSS). The principal goal is to revolutionize the logistics planning and execution process by providing specific domain capabilities through rapid application of emerging information technologies. JDSTs provide warfighters and logisticians with the ability to: assess support force capabilities to perform mission tasks; develop and evaluate logistics operational support plans; and, monitor logistics operations and react to deviations from projected support. This ACTD delivers tools that are available to all users via a web-based client-server environment that complies with Defense Information Infrastructure (DII) Common Operating Environment (COE) architecture standards and requirements.

U. S. Joint Forces Command is the operational sponsor.

APPENDIX B. ACTDS – 1995 THROUGH 2002

Miniature Air-Launched Decoy (MALD)

MALD is a small, low cost, expendable air-launched decoy designed to enhance the survivability of friendly aircraft and aid in establishing air superiority by diluting and confusing surface-based and airborne enemy air defense systems. MALD is capable of being carried on, and launched from, fighter aircraft, and requires no guidance from other aircraft or ground stations once launched. The vehicle, which is approximately eight feet long and weighs 100 pounds, is powered by an extremely small 50-pound thrust turbojet engine. The electronics package is made up of the Signature Augmentation System (SAS), which electronically enlarges the decoy radar cross-section to look like jet aircraft. MALD is currently undergoing the military utility assessment conducted by Air Combat Command. The Air Force is considering production in future years.
USAF Air Combat Command is the operational sponsor.

Navigation Warfare (NavWar)

Purpose: To develop and demonstrate NavWar Prevention (jamming) and Protection (antijam)technologies by the provision of enhanced GPS receivers (handheld and avionics) a challenged Electronic Warfare (EW) environment as well as devices that provide an initial Satellite Navigation (SATNAV) prevention capability. The NavWar ACTD successfully developed and demonstrated three prevention capabilities and an enhanced handheld GPS receiver during the conduct of eight demonstrations. In addition, a NavWar Concept of Operations (CONOPS) was developed as well as observing and identifying to the warfighter a number of GPS vulnerabilities. The NavWar ACTD was completed on 30 Sep 99. All legacy prevention assets will be transferred to the 746th Test Squadron where they will be made available to the warfighter for operations and exercises by JFCOM. The continued development and demonstration of the avionics protection receivers will be sponsored by JFCOM and conducted by the Joint GPS Combat Effectiveness (JGPSCE) JT&E Office.

Semiautomated Imagery Processing (SAIP)

Purpose: To significantly improve an image analyst's ability to provide accurate, timely situation awareness to the warfighter. This system will allow analysts to exploit the output of an increasing quantity of image collection assets. Field tests commenced in March 1997 with the XVII Airborne Corps using the ETRAC ground station as a radar interface. There were also several subsequent, successful XVIII Airborne Corps evaluations during field exercises. System residuals were provided to the Army and Air Force in FY99.

Tactical Unmanned Aerial Vehicle (TUAV)

Purpose: To demonstrate a low-cost TUAV system for use by brigade-level commanders. This ACTD completed its final demonstration phase and was chosen by the Army to participate in a four-system competition leading to full acquisition.

FY1997

Chemical Add-On to Airbase/Port Biological Detection (Chem Add-On)

Purpose: To (1) integrate a networked chemical warning capability using mature and available technologies to automatically detect and identify, in near-real time, chemical threats within the designated areas of operations associated with the Airbase/Port Biological Detection ACTD; (2) accelerate the demonstration of a Joint Warning and Reporting Network (JWARN); and (3) provide an interim capability to support the Commander in Chiefs (CINCs) for 2 years after the demonstration. The process of integrating the chemical and biological detection systems began in FY97. Full operational testing with simulated chemical and biological attacks was conducted in FY98 at Dugway Proving Ground, Utah.

Consequence Management (Cons Mgt.)

Purpose: To demonstrate the capability to detect and model, inside a building, a biological warfare (BW) agent simulant for consequence management. This ACTD fully satisfied its objective of demonstrating the U.S. military's capability to perform in a supporting role for consequence management of the terrorist/paramilitary use of biological weapons or agents. The ACTD ran for less than 12 months with two major demonstrations in 7 months. Exemplar results of the final demonstration in December 1997 and subsequent activities follow. Fifteen biological agent collection, detection, and identification technologies were evaluated with a subset meeting near-term assay timeline goals. These sensors allowed units to perform onsite analysis and identification of suspected BW agents in less than 1 hour, unlike other methods that require specialized laboratories. Integrated, dedicated chamber tests and a vignette day were used to establish definitive baseline technical performance levels for the technologies while also providing realistic training for the U.S. Army Technical Escort Unit (TEU) and the U.S. Marine Corps Chemical/Biological Incident Response Force (CBIRF). The sensors are one of several residual technologies that were favorably assessed and are being procured by the participating units. Another residual is coming from the evaluation of several modeling tools that simulate the complex airflow in multistory buildings. These indoor hazard prediction models assist first responders in determining source and high-contamination areas. Open-air hazard prediction models were also evaluated. The combination of these two modeling residuals allows users to train for a much wider range of scenarios and environments than they could before the ACTD. Soldiers from the TEU and Marines from the CBIRF worked together for the first time and produced a jointly approved concept of operations—a significant residual. The ACTD was also the venue for the units to develop rigorous chain-of-custody procedures. The CONOPS is now used whenever the units operate together, and the chain-of-custody procedures have become standard operating procedures. For the first time, non-DoD federal agencies, state emergency management personnel, and local first-responders participated in a DoD ACTD from initiation to conclusion and obtained significant training on DoD unit capabilities. This has facilitated better coordination between the services and federal, state, and local agencies in exercises to prepare for actual events. The ACTD's success in demonstrating emerging technologies in an operational setting and in providing diverse and novel residuals represents a concrete example of DoD's efforts to address the equipment, doctrinal, and interagency coordination challenges posed by the terrorist use of BW. Equipment residuals have been deployed during a variety of current events, such as the U.S. visit of Pope John Paul II in 1999.

Counterproliferation II (CP II)

CP II builds on the success of CP I. Whereas CP I focused on precision-guided gravity weapons, CP II focuses on: (1) standoff penetration with enhanced warhead penetration performance and fuzing options for Conventional Air Launched Cruise Missile (CALCM) and Tactical Tomahawk Penetrator Variant (TTPV) systems; (2) attack planning to include more accurate target damage and collateral effects capabilities and predictions and new deliberate and contingency target planning capabilities. The LANTIRN Battle Bomb Impact Assessment module underwent a series of successful operational tests. The Chemical Combat Assessment System for unmanned aerial vehicle (UAV)-based BDA and sampling of chemical agent clouds after weapons used also was evaluated. Additional CP II ACTD demonstrations are planned over the period of Fiscal Years 2001-2003 to provide the operational sponsor and participating commands with opportunities to assess the utility of the selected technology components against the CONOPS.

Extending the Littoral Battlespace (ELB)

ELB is enabling rapid employment, maneuver and fire support from dispersed units operating from the sea, in an extended littoral area of operations. ELB provides connectivity between units from commanders to the individual squad level through a Wide Area Relay Network (WARNET). The WARNET uses air and ground relays, and is comprised of a high data rate, point-to-point Tactical Common Data Link, broadcast packet radio (VRC-99A and NTDR), and an IEEE 802.11 wireless local area network (WaveLAN/Prism) to the end user. A proof of concept (military utility) demonstration in April 1999 provided strong operational validation of this capability. A portion of the system is installed on a deployed Pacific Fleet Amphibious Reconnaissance Group/Marine Expeditionary Unit (ARG/MEU) in support of real-world testing. Numerous programs of record are transition targets including Unit Operations Center, Joint Tactical Radio System, Vertical Takeoff and Landing Tactical UAV, Tactical Common Data Link, Tactical Exploitation System – Navy, Advanced Assault Amphibious Vehicle, Advanced Digital Networking System, and Tactical Data Network. Two Full Systems Tests were conducted in FY 2000 and Full Systems Test 3 and Major Systems Demonstration II will be conducted in FY 2001.
U.S. Pacific Command is the operational sponsor.

Information Operations Planning Tool (IOPT)

IOPT is providing information operations (IO) planning, modeling, and analysis tools supporting the target nomination process. These automated tools, operating at the compartment level, provide analysts at the CINC and Service Components a collaborative capability to analyze strategic level direction; convert the direction into specific IO tasks; and, to postulate and model the effects of non-kinetic options. The tool set is initially focused on supporting information operations against enemy air defenses, but is also being developed to support a broad range of strategic and operational level information operations.
U.S. Central Command is the operational sponsor.

Integrated Collection Management (ICM)

ICM is developing software and processes to improve the management of intelligence collection assets for the joint tactical forces (JTF) commander. ICM is integrating management of overhead and airborne signals intelligence (SIGINT) and imagery sensors. The tools are also assisting the collection manager to synchronize his plans with the operational plan of the JTF Commander. The ICM tools will be demonstrated in total with the U. S. Joint Forces Command. Parts of the system have already been deployed to the National Military Intelligence Center in the Pentagon.
U.S. Joint Forces Command is the operational sponsor.

Joint Advanced Health and Usage Monitoring System (JAHUMS)

JAHUMS is enabling a change in maintenance philosophy for DoD helicopters. JAHUMS provides a means to monitor the health and usage of individual aircraft utilizing onboard sensors and diagnostics. It is demonstrating an open architecture so that modules from multiple vendors can be inserted into a baseline system. The baseline system is a commercial dual-use system that is scaleable to meet the specific requirements of a given helicopter or operator. The condition-based maintenance effort in an automated maintenance environment will utilize conventional wired sensors as well as advanced wireless sensors integrated into the JAHUMS open architecture. JAHUMS will generate significant life cycle cost savings and dramatically reduce Class A mishaps on the aging helicopter fleet. Anticipated benefits include reduced maintenance costs and increased aircraft availability and safety.
U.S. Joint Forces Command is the operational sponsor.

Military Operations in Urban Terrain (MOUT)

MOUT responds to the extremely difficult urban warfare environment that requires manpower-intensive operations due to line-of-sight restrictions, inherent fortifications, limited intelligence, densely compacted areas, presence of noncombatants, and associated restrictive rules of engagement. MOUT evaluated 509 potential technological solutions and field-tested 128 of the most promising. Thirty-two products and technologies were determined to have merit and will be further evaluated during remaining demonstrations. MOUT instrumented sites at Fort Benning and Camp Lejeune and conducted two company-sized joint experiments with integrated Marine and Army forces. A subsequent demonstration integrated a Marine infantry company into an Army battalion, fully equipped with the MOUT ACTD package. This demonstration occurred at Ft Polk in September 2000, as part of a normal Joint Readiness Training Center rotation, included in the Joint Contingency Force Experiment. Congress provided funds in the FY 2001 Appropriations Act for Radar Vision 2000 that will be demonstrated as part of the MOUT ACTD. In addition, a significant MOUT demonstration is planned for FY 2001 that will use live and simulated forces in conjunction with the Marine Corps' Project Metropolis.
U.S. Special Operations Command is the operational sponsor.

Rapid Terrain Visualization (RTV)

RTV is demonstrating the ability to rapidly provide digital terrain data (DTD) for the warfighter. Since digital terrain data exists for only a very small portion of the earth, future conflicts will likely involve U.S. forces in regions lacking topographic data. Indigenous forces will have the most comprehensive and accurate knowledge of the terrain. The RTV aircraft uses laser and infrared synthetic aperture radar to develop terrain data for 90X90 kilometer areas in less than 72 hours. The RTV workstation software is capable of using data gathered by the radar-equipped RTV aircraft, or data provided by NIMA or commercial sources to develop custom terrain products. RTV products support intelligence preparation of the battlefield, and mission planning and rehearsal. Software modules are transitioning to the Digital Topographic Support System. RTV will support the Army's Joint Contingency Force Experiment in September 2000 with high-resolution terrain data of Fort Polk's urban operations site.
U. S. Joint Forces Command is the operational sponsor.

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FY1998

Adaptive Course of Action (ACOA)
ACOA is demonstrating web-based planning tools to cut initial crisis action response time by 50 percent and allow joint planning by multiple participants during crisis action planning. Participants, including the supported Commander in Chief (CINC), supporting CINCs, and commanders of joint task forces, will use a shared representation of the pieces of the plan and will be able to simultaneously view those pieces as they evolve in plan options and fidelity. The goal is to provide a mission focused link among operations, logistics, and intelligence elements, as well as a shared dynamic workspace for situational assessment. Planners and executors will immediately understand changes in the assumptions on which their plans are based. U.S. Pacific Command is the operational sponsor.
U.S. Strategic Command, U.S. Transportation Command, and U.S. Joint Forces Command are participating as supporting CINCs and advisors.

C^4I for Coalition Warfare (C4I C2SIP)
This ACTD is developing a modular software package that will allow standard U.S. messages to be translated to a NATO standard message format, and allow data to be passed directly between U.S. databases and those of allied countries. The capability increases the speed and accuracy of US-to-NATO communications by eliminating the "sneaker net" between allied command and control systems. The software is designed to be compliant with Defense Information Systems Agency (DISA) Common Operating Environment (COE) standards so it can be used by any service system that is Global Command and Control System (GCCS)/Defense Information Infrastructure (DII) COE compliant.
U.S. European Command is the operational sponsor.

Information Assurance: Automated Intrusion Detection Environment (IA:AIDE)
IA:AIDE is developing the means for determining whether hacker attacks are singular events or part of greater information attack against DOD information systems. Each facility employs a number of products such as sensors, firewalls, and intrusion detection systems, to provide protection for their network and computer systems. IA:AIDE provides network administrators the means to correlate information captured by these individual commercial systems and to automatically forward attack alerts to CINC, Service and DISA Computer Emergency Response Teams. It also provides ability to capture all this information in one, searchable database. The system is incorporating current and maturing intrusion sensing tools in along with expert systems technology and is being executed in coordination with DARPA information assurance program.
US Strategic Command is the operational sponsor.

Joint Biological Remote Early Warning System (JBREWS)
JBREWS is demonstrating an operationally capable biological remote early warning system for use by deployed ground forces in a mobile environment. This system provides both warning of a biological attack and reporting of the threat to appropriate command and control nodes. The JBREWS system detects up to eight biological warfare (BW) agents. It provides brigade/joint task force area commanders with the capability to accelerate the decision cycle to warn and protect U.S. forces. JBREWS completed the Short-Range Standoff Detection System development test in late Fiscal Year 1999 and will integrate biological detection technologies with the command, control and communications (C3) architecture early in Fiscal Year 2000.
The U. S. European Command is the operational sponsor.

Joint Continuous Strike Environment (JCSE)

JCSE greatly reduces the latency associated with correlating command guidance, weapons status, targets, and airspace deconfliction. This technology makes it possible to attack time-sensitive surface targets. JCSE optimizes weapons for a four-dimensional battlespace by providing the software glue to combine actionable targets emerging from the intelligence, surveillance and reconnaissance (ISR) processing, exploitation and dissemination path with command objectives and guidance from the operational planning and execution process. JCSE then supplies weapon status information both horizontally and vertically across a joint forces commander's (JFC's) organization to pair weapons with targets based on availability, rather than organizational ownership. Finally, JCSE generates options for rapid deconfliction of airspace to insure timely attack and to minimize hazards to friendly systems. Military utility assessments have and will occur in several Fleet Battle Experiments, a simulation driven lab exercise, and Korean exercises. JCSE is also being used in JFCOM J-9 attack operation experiments.
U.S. European Command is the operational sponsor.

Joint Modular Lighter System (JMLS)

JMLS is a joint Army/Navy effort to demonstrate a sea state 3-capable lighterage for Joint Logistics Over-The-Shore (JLOTS) operations. It will demonstrate a service-interoperable prototype causeway lighter system that can be safely assemble and operated (in a loaded condition) through sea state 3. This capability will permit the rapid planning, deployment, and execution of more responsive and efficient logistics support to JLOTS operations. JMLS will permit the Army and Navy to acquire a single lighterage system, thus producing savings from economies of scale production and reducing total life-cycle costs.
U.S. Joint Forces Command is the operational sponsor.

Line-of-Sight Antitank System (LOSAT)

The LOSAT ACTD is designed to meet the requirements of the lighter, but more lethal, Army. It is an anti-tank system that possesses the overwhelming lethality of the kinetic energy missile. LOSAT will be integrated into an expanded-capacity High-Mobility Multipurpose Wheeled Vehicle (HMMWV) to meet C–130 airdrop requirements and UH–60L (Blackhawk) helicopter slingload weight constraints. The ACTD objectives are to demonstrate system lethality, deployability/ mobility, assess military utility through Battle Lab Warfighting Experiments and provide residual hardware to an operational unit within XVIII ABN Corps.
U.S. Central Command is the operational sponsor.

Link–16

Link 16 is demonstrating an integrated capability to pass tactical information seamlessly among Department of Defense tactical data link systems. Link-16 focuses on two tactical data links systems: Link 16 (primarily utilized among Navy and Air Force airborne, ground and maritime assets) and the Variable Message Format (VMF) (primarily used by U. S. Army and Marine Corps ground assets). The software program has been successfully tested in several operational demonstrations, including Combat Identification Testing in July 1998 and the All Sources Combat Identification and Evaluation Testing (ASCIET) 99 conducted in March 1999. At the request of NATO-SHAPE in June 1999, it was deployed in Kosovo to support Operation Allied Force and continues to support efforts in theater. This includes the system being resident within the Combined Air Operations Center (CAOC). Based on deployment results, ongoing improvements include the translation of additional DoD tactical data link systems currently deployed in the Balkan theater.
U.S. Joint Forces Command is the operational sponsor.

Migration Defense Intelligence Threat Data System (MDITDS)

MDITDS is supplying the information infrastructure required for intelligence support in combating terrorism (CT) and force protection (FP) operations. The ACTD is enhancing MDITDS (the baseline DODISS migration system) software with advanced applications to maintain on-line a centralized database of all antiterrorism security assessments and inspections of DoD facilities, as well as provide analysis on combating the terrorist threat to DoD interests worldwide. MDITDS is also providing the data repository and the functionality to access, evaluate, and disseminate this information. Capabilities include: increased protection of DoD personnel, resources, and facilities; increased deterrence of terrorist attacks; and improved retaliation capability. MDITDS is being evaluated in a series of joint exercises by U.S. European Command and within the CONUS involving regular U.S. military forces, special operations forces, uniformed and civilian intelligence personnel, and DoD civilian personnel.
U.S. European Command is the operational sponsor.

Precision Targeting Identification (PTI)

PTI is demonstrating the military utility of advanced active and passive sensor systems for precision detection and identification of targets from an airborne platform. The ACTD is employing an advanced ESM, third-generation infrared, spectral, and laser radar (LADAR) systems, together with an integrated command, control and communications track dissemination system. The PTI system provides a day/night target detection, classification, and dissemination capability at standoff ranges that cannot be achieved with conventional detection and monitoring systems. The system is being demonstrated in conjunction with Joint Interagency Task Force EAST counter drug operations. This system will provide sensor technologies that will be applicable to DoD, US Customs, US Coast Guard, Air National Guard and Personnel Recovery agencies.
U.S. Southern Command is the operational sponsor.

Space-Based Space Surveillance Operations (SBSSO)

SBSSO has demonstrated that a space based sensor can be integrated into the space surveillance system and greatly enhance the performance of that system. The SBSSO utilizes the space based visible (SBV) sensor on the Ballistic Missile Defense Office (BMDO) Midcourse Space Experiment (MSX) program spacecraft. SBSSO has found over 80 lost satellites to date and has improved the performance of the space surveillance system by over 20% for geostationary satellites. The system operation was extended into low altitude surveillance domains in Fiscal Year 2000.
U.S. Space Command is the operational sponsor.

Theater Precision Strike Operations (TPSO)

TPSO is providing ground component commanders with the automation needed to plan and direct counterfire and precision strike operations. This capability will interface with Air and Naval command and control systems to achieve synchronization of U.S. and coalition assets and activities for strike planning at the theater level. TPSO was demonstrated in Korea during Fiscal Year 2000 and demonstrations will be continued in Fiscal Year 2001.
United States Pacific Command is the operational sponsor.

Unattended Ground Sensors (UGS)

Purpose: To evaluate the military utility of two distinct unattended ground sensors – the Unattended MASINT Sensor (UMS), (Steel Eagle (air drop) and Steel Rattler (hand-emplaced)), and the Remote Miniature Weather Station (RMWS). For 24 months, the UGS ACTD demonstrated and fielded improvements in the UMS' capability to detect, locate, identify, and report Time Critical Targets, primarily Theater Ballistic Missiles. Exercised in conjunction with Special Forces (SF) detachments, UMS proved itself to be a force multiplier, and allowed SF to make operational decisions, for the first time, based on the UMS reports. In addition, RMWS, through close coordination with multiple users, and during multiple demonstrations over 24 months, proved its utility when requested by U.S. European Command in support of the Kosovo Operation "NOBLE ANVIL." RMWS proved itself to operational forces through reports that helped them to determine safest routes of travel and transit. RMWS is in the process of becoming a standard Air Force program through Air Force OS21. UMS is currently in transition to acquisition with the US Air Force.

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FY1999

Battle Damage Assessment (BDA) in the Joint Targeting Toolbox (JTT)

This ACTD provides the warfighters with a significant BDA capability by combining battle damage indicators, observed physical damage and inferred functional damage into an accurate assessment of combat operations. The BDA in JTT ACTD incorporates advances in artificial intelligence and decision aiding, especially evidential reasoning and case-based reasoning to provide a more accurate assessment of combat operations. It addresses the four technical aspects of BDA: data acquisition, results analysis, data aggregation, and visualization. The system will provide theater/JTF commanders with a joint BDA and targeting process to correct current limitations. The ACTD will directly result in significant operational improvements to both the planning and targeting communities.
U.S. Central Command is the Operational Sponsor.

Coherent Analytical Computing Environment (CACE)

CACE is demonstrating advanced data warehousing concepts, on-line analytical processing decision support, and intelligent analytical computing tools to access and utilize joint aviation asset information. The application of such technologies is expected to ensure global access to joint aviation asset information, enhance aviation safety, reduce DoD investment in inventory, increase unit readiness, and provide benefits in all types of operational settings. CACE will use an AV-8B (Harrier aircraft) Marine Air Group to demonstrate the technologies.
U.S. Pacific Command is the operational sponsor.

Common Spectral Measurements and Signals Intelligence Exploitation (COSMEC)

COSMEC is demonstrating the tactical utility of spectral MASINT products to the warfighter by providing processing capability to exploit data from government and commercial multi/hyperspectral collection platforms. COSMEC supports both tactical and strategic intelligence, using state-of-the-art MASINT processing and exploitation algorithms. COSMEC also supports a variety of operational requirements, including detection and identification of camouflaged vehicles, search and rescue, terrain characterization and mapping, beach route preparation, and counter-drug operations.
U.S. European Command is the operational sponsor.

Compact Environmental Anomaly Sensor II (CEASE II)

CEASE II is evaluating the utility of integrating small sensors onboard a satellite to monitor the space environment. Operators will be better able to understand the cause of solar storm disruptions and be able to mitigate or prevent their effects. This allows more optimal warfighter use of the satellite, assists in preventing permanent damage to satellite components, and offers insight into the origin of the satellite disruption.
Air Force Space Command is the operational sponsor.

Force Medical Protection/Dosimeter (FMP/D)

FMP/D is providing the capability to determine the exposure of the individual warfighter to chemical/biological (CB) agents by developing an individually worn sampler. The first phase of the ACTD emphasizes CONOPS development utilizing commercial-off-the-shelf (COTS) products for collection and archiving of exposure to chemical agents using passive sampling methodology. The second phase of development includes real-time analysis to warn the wearer of an immediate chemical hazard and will trap biological pathogens for later analysis.
The U. S. Joint Forces Command is the operational sponsor.

Human Intelligence and Counterintelligence (CI) Support Tools (HICIST)

HICIST is an accelerated effort to provide mature commercial and Government off-the-shelf technology to human intelligence (HUMINT) and CI personnel. HICIST is developing, integrating, and demonstrating the technologies, concepts, and architectures to meet requirements for improving all-echelon satisfaction with HUMINT and CI targeting, collection and dissemination. HICIST has completed several military utility assessments in which special operations forces, CI, HUMINT, Defense Attaches and Long Range Surveillance operators, including National Guard and Reserve, evaluated several targeting, collection and dissemination technologies in exercise scenarios relevant to their respective missions. These assessments resulted in: termination of some technologies and identification of improvements to be made in others before residual deployment; evolution of CONOPS and techniques, tactics and procedures; improvements in cross-echelon linkages; and deployment of a text translation device to Bosnia. Initial Operating Capability of the Analytic Support Cell was achieved.
U.S. Special Operations Command is the operational sponsor.

Joint Medical Operations—Telemedicine (JMO–T)

JMO-T is demonstrating the ability to integrate the Services deployable theater medical telepresence for improved force health protection, reduced force attrition and minimized medical evacuations. Since future health support will often take place in austere environments, U.S. forces in a joint medical battlespace require an integrated interoperable information network ability to move digitized medical information instead of patients or medical staff. Communicating medical threats and care between theater telemedicine teams and back to centralized medical facilities will provide improved diagnosis and treatment to forward areas. JMO-T modeling and simulation tools are improving medical mission planning for deployment. At its completion, JMO-T will provide a theater interoperable telemedicine force package that is manned, equipped, and trained, with medical equipment and communications hardware. Ultimately, JMO-T concepts will be incorporated into the Theater Medical Information Program (TMIP).
U. S. Pacific Command is the operational sponsor.

Joint Theater Logistics (JTL)

JTL is using web-based planning tools to produce and transition advanced logistic and operational planning and execution capabilities to the warfighter. JTL is demonstrating a collaborative environment between the operations and logistics staffs, with emphasis on deployed forces under the joint task force (JTF) command. JTL has three operational objectives. The first objective is to provide an integrated operations and logistic collaborative environment. By fusing operations and logistic information for the first time, operators and logisticians will share common data and views of operational plans and mission guidance. The second objective is to dynamically produce and assess logistic plans to support operational missions. This provides tailored logistic packages and sustainment directly to each level of the military operation. The third objective is to, in real time, track the logistic situation, assess the impact of current logistic support upon operations, and to shift forces, equipment, and supplies enroute to meet changing requirements.
U. S. Joint Forces Command is the operational sponsor.

Personnel Recovery Mission Software (PRMS)

PRMS is improving the command and control functions associated with personal recovery (PR) operations. It is increasing the probability of safe recoveries, increasing the speed of the recovery process, and lowering the cost of recovery. This is being accomplished by moving to an integrated GCCS software suite with currently available mission interface. PRMS will automate the critical early actions of a personnel recovery event. This allows a more timely and focused response by recovery forces. The first PRMS operational demonstration was conducted in Spring 2000 in conjunction with Exercise Northern Edge in Alaska.
United States Pacific Command is the operational sponsor.

Small-Unit Logistics (SUL)

SUL is developing a tactical-level logistics command and coordination system to fuse information from Defense and Service legacy logistics systems. SUL is providing: timely situational awareness; a common tactical-level logistics picture; and, access to logistics planning, decision support, and course of action analysis tools. SUL will provide tactical (small unit) logisticians and commanders an interoperable combat service support command and coordination system that enables them to support and sustain operating forces quicker and more effectively with a reduced forward-based logistical footprint.
U.S. Pacific Command is the operational sponsor.

Theater Air and Missile Defense Interoperability (TAMDI)

TAMDI is integrating separate Navy and Army air defense systems and allowing them to exchange target track information to achieve an integrated air defense picture. The track data accuracy will be sufficient to engage an airborne target with a Patriot surface-to-air missile using only the Navy's radar sensor data. Target tracks will be passed between the Navy and Army air defense units using the Cooperative Engagement Capability as the data transfer mechanism. Objectives of the project include bounding the target track errors using two totally separate track and geo-position (gridlock) schemes. Data will be collected during this project to provide the Theater High Altitude Air Defense program information regarding air picture integration and interoperability needs.
U.S. Joint Forces Command is the operational sponsor..

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FY2000

CINC 21
CINC 21's objective is to improve a Joint Force operational commander's ability to do crisis action planning that supports the simultaneous execution of multiple coalition, inter-agency, and non-governmental organizations. Building upon the Global Command and Control System infrastructure, CINC 21 will integrate collaborative planning, visualization, and information dissemination software modules and networks which provide commanders the ability to allocate communication capacity as they would other combat power. CINC21 includes the Coalition Rear Area Security Operations Command and Control (CRASOC2) project for U. S. Forces Japan. In compliance with language in the FY 01 House Appropriation Committee report, CRASOC2 incorporates the WMD Consequence Management Program executed by the National Terrorism Preparedness Institute at the Southwest Public Safety institute.
U.S. Pacific Command is the operational sponsor.

Coalition Aerial Surveillance and Reconnaissance (CAESAR)
Over the next decade, Canada, France, Germany, Italy, Norway, the United Kingdom, and the United States will deploy Moving Target Indicator (MTI) ground surveillance radar, Synthetic Aperture Radar (SAR) platforms and/or their processing systems. The CAESAR ACTD is maximizing the military utility of these scarce and expensive resources through the demonstration of interoperability among these assets. Using a combination of simulation and live-fly exercises, CAESAR is developing a concepts of operations and tactics, techniques and procedures (TTPs) for coalition employment of MTI and SAR operations. CAESAR correlates the products and provides interoperability among the MTI and SAR assets of the U.S. and these NATO partners. CAESAR participated at five sites in the Joint Project Optic Windmill/Clean Hunter Exercise in FY00 with a combination of live fly and simulation. The exercise provided a technical and operational baseline for the ACTD.

Communication/Navigation Outage Forecasting System (C/NOFS)
The Defense Department relies heavily on satellite systems for navigation, communications and data transmission. Satellite systems can be disrupted when solar flares emit particles that disturb the earth's ionosphere. This ACTD will predict the satellite space environment and alert control operators to place satellites in a protective mode when disturbed ionospheric conditions are likely, thereby improving satellite survival and minimizing service disruption and navigation errors.
U.S. Space Command is the operational sponsor.

Computerized Operational MASINT Weather (COMWx)
This ACTD provides near real-time cloud pictures for high-value targeting support, utilizes existing National assets and provides a foundation to exploit future systems. It also increases battlespace situation awareness to support use of precision-guided munitions, strike warfare, fleet defense, air refueling and reconnaissance. The ACTD will demonstrate algorithms to exploit COMWX products at the theater level.
U.S. Central Command is the operational sponsor.

Content-Based Information Security (CBIS)
This ACTD addresses the long-standing need for a multi-level security solution that can support joint, coalition, and interagency operations. It develops a proof of concept security environment on a Windows NT platform that will initially support, up to and including, SECRET information in a coalition environment. The solution is focused at the tactical level and will operate over disadvantaged networks and interface to Public Key Infrastructure networks.
U.S. Joint Forces Command is the operational sponsor.

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Global Monitoring of Space Intelligence, Surveillance and Reconnaissance Systems (GMSIS)

This ACTD is demonstrating the value of providing near-real-time information on potential threats to theater operations posed by commercial space systems. This will enable the theater commander to take mitigation actions to avoid the threat.
U.S. Space Command is the operational sponsor.

Ground-to-Air Passive Surveillance (GAPS)

GAPS is evaluating passive surveillance systems for counter drug operations. The systems being evaluated include passive coherent location. This technique employs a passive multi-static ground-based receiver to detect and track air targets by sensing the radiation emanating from television and radio frequency sources that is reflected off the aircraft. The system may also provide precision tracking information to cue other sensors. The utility of passive acoustic systems to detect and track small boats will also be demonstrated. The GAPS ACTD will evaluate these capabilities for counter-drug operations in the SOUTHCOM Area of Responsibility.
U.S. Southern Command is the operational sponsor.

Joint Intelligence, Surveillance & Reconnaissance (JISR)

JISR provides the Joint Force and Early Entry Force commanders the ability to integrate tactical reconnaissance and tactical operational sensors to improve situational awareness. The JISR ACTD will demonstrate two-way links between these tactical-level sensors, and will integrate data from sensors such as Firefinder radars, millimeter wave radars on Apache helicopters, and the Remotely Monitored Battlefield Sensor System (REMBASS).
U.S. Central Command is the operational sponsor.

Multiple Link Antenna System (MLAS)

The single MLAS antenna will provide two-way communications with four different platforms simultaneously while on the move. For example, a mobile Unmanned Aerial Vehicle (UAV) base station equipped with a single MLAS antenna can control two UAVs, exchange data with a Rivet Joint, and communicate over a Ku-band satellite communications link simultaneously while on the move. The electronically steered phased array antenna has no moving parts or mechanical interference. It has a much smaller footprint and is more reliable than the equivalent number of mechanically steered antennas.
U.S. Joint Forces Command is the operational sponsor.

Quick Bolt (QBolt)

The Quick Bolt ACTD integrates five different guidance technologies into the High-Speed Anti-Radiation Missile (HARM), used to destroy mobile enemy radar systems that can threaten friendly aircraft. The Quick Bolt will be continuously updated on threat position based on satellite-disseminated information. This will be combined with the Global Positioning System, inertial navigation, advanced radar frequency seeker technology, and its own millimeter-wave radar, thereby greatly improving targeting of enemy threats.
U.S. European Command is the operational sponsor.

Restoration of Operations (RestOps)

The Restoration of Operations ACTD will demonstrate the tools required to prepare for and immediately react to the consequences of a chemical and biological (CB) weapon attack on a Commander-In-Chief (CINC)-identified port, airfield or logistics facility. This ACTD will integrate Concept of Operations (CONOPS) and CINC planning tools and identify the improvements needed in current policy for restoration of operations. Further, it will provide the tools needed to better prepare for potential CB attacks and restore operations with a minimum down time.
U.S. Pacific Command is the operational sponsor.

Ref: ACTD Descriptions, www.acq.osd.mil/actd/descript.html, updated April 2003

Tri-Band Antenna Signal Combiner (TASC)

Increased information flow and a lighter, more mobile force are immediate military needs. The Tri-Band Antenna Signal Combiner ACTD enables mobile forces to use multiple, small, relatively inexpensive, lightweight antennas to achieve the same performance as a single large, bulkier, and heavier antenna. Mission planning software will be demonstrated to enable the antennas to be selected for maximum data throughput at minimum weight and volume.
U.S. Special Operations Command is the operational sponsor.

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Active Network Intrusion Defense (ANID)

ANID will demonstrate a capability to respond in real time to network intrusions by making changes to network devices like routers, firewalls, intrusion sensors, etc. For example, ANID will automatically disable routes used by a hacker. This ACTD will use a highly distributed architecture with intrusion detection capabilities installed at very low levels, and a collection of smart agents to correlate sensor information and distribute summary level alert information to neighboring nodes. Policy issues with the inherent capability to strike back will also be investigated.
U.S. Space Command is the operational sponsor.

Area Cruise Missile Defense (ACMD)

ACMD is integrating sensors and forces in the Continental U.S., through North American Air Defense Command channels, for homeland area cruise missile defense. It is examining technologies, systems, manpower, and deployment concepts to provide surge response to cruise missile attacks. Localized command and control will be demonstrated through a mobile tactical interface shelter. This ACTD involves active duty forces, reserve forces, the National Guard, and civilian agencies.
U.S. Joint Forces Command is the operational sponsor

Adaptive Battlespace Awareness (ABA)

ABA will demonstrate the potential of the Global Command and Control System (GCCS) Common Operating Picture (COP) to provide relevant information to support Commander-in-Chief (CINC), Joint Task Force (JTF), and Component -level situational awareness, decision-making, execution, and planning for future military operations. It will accomplish this by: (1) providing user customized templates and filters; (2) providing links to relevant amplifying information (such as targeting, intelligence products, status, etc.; (3) introducing new force-level track types; and, (4) facilitating information aggregation at the CINC and JTF levels.
U.S. European Command is the operational sponsor.

Advanced Tactical Laser (ATL)

ATL will integrate a moderate-power laser, uncooled optics, and existing fire-control systems onboard a V-22, H-53, C-130, or H-47 aircraft. This capability will focus on military or law enforcement operations in an urban or suburban environment. The precision of the laser mitigates potential collateral damage, while delivering a non-lethal or lethal force up to 15 kilometers away.
U.S. Special Operations Command is the operational sponsor.

Advanced Technology Ordnance Surveillance (ATOS)

ATOS will demonstrate a small hybrid integrated circuit chip incorporating the most recent industry advances in miniaturized electronics technology. The successful fielding of such a system will allow the user to remotely maintain an inventory, while an integrated sensor array will provide continuous tailored environmental information, such as temperature, humidity, pressure, etc. Finally, the user will be able to achieve real-time location, quantity, and condition knowledge of the ordnance stockpile.
U.S. European Command is the operational sponsor.

Coalition Combat Identification (CCID)

CCID will demonstrate and transition hardware and software providing situational awareness, 'blue force' tracking interoperability systems, target identification systems, modeling and simulation, joint training, requirements and architecture definition, CONOPS, doctrine and techniques, tactics and procedures for a new combat identification capability across joint, allied and coalition operations.
U.S. Joint Forces Command is the operational sponsor.

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Coalition Theater Logistics (CTL)

This ACTD integrates logistics information and combat support tools among coalition forces. It provides enhanced command and control of combat support for the Coalition Task Force through real-time coalition logistics information technologies and decision support tools. Technologies demonstrated will include secure coalition network and standard information tags, information collection, storage and transfer, intelligent data retrieval agents, and web-based collaboration technologies.
U.S. Pacific Command is the operational sponsor and Australia is the principal coalition partner.

Coastal Area Protection System (CAPS)

CAPS will demonstrate the feasibility of deploying technologies in the coastal/littoral areas for force protection. The system demonstrations will consist of technologies to support the surveillance , identification and exclusion of threats in the vicinity of ports and harbors. The goal of the ACTD is to provide a rapid capability to the US Navy, US Marine Corps, and US Army prepositioned ships, as well as a flyaway capability for contingency operations.
U.S. Central Command is the operational sponsor.

Hunter Standoff Killer Team (HSKT)

HSKT will integrate, demonstrate and transition for the Joint Task Force Commander:
(1) cognitive decision aiding (CDA) technologies into F/A 18s, AH-64D Longbows, Blackhawk A2C2S, UAVs, ground tactical operations centers, and surface ships; (2) seamless tactical command and control of airborne manned and unmanned sensors / shooters; and, (3) CONOPS and techniques, tactics and procedures.
U.S. Pacific Command is the operational sponsor.

Joint Area Clearance (JAC)

This ACTD will demonstrate de-mining and explosive ordnance disposal equipment for area clearance of airfields, fuel/ammunition distribution points, hospital sites, main supply routes, and other rear area activities. Additionally, it will demonstrate tools that enhance situational awareness of clearance progress.
U.S. Joint Forces Command is the operational sponsor.

Loitering Electronic Warfare Killer (LEWK)

LEWK will demonstrate a $40K Unmanned Combat Aerial Vehicle that weighs 650 pounds, carries a combined 200-pound lethal and non-lethal payload, and has eight hours endurance. The vehicle transforms from a general-purpose bomb into an aerobatic air vehicle by using unique inflatable airfoils, integrates demonstrated commercial and military technologies, and is commanded through data links and on-board sensors. The system can be air, ground, or sea launched. Recovery is via parachute.
U.S. European Command is the operational sponsor.

Network-Centric Collaborative Targeting (NCCT)

This ACTD networks operational intelligence, surveillance and reconnaissance (ISR) sensors (Rivet Joint, Guardrail, JSTARS, AWACS, Global Hawk, Predator, U2, EP3E, Nimrod, ASTOR) to significantly improve capability to detect, identify and locate time critical targets within their cycle times. These sensors have different, but complementary, and synergistic capabilities. Front-end networked collaborative processing of their data can greatly reduce location error and timelines.
U.S. Central Command is the operational sponsor.

Ref: ACTD Descriptions, www.acq.osd.mil/actd/descript.html, updated April 2003

Personnel Recovery Extraction Survivability/ Smart-Sensors (PRESS)

PRESS will demonstrate and transition: (1) real time, automated, precision evader location, tracking and re-supply devices and systems; (2) integration and improvement of extraction platform survivability technologies and options including infrared (IR) countermeasures, cognitive decision aides, wire/obstacle avoidance, millimeter wave imaging and unmanned aerial vehicles (UAV) platforms; (3) integrated, semi-automated, real-time situational awareness and mission management through exploitation of smart sensor web technologies, UAV sensors and mission management software; and, (4) CONOPS and techniques, tactics and procedures.
U.S. Joint Forces Command is the operational sponsor.

Tactical Missile System - Penetrator (TACMS-P)

TACMS-P will demonstrate integration of the Army Tactical Missile System (ATACMS) booster with a Navy reentry vehicle to provide a high-availability, all-weather, survivable and short response time means to destroy hard and deeply buried targets within the Korean theater. The TACM-P ACTD has been endorsed by three Commanders in Chief (CINCs) to solve urgent needs within their theaters.
U.S. Pacific Command is the operational sponsor.

Theater Integrated Planning System (TIPS)

TIPS will automate and electronically network the current manual processes required to produce decision documents to assist in weapons of mass destruction (WMD) targeting for the theater CINCs. The ACTD will include specialized conventional strike planning. Expected benefits include improved crisis planning, CINC interoperability, reduced turnaround time for target planning, and reduced manpower of the currently labor-intensive process.
U.S. Strategic Command is the operational sponsor.

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FY2002

Active Denial System (ADS)
ADS will demonstrate long-range, anti-personnel non-lethal force options to commanders using a powerful millimeter wave transmitter on stationary and mobile platforms to heat the skin and cause pain in threat personnel.
U.S. Joint Forces Command is the proposed operational sponsor.

Advanced Notices
This ACTD will demonstrate tools and techniques for the destruction of certain weapons of mass destruction production facilities. The military utility of the developed materials and concepts of operation will be evaluated.
U.S. Special Operations Command is the operational sponsors.

Agile Transportation (AT)
AT 2000 will demonstrate total visibility of all transportation requirements, available lift assets, personnel and equipment moving to and within the various theaters of operation. Advanced scheduling decision support tools will be used for mode determination and optimization of strategic lift assets resulting in reduced force closure times, smaller theater logistics footprint and approximately $40M annual cost avoidance.
U.S. Transportation Command is the operational sponsor.

Coalition Information Assurance Common Operating Picture (CIA COP)
CIA COP will demonstrate a detailed information assurance and situational awareness picture of the information system security status of all mission critical systems on a near- or real-time basis in support of CINC and coalition missions.
U.S. European Command is the proposed operational sponsor.

Contamination Avoidance at Seaports of Debarkation (CASPOD)
CASPOD will demonstrate contamination avoidance at seaports of debarkation proposal provides a flyaway package that fills the gap in chemical and biological defense capability that exists at seaports of debarkation.
U.S. Central Command is the operational sponsor.

Expendable UAV (EUAV)
EUAV will demonstrate covert delivery of off-board sensors, tactical surveillance, battle damage assessment and weapons of mass destruction monitoring without risking personnel. The Expendable UAV provides this capability with a low cost autonomous air vehicle operated either powered or as a glider for covert delivery.
U.S. Special Operations Command is the operational sponsor.

Homeland Security Command and Control (HLSC2)
HLSC2 will demonstrate a homeland defense decision support center for knowledge capture and knowledge management using high-powered computing and visualization capabilities for emergency response.
U.S. Joint Force Command is the operational sponsor.

Hyperspectral Collection and Analysis System (HYCAS)
HYCAS will demonstrate sensors integrated onto operational platforms and integration into the existing tasking, processing, exploitation and dissemination (TPED) architectures to support an intelligence capability to support counter-concealment, camouflage, and deception.

Ref: ACTD Descriptions, www.acq.osd.mil/actd/descript.html, updated April 2003

Joint Explosive Ordinance Disposal (JEOD)
JEOD will demonstrate a new integrated capability for joint and coalition EOD forces for unexploded ordnance and improvised explosive ordnance.
U.S. Pacific Command is the operational sponsor.

Language and Speech Exploitation Resources (LASER)
LASER will demonstrate automation of translation of spoken or written foreign languages. This capability will quickly translate captured documents, debrief witnesses support communication in coalition operations.
U.S. Pacific Command is the operational sponsor.

Micro Air Vehicle (MAV)
MAV will provide small, ground combat units with situational awareness of enemy activity using a low-cost, disposable, fully autonomous 6-9 inch unmanned aerial vehicle as an organic asset at the platoon level.
U.S. Pacific Command is the operational sponsor.

Pathfinder
Pathfinder will improve urban reconnaissance by integrating capabilities of unattended ground vehicles, air vehicles and smart sensors in a mobile, self-forming network. The integrated system provides enhanced command, control and communications and situational awareness.
U.S. Special Operations Command is the operational sponsor.

Signal Intelligence (SIGINT) Processing (SIP)
This ACTD will provide a SIGINT processing mode, which is not currently exploited. This capability will be coupled with concepts of operation to determine its military utility.
U.S. Pacific Command is the operational sponsor.

Thermobarics (TB)
TB will demonstrate an energetic, thermobaric penetrator payload to defeat enemy tunnel facilities and weapons with 2-3 times the lethality of conventional high explosive payloads.
U.S. Pacific Command is the operational sponsor.

Space-Based Moving Target Indicator (SBMTI)
This ACTD will demonstrate the military utility of SBMTI capabilities.

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LIST OF ACRONYMS

A	
AC2ISRC	Aerospace Command and Control, Intelligence, Surveillance, and Reconnaissance Center
ACAT	Acquisition Category
ACTD	Advanced Concept Technology Demonstration
ASD (C3I)	Assistant Secretary of Defense (Command, Control, Communications, and Intelligence)
ATD	Advanced Technology Demonstration
AWRCP	Army Watercraft Restructuring Concept Plan
ARGUS	Advanced Remote Ground Unattended Sensor
ADU	Air Deployable Unit
AC2ISRC	Aerospace Command and Control, Intelligence, Surveillance, and Reconnaissance Center
AFROC	Air Force Requirements Oversight Council
ACC/DR	Air Combat Command / Director of Requirements
B	
BMDO	Ballistic Missile Defense Organization
C	
C3I	Command, Control, Communications and Intelligence
C4I	Command, Control, Communications, Computers and Intelligence
CAIV	Cost As an Independent Variable
CENTCOM	Central Command
CF	Causeway Ferry
CINC	Commander-in-Chief
CMO	Central MASINT Office
COI	Critical Operational Issues
CONOPS	Concept of Operations
CONUS	Continental United States
C-MNS	Combat Mission Need Statement
COE	Common Operating Environment
D	
DAB	Defense Acquisition Board
DARPA	Defense Advanced Research Project Agency
DASD	Deputy Assistant Secretary of Defense
DDR&E	Director, Defense Research & Engineering
DEPSECDEF	Deputy Secretary of Defense
DERF	Defense Emergency Relief Funding
DIA	Defense Intelligence Agency

DoD	Department of Defense
DoDD	Department of Defense Directive
DoDI	Department of Defense Instruction
DOT&E	Director of Operational Test and Evaluation
DRB	Defense Resources Board
DSMC	Defense Systems Management College
DTC	Design to Costs
DUSD(AT)	Deputy Under Secretary of Defense (Advanced Technology)
DUSD(A&T)	Deputy Under Secretary of Defense (Acquisition & Technology)
DUSD(AS&C)	Deputy Under Secretary of Defense (Advanced Systems & Concepts)
DUSD (S&T)	Deputy Under Secretary of Defense (Science & Technology)
DII	Defense Information Infrastructure
E	
EDRB	Enhanced Defense Resources Board
EMD	Engineering, Manufacturing and Development
ESC	Electronic Systems Center
EUCOM	European Command
F	
FC	Floating Causeway
FRP	Full-Rate Production
FY	Fiscal Year
FYDP	Future Years Defense Program
FOC	Full Operational Capability
G	
GAO	General Accounting Office
GDU	Ground Deployable Unit
H	
I	
IOT&E	Initial Operational Test and Evaluation
IOC	Initial Operational Capability
IPT	Integrated Product Team
ILS	Integrated Logistics Support
J	
JLOTS	Joint Logistics Over The Shore
JMLS	Joint Modular Lighter System
JROC	Joint Requirements Oversight Council
JTA	Joint Technical Architecture
JWCA	Joint Warfighting Capability Assessment

K	
KPP	Key Performance Parameter
L	
LCC	Life Cycle Cost
LEO	Low Earth Orbit
LFT&E	Live Fire Test and Evaluation
LMSR	Large, Medium Speed Roll-on/Roll-off
LO/LO	Lift-on/Lift-off
LOTS	Logistics Over The Shore
LRIP	Low-Rate Initial Production
M	
MAIS	Major Automated Information System
MASINT	Measurement and Signatures Intelligence
MCS	Modular Causeway System
MDA	Milestone Decision Authority
MDAP	Major Defense Acquisition Programs
MNS	Mission Need Statement
MoE	Measures of Effectiveness
MoP	Measures of Performance
MPF	Maritime Pre-positioned Force
MS	Milestone
MUA	Military Utility Assessment
MOS	Measure of Stability
N	
NAVFAC	Naval Facilities Engineering Command
NL	Navy Lighterage
NRT	Near-Real-Time
NVL	Night Vision Laboratory's
O	
OA	Operational Assessment
O&S	Operation and Sustainment
OPEVAL	Operational Evaluation
OPFOR	Operational Forces
ORD	Operational Requirements Document
OSD	Office of the Secretary of Defense
OT&E	Operational Test and Evaluation
OIPT	Overarching Integrated Product Team
OM	Operational Manager
OIG	Office of the Inspector General
OTA	Operational Test Agency
OS21	Observing System for the 21st Century

P	
P3I	Pre Planned Product Improvement
PACOM	Pacific Command
P&D	Production & Deployment
PE	Program Element
PEO	Program Executive Officers
PM	Program Manager
POM	Program Objective Memorandum
PPBS	Planning, Program and Budgeting System
PR03	Procurement Request FY03
PSI	Personal Security Investigations
Q	
R	
RDT&E	Research, Development, Test & Evaluation
RF	Radio Frequency
RFP	Request for Proposal
RO/RO	Roll-on/Roll-off
RRDF	Roll-on/Roll-off Discharge Facility
RMWS	Remote Miniature Weather Station
S	
S&T	Science and Technology
SAM	Surface-to-Air Missile
SATCOM	Satellite Communications
SD&D	System Development & Demonstration
SECDEF	Secretary of Defense
SF	Special Forces
SOST	Special Operations Special Technology
SOUTHCOM	Southern Command
SS3	Sea State 3
SAF/AQI	Secretary of the Air Force / Acquisition Information
T	
T-ACS	Transport-Auxiliary Crane Ships
T&D	Test and Demonstration
T&E	Test and Evaluation
TCO	Tactical Combat Operations
TCT	Time Critical Target
TEL	Transporter, Erector, and Launch
TEMP	Test and Evaluation Master Plan
TIPT	Transition Integrated Product Team

TRL	Technology Readiness Level
TST	Time Sensitive Target
TMD	Theater Missile Defense
U	
UAV	Unmanned Aerial Vehicle
UGS	Unattended Ground Sensors
UHMW	Ultra-High Molecular Weight
USD [A&T]	Under Secretary of Defense for Acquisition and Technology
USD (AT&L)	Under Secretary of Defense (Acquisition, Technology, and Logistics)
USJFCOM	US Joint Forces Command
USCENTCOM	US Central Command
USSOCOM	US Special Operations Command
UMS	Unattended MASINT Sensor
V	
VDC	Volts Direct Current
W	
WT	Warping Tug
X	
Y	
Z	

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