

The Joint CAD/PAD Program

Transition to Joint Program Building Trust, Achieving Economies of Scale

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In a previous edition of this publication (May-June 1999), the authors described a unique management experiment—a Joint Program to manage the sustainment of Cartridge Actuated Devices (CADs) and Propellant Actuated Devices (PADs). The purpose of this article is to answer the question, “How has the Joint Program worked out since stand-up in April 1998?”

In the four years since stand-up, the Joint CAD/PAD Program has moved steadily toward merging Air Force and Navy/Marine Corps management practices.



Composite photo of Next Generation Ejection Seat sled test demonstrating controllable propulsion. Photo by Craig Wheeler

What are CADs/PADs?

Cartridge Actuated Devices (CADs) and Propellant Actuated Devices (PADs) are commodity items that function as a system component. In operation, they release precise explosive or propellant energy to perform controlled work

functions in a variety of applications, including aircrew escape, fire suppression, and stores/emergency release systems.

They generally contain an energetic material along with a mechanical or electronic actuating component. About

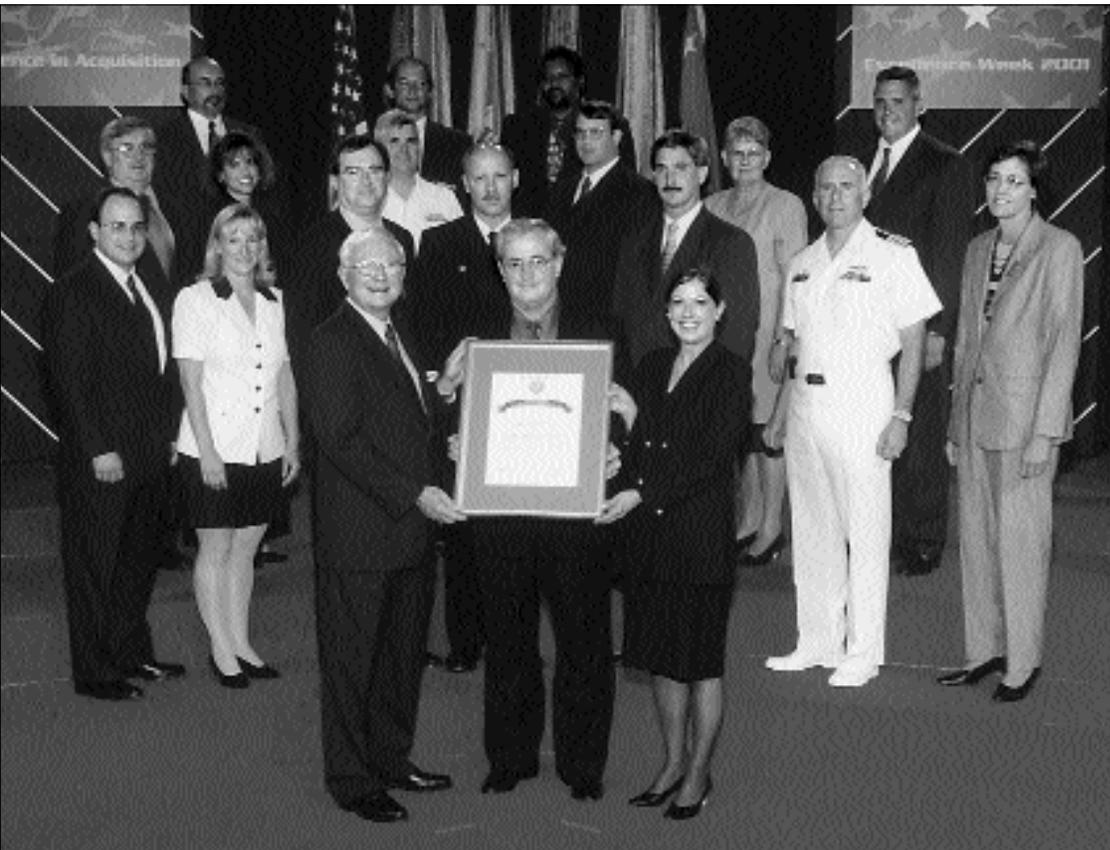
3,100 different configurations are now in use by all Services. Many of these are man-rated, requiring a high degree of reliability.

Some CADs and PADs are expended in normal operations, such as those used for stores release; others are used only

Chappell is the Director of the Cartridge Actuated Device/Propellant Actuated Device (CAD/PAD) Joint Program Office located at Indian Head Division, Naval Sea Systems Command. Graduating from Michigan State University as a chemical engineer, he has worked at Indian Head his entire career and has been involved with all aspects of the CAD/PAD Program since 1973. Taylor is consultant to the Joint Program. He is a retired Air Force Reserve colonel and former director of the U.S. House Science and Technology Subcommittee on Transportation, Aviation and Materials.

Navy CAD/PAD Program Team Receives Packard Award, Sept. 10, 2001. The Navy's CAD/PAD (Cartridge Actuated Devices/Propellant Actuated Devices) Supply Reengineering Team reinvented the process for ordering and receiving aircraft emergency system explosives (Hazard Class 1.3 and 1.4) at U.S. Navy and Marine Corps activities worldwide. Using the Business Process Reengineering and Systems Thinking methodologies, the team created a process that uses existing aircraft maintenance and technical data to automate requisitioning, enabling telephone, e-mail or fax orders, while eliminating burdensome paper transactions. The team also instituted bundling, transitioned to small package carriers, streamlined redundant receipt inspections, and incorporated other support processes (e.g., deficiency report tracking) to reduce Fleet workload. The reengineered process averages less than eight days' cycle time within the continental United States (reduced from up to four months), while avoiding over 45 unnecessary work years annually required under the historic process.

Photo by Richard Mattox



201), which reports to the Program Executive Officer for Tactical Aircraft Programs. Execution of the Navy's sustainment program is accomplished by the Indian Head Division, Naval Surface Warfare Center. The size of the Navy program is about \$40 million annually.

Air Force

Responsibility for sustainment of Air Force CADs and PADs was formerly delegated to a unit under the Air-to-Surface Product Group Manager (PGM) at the Ogden Air Logistics Center (ALC), who reports programmatic to the Armament Product Group Manager (APGM) at Eglin Air Force Base, Fla. The size of the Air Force program is about \$45 million annually.

Army

Responsibility for Army CAD/PAD has been consolidated within the Navy for many years.

Building the Trust

The program was born when visionary managers in the Air Force and Navy saw the greater value of consolidating their previously separate activities and began building the trust needed to overcome the risks of doing business in a new way. The key organizing principles of the joint program are:

in emergencies. All have a defined shelf/service life and must be replaced periodically. CADs and PADs that are needed for safety of flight can cause the grounding of aircraft if they are defective or past their defined shelf/service life.

Life Cycle Management Responsibilities

CADs and PADs are normally developed as a component of a weapon or life support system. Responsibility for initial development rests with the acquisition program manager. For example, the 112 CADs and PADs in the B-2 and the 222

CADs and PADs in the F-14 were developed along with other systems in the aircraft. In keeping with the cradle-to-grave concept, when a system is fielded overall responsibility for sustainment activities, including disposal when necessary, remains with the program manager. However, day-to-day responsibility for sustainment of CADs and PADs has been delegated within each Service to achieve economies of scale.

Navy

For CADs and PADs in Navy systems, the delegation is to the Conventional Strike Weapons Program Office (PMA-

- operation as a joint integrated product team/competency aligned organization with the Service affiliation of team members transparent to users;
- assumption of responsibility by the Navy, as lead Service, for an important factor (the escape system) in the operational readiness of aircraft in all Services;
- employment of jointness in the sustainment phase of the life cycle, rather than the more traditional development phase;
- use of best practices and continuous improvement in consolidating sus-

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On April 16, 1998, Dennis P. Chappell became the Director, Cartridge Actuated Device/Propellant Actuated Device (CAD/PAD) Joint Program Office. The CAD/PAD Joint Program Office is a \$140 million-per-year full life cycle commodity program providing energetic devices and support services to the Navy, Marine Corps, Air Force, Army, other DoD agencies, NASA, and over 70 foreign countries. These devices are used in Aircrew Escape Systems, Weapon Systems, Bomb and countermeasure ejector systems, emergency egress systems, and other systems requiring high-energy density in a small volume.

Chappell's career in Energetics began in 1964 as a project engineer in the Cast Products Production area working on propulsion components for the Polaris Missile System. He was then assigned as a Project Manager for the design and installation of a new propellant manufacturing capability at Indian Head. He followed this with assignments designing and qualifying a new Chaff

tainment activities while remaining responsive to customer needs;

- management of a commodity, rather than a weapon system; and
- creation as an initiative from the working level, rather than a directive from the top.

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Packard Award

In September 2001, the Joint Program received the David Packard Excellence

launching rocket motor system and evaluating performance of the Navy's Surface Missile Systems. In 1973, he was assigned as one of the original three team members to consolidate the Navy's CAD/PAD program at Indian Head. This grew into the current Joint Service Program of over \$140 million per year and 350 direct work years. Chappell held numerous leadership roles in the growth of the CAD/PAD program, serving as Engineering Director and Program Manager, culminating in his current position as Director of the Joint Program Office.

Chappell's awards include commendations for serving on five Source Selection Evaluation Boards for major weapons systems. Recent individual and team awards include: David Packard Award for Acquisition Excellence, Assistant Secretary of the Navy Award for Supply Support Reengineering, Commander Naval Sea Systems Command (NAVSEA) Excellence Award for Reengineering, Indian Head Award for Quality Achievement, and the Navy Meritorious Civilian Service Award. He has been published in *Program Manager Magazine*, *Naval Forces Magazine*, and *National Defense Magazine*.

Chappell graduated from Michigan State University with a Bachelor of Science Degree in Chemical Engineering.

in Acquisition Award, given for great innovation and results in acquisition and logistics reform. The Award recognizes the Program's reengineering of the process for re-supplying CADs and PADs to Navy/Marine Corps users in the field. The old process was both labor- and paper-intensive, requiring up to four months from order to delivery. Making matters worse, requisitions often simply got lost in the supply system. CADs and PADs were perceived as hard to get and squadrons stockpiled the items as a hedge, leading to shortages elsewhere.

The reengineering team developed a 1-877 phone system that maintenance personnel use to order directly from the

stock point at Indian Head, Md.—a common practice in the commercial world. The telephone operator is able to validate need in real time using computerized maintenance records, and automatically create the supply requisitions. Shipments are accomplished, in most cases, by overnight commercial carrier, allowing automated tracking. Actions by intermediate personnel have been greatly reduced and the average cycle time is down to eight days. The team has since Web-enabled the process, eliminating the need for the phone call and making customer service available 24/7. The new system is under consideration for application in the Air Force.

Consolidation Gains

Minimizing duplication, optimizing joint resources, and applying the best practices of each Service have all resulted in numerous savings, estimated by the Program Management Office at \$825K per year. Included in this figure are the savings from combined procurements of items that are common to two or more Services, reducing the number of contract actions required and invoking economies of scale. Adoption of a Navy computer system for materiel planning will lead to more precise requirements determination and budget justification for Air Force needs.

Under this system, the Navy has been able to defend successfully its annual request for procurement funds by predicting very accurately the readiness impact on specific aircraft of any reductions. The transfer of several former Air Force civilian personnel to the Navy has helped preserve the technical and management capability to serve Air Force users. This has resulted in savings because Navy personnel in the Joint Program are industrially funded, with money for salaries included in the item unit price. Air Force personnel levels are subject to direct appropriations.

Virtual Fleet Support

Another innovation currently being deployed, initially for Navy/Marine Corps needs, is a Web-based Virtual Fleet Support (VFS) system. The idea is to use commercial, off-the-shelf

technology to allow input and updating of core technical, engineering, acquisition, and logistics/supply data directly from the source. Wherever possible, embedded programming will automate business processes, electronically completing tasks previously performed by sailors, Marines, and other support personnel.

VFS will change the way the Joint Program interacts with Fleet users by automating business practices, eliminating paperwork, providing access to a corporate real-time CAD/PAD database, and reducing Fleet workload. The previous focus was collecting data for use by the Program Office and its chain of command. VFS will concentrate on managing corporate data for the primary user, the Fleet. Each point of origin will be able to input directly to the central system. Validation and security routines will be built in to avoid corruption. The Internet will be the means to make the data a corporate resource.

The system will ultimately consist of 17 modules. One of these facilitates the service life extension process. As noted, installed CADs and PADs are life-limited, requiring the Fleet to ground aircraft for maintenance when the life expires. The Fleet may request a waiver to the service life for reasons of operational tempo, deployments, or parts shortages. This happens about 400 times each year. The old process was paper-intensive, involving numerous steps, both in the field and at Indian Head where the waiver requests are reviewed and approved. The elapsed time was typically 10 working days.

VFS allows a requester to log onto the CAD/PAD Web site and select data for the item requiring a waiver. If the request falls within pre-established criteria, the waiver will be generated and entered into the aircraft logbook—all automatically in less than a minute. If the request falls outside the criteria, VFS will prepare an e-mail to the engineering group at Indian Head requesting an evaluation. Upon completion of the evaluation, an engineer responds via the Web. The requester is e-mailed auto-

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matically and can check back at any time to determine the status of the request.

Another module allows Web-based tracking of installed CADs and PADs to support Web ordering, procurement, and maintenance planning. Previously such data was compiled at over 780 Navy maintenance activities and forwarded monthly via diskette, a burdensome process with centralized information that was always out of date. The new system produces accurate and timely tracking data with substantially reduced workload on maintenance personnel.

Reverse Auction

In 2000 the Joint Program sponsored the first ever DoD online reverse auction. Pre-qualified suppliers competed in real-time via the Web for a contract to produce 756 replacement Electronic Recovery Sequencers for the escape systems in B-1 bombers and F-15, F-16,

and F-117 fighters. A private company, Freemarkets.com, conducted the auction. Under the rules, bidders were able to view the progress of bidding but did not know the names of the other bidders, a bid had to be lower than the previous bid by at least \$500, and there was a time limit of 30 minutes for the entire process. The result of the auction was a 28 percent (\$933K) savings from the Program Management Office's estimated cost.

Future Plans

The business plan that launched the Joint Program calls for a “walk before run” approach so that the transition to joint operation will occur as the Services build trust and can assure that change will be transparent to the users. Continuing in this vein, the Joint Program is currently working on consolidating the Air Force and Navy/Marine Corps programs for Foreign Military Sales of CADs and PADs. Further in the future may be joint programming and budgeting, and joint stock and inventory control.

A recent thrust is the application of “lean manufacturing” principles to the production of CADs and PADs. The Joint Program Office began a joint venture with the University of Maryland to improve efficiency and reduce costs. The results will be applied first to government production activities, which amount to about 10 percent of the total, and later may be extended to the industrial base.

Another venture with Maryland will employ its Computer Aided Virtual Environment (CAVE) to simulate possible designs for a planned automated warehouse and to assist in “hands-on” training of personnel, especially for infrequently performed tasks where the corporate memory may have been lost.

Editor's Note: The authors welcome questions or comments on this article. Contact Chappell at ChappellDP@ih.navy.mil.