Building Better Airdrop Equipment

The Army's Low Cost Aerial Delivery System Low Cost Container

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The December 2004 tsunami disaster in Southeast Asia brought about a need for humanitarian relief efforts on an unprecedented scale. The new Low Cost Container (LCC), part of the Low Cost Aerial Delivery System, had recently become available for use in just such contingencies. The LCADS program is designed to provide one-time-use aerial delivery components for use in humanitarian and re-supply missions and to address the need for low-cost airdrop capabilities. The requirements document for the LCC was the result of the lessons learned from U.S. relief efforts during the previous decade.

The new low-velocity parachute, the third component of the Army's Low Cost Aerial Delivery System, is to be developed and manufactured by a disabled veteran-owned business.

Learning the Lesson of Learning Lessons

In 1993, during Operation Provide Promise (in which U.S. forces helped keep a multinational lifeline of food and medical supplies flowing into Bosnia throughout nearly four years of war) over $31 million of standard airdrop equipment was used and never recovered, signaling a need for a low-cost alternative. Since predicting the scope of a humanitarian aid crisis is impossible, stocks of container delivery system (CDS) components used in the relief efforts were greatly depleted. While Operation Provide Promise was ongoing, engineers and technicians at the U.S. Army Research Development and Engineering Command (RDECOM), Natick. Mass., began the analysis and development of several low-cost airdrop components and specialized procedures. The goal was to avoid the complete depletion of all airdrop war reserve stocks of high velocity CDS systems and to reduce operation and support costs. Several alternative materials were used in the redesigns, reducing both the price and the rigging time for both components. At the time, the cost of these standard systems was about $1,100 each, which included the parachute, container, packaging material, and skidboard. Preliminary testing of these lower-cost components showed promising results. While significant progress was made in developing, acquiring, and—to a degree—implementing various low-cost airdrop capabilities and specialized rigging procedures, once Operation Provide Promise ended, the changes were shelved without testing.

Following the Operation Provide Promise experience, Training & Doctrine Command (TRADOC)'s Combined Arms Support Command took the initiative and developed an operational requirement for low cost airdrop capabilities, which was validated by TRADOC. However, it remained unfunded as a result of concern among Department of the Army staff that the effort didn't support an Army mission; thus, it should not be an Army requirement nor be supported with Army research, development, test, and evaluation funding.

During Operation Enduring Freedom in Afghanistan in October 2001, there was another great increase in demand for CDS in order to supply Special Forces and Ranger units, as well as to provide humanitarian relief. CDS bundles, which use standard Army A-22 cargo containers for

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U.S. Army photographs.

both high- and low-velocity aerial delivery, were dropped at a rate of 220 to 360 per day during this operation. The nature of the airdrop missions meant the equipment was non-recoverable, resulting in an estimated cost of $25 million and once again depleting Army war reserve stocks of CDS equipment to critical levels.

The Army lost valuable information and time by its failure to support or pursue low-cost CDS alternatives during both of these efforts. By the establishment and funding of the LCADS program, it initiated the development and fielding of low-cost airdrop capabilities. These capabilities provide a substantial return on investment, rather than continuing to allow humanitarian relief airdrop missions to incur significant costs and to deplete Army war reserve stocks.

The Challenge: Same Performance, Lower Costs

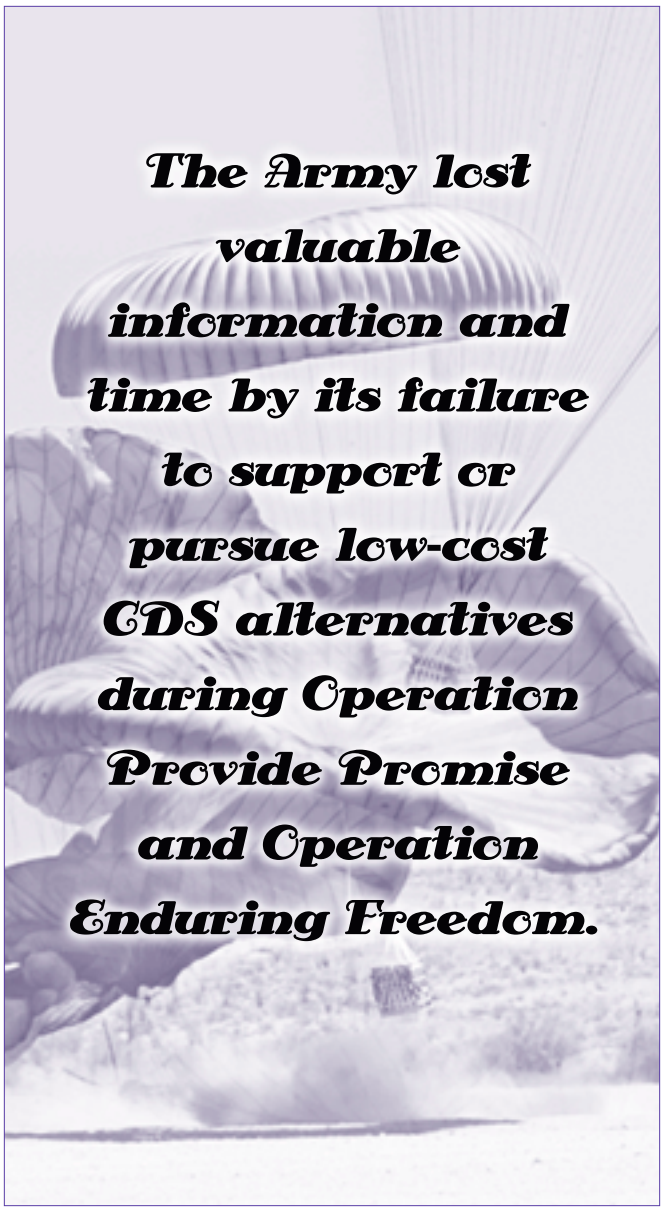
The most important requirement of the 2002 operational requirements document was for LCADS components to reduce costs by 55 percent (threshold) to 80 percent or more (objective) over current CDS components. The system would have the same performance as CDS: 500 pounds to 2,200 pounds in capacity, capable of being deployed from U.S. Air Force cargo aircraft at release altitudes of 500 to 1,250 feet above ground level for low-velocity airdrop and 15,000 to 25,000 feet mean sea level for high-velocity airdrop with identical load accuracy and survivability. The items developed under LCADS would be interchangeable with the standard CDS component that each was designed to replace so that a standard parachute could be used with LCADS containers and vice versa.

Product Manager Force Sustainment Systems Cargo Airdrop Team, located at the U.S. Army RDECOM in Natick, was assigned the program and initiated it. At once, the LCADS team's attention turned to the light, easy-to-rig container developed by the Natick team at the time of the operation in Bosnia. Like the A-22 cargo container, it could be used for both high- and low-velocity CDS airdrops. Unlike the A-22 cargo container, however, which uses metal hardware and multiple straps of nylon webbing to contain a CDS load, the Natick container used inexpensive fabrics and a simpler design. The container didn't have the durability of the A-22, which can be repaired and re-used as many as 30 times, but this was ideal for its intended purpose. It promised to be a perfect one-time-use alternative.

A sources sought notice was posted to identify domestic products, suppliers, manufacturers, and technical information to develop a low-cost airdrop system. The notice stated the need for a modular suite of airdrop items, composed of parachutes, containers, and other air items configured for low-velocity, high-velocity, and free-drop aerial delivery. All components were to be simple in design, maintenance, and operation; have low production and life cycle costs; and be made of readily available, low-cost materials. They were to be easy to manufacture in order to minimize production lead times and broaden the industrial base. Product characteristics were to minimize or eliminate rigging time, allow for long shelf life, and have low weight and volume.

The Solution: Bring the Project In House

Responses to the sources sought notice were marginal. The most promising idea came from a company describing their concept for an airdrop container. It had been validated through half-scale and full-scale prototypes but at limited weights, speeds, and altitudes. As the Natick low-cost container was further along in the development process than industry's concept, the in-house approach to the LCADS container solution began.



A sole source contract to fabricate test quantities of the LCC built to Natick's drawing package was issued to a small local business that had done work for Natick in the past. Within a few weeks, the first LCCs were being delivered to Yuma Proving Ground, Ariz., and design validation testing began. After a few minor modifications, the program entered developmental testing to determine the reliability of the system. Once completed, operational testing began, with operational users from Fort Bragg, N.C., rigging the CDS loads. Over 300 LCCs were tested containing loads weighing between 500 and 2,200 pounds. Loads were released singly at the start of testing and then ramped up to full plane loads released in a single pass: 16 bundles from C-130 aircraft and 40 bundles from C-17 aircraft. Drops were conducted in both low-velocity environments with the standard G-12 chute and high-velocity environments with the standard 26-ft ringslot chute. The LCC performed without a single mission failure, resulting in a reliability of 0.9945.

At about $150, the LCC is roughly 60 percent less expensive than the current A-22 container, which the Army buys for about $350. The cost saving results from use of light polypropylene webbing rather than nylon webbing, and a simplified design that uses less material. Hardware has been reduced to a minimum, with only two friction adaptors and four D-rings. The container is so easy to rig that no training for soldiers is required.

The LCC is the first of three LCADS components to be developed. The second is a low-cost alternative to the 26-foot high-velocity ringslot chute. The low-cost chute is made from 3-foot-wide, woven polypropylene strips stitched in a crosshatch pattern to form 12 legs that give it the look of a giant spider. The chute has completed testing and will be available in late 2005.

First Award Under Service-disabled Vet Business Program

The LCADS low-velocity parachute, third component of the LCADS suite, will offer an alternative to the G-12 parachute. The photograph on page 59 shows a low-velocity chute prototype being tested at Yuma Proving Ground. For the contracting strategy, PM FSS worked with the Natick contracting division and leveraged a new small business program for firms owned and operated by service-disabled veterans. The program (known by the acronym SDVOSB), allows federal agencies to contract directly with an SDVOSB provided it is the only one with the required capabilities. Market research confirmed that BA-Tech, Ltd., of Fall River, Mass., was the only small business owned by a disabled veteran capable of developing and manufacturing test quantities of the low-velocity chute. Contracting directly with BA-Tech shortened contracting time by a minimum of three months, meaning warfighters would get the product faster, so Product Manager Force Sustainment Systems made its first award under the new service-disabled veteran program. Both the standard A-22 container and the LCC are used during testing of the two parachutes in order to establish interoperability.

The LCC, the first piece of LCADS equipment to be available to the field, is a source of great pride to the LCADS team. They feel that their program is unique, combining opportunities to save money for the U.S. taxpayers, assist the U.S. military, and provide aid to people in need. The team considers the opportunity to work on such a program a very great honor.

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