Soldiers prepare supplies for delivery via airdrop, a critical method of resupply in Afghanistan, where rugged terrain, harsh weather and a rudimentary road system pose sustainment challenges.

From left to right: Bundles of bottled water destined for Combat Outpost (COP) Herrera are released above Paktiya Province, in eastern Afghanistan. The loads drift to the ground where they are recovered by U.S. Army soldiers.
The environment in Afghanistan is replete with many challenges for Army logisticians. As they continue to sustain a force of nearly 70,000 soldiers operating from multiple—often remote—locations throughout the country, they also support President Obama’s directed surge of an additional 30,000 forces. A landlocked nation with limited road infrastructure, few airfields, rugged terrain and harsh weather conditions, Afghanistan is possibly the most difficult place in which to execute sustainment operations. As one means of overcoming these sustainment challenges, Army logisticians are using a method of resupply that, while not new, has undergone a renaissance of sorts in Afghanistan—aerial resupply.

**Short History of Airdrop**

Aerial resupply—the delivery of supplies via airdrop from fixed- or rotary-wing aircraft—has been part of the logisticians’ tool kit since World War II. During World War II, as in many subsequent conflicts, U.S. forces employed airdrops primarily as a means of emergency resupply. In the winter of 1943, part of Fifth U.S. Army was isolated in the Italian Alps. With ground convoys unable to reach these units, logisticians packed supplies into empty fuel tanks placed on the underbellies of A-36 bombers that released the supplies above the stranded units. During the Battle of the Bulge, 976 tons of supplies were air-dropped to troops in a period of five days.

With parallels to the environment in which our soldiers now operate in Afghanistan, during the Korean War, U.S. forces relied on aerial resupply to overcome infrastructure limitations. Difficult terrain, the lack of road or rail networks, and enemy activity limited the amount of sustain-
A U.S. Air Force loadmaster secures the ramp of a C-130 Hercules after dropping supplies to ground forces in Afghanistan in 2007.

The volume of supplies delivered by airdrop in Afghanistan exemplifies its growing importance to the sustainment effort. In 2008, the Army airdropped 1.2 million pounds of supplies; by 2009, this volume grew to 30 million pounds. In 2010, with an additional 30,000 U.S. forces alone entering the fray, logisticians expect to use airdrops to deliver even more supplies.

As one might imagine, the science of executing effective aerial resupply missions is far more exact than simply strapping a parachute to a bundle and pushing it out of a plane or helicopter. Army logisticians, working with their U.S. Air Force counterparts, consider many factors—such as the type of supplies being delivered, weight, location and terrain at the drop zone—before deciding which of three major aerial resupply methods to use: the joint precision airdrop system, low-cost airdrop system or low-cost low-altitude airdrop system.

**Joint Precision Airdrop System (JPADS)**

The most sophisticated aerial delivery system, the joint precision airdrop system, makes airdrops from 5,000 to 25,000 feet above ground level. U.S. Air Force C-130 and C-17 aircraft drop container-delivery-system (CDS) loads weighing from 500 to 2,200 pounds, with GPS devices then guiding the loads to their designated point of impact.

JPADS, which works well in many types of terrain, has its challenges in Afghanistan, says CWO Jimmy Taylor, command airdrop advisor, 1st Theater Sustainment Command. “We have such severe terrain here [in Afghanistan],” he said, “that when the guidance system loses contact with the satellite, [the bundle] can fly anywhere.” Since JPADS typically is used to reach extremely remote and isolated combat outposts, being off target by as little as 100 meters can send a bundle into a deep ravine, rendering it unrecoverable. An additional challenge comes with retrograde of the valuable GPS devices affixed to each bundle. If retrograding these devices efficiently and safely by ground convoy or helicopter were feasible, there would be little demand for JPADS capability. Thus logisticians currently are not using JPADS as extensively in Afghanistan as was expected, while work on an improved GPS guidance system continues.

**Low-Cost Airdrop System (LCADS)**

A less costly aerial delivery alternative is the low-cost airdrop system, which drops similar-size payloads as JPADS. Supplies are attached to one of two types of parachutes: a low-velocity type that descends 28 feet per second and is dropped at 1,000 to 3,000 feet above ground level, or a high-velocity type that descends two to three times faster and can be dropped from 3,000 to 25,000 feet above ground. The parachutes used in this system are...
made of polypropylene as opposed to traditional nylon, hence reducing the cost of each system by about $2,000. LCADS is becoming the workhorse in Afghanistan, with more than 8 million pounds of supplies dropped by this method alone in 2009.

Low-Cost Low-Altitude System (LCLA)
The low-cost low-altitude system currently is the least costly alternative and enables air-drops from fixed-wing aircraft and helicopters flying much closer to the ground—at altitudes between 150 and 300 feet above ground level. This makes the LCLA system very accurate and ideal for bringing supplies to small groups of soldiers in extremely remote parts of Afghanistan, according to CWO Taylor. An added LCLA advantage is that the parachute (costing approximately $128 per chute) is disposable, placing no retrograde burden on the unit receiving supplies. Currently, LCLA is designed to deliver payloads between 80 and 450 pounds, but the Army is working to double the payload size.

“During 13 months of sustaining combat operations in Afghanistan,” said COL Jeffrey Kelley, former commander of the 101st Sustainment Brigade, “we flew supplies every day, seven days a week, to small units located in very remote, hard-to-reach places. [With LCLA], in no time at all combat units had every class of supply they needed—food, water, fuel, ammunition. We also provided humanitarian aid to support the Afghan population.”

New Aerial Delivery Options
While improvement efforts continue with the JPADS, LCADS and LCLA systems, the Army also continues to push the envelope in developing aerial delivery technology that logisticians in Afghanistan can bring to bear in sustainment operations.

The Army G-4’s Logistics Innovation Agency (LIA) is at the forefront of testing one such technology: the free-drop delivery system (FDS). As the name implies, this system involves free-dropping (without a parachute) bundles of supplies from rotary-wing aircraft at low altitudes and air speeds. The key to FDS is in the system’s energy-absorbing characteristics, which prevent damage to the cargo. Having successfully tested FDS with small-arms ammunition, LIA is currently undergoing further testing with the 82nd Sustainment Brigade, the goal being delivery of this system to Army logisticians in Afghanistan quickly. “Having alternative methods to conduct aerial resupply operations,” said Nick Zello, the free-drop project manager at LIA, “is enormously important to logistics commanders and increases their ability to deliver what is needed.”

Another system under development is the high-altitude low-opening (HALO) container delivery system, which can be air-dropped from altitudes up to 17,500 feet using 500- to 10,000-pound CDS loads. With staged parachute deployments—high-velocity chutes for rapid descent followed by deployment of low-velocity chutes at programmed altitudes—HALO CDS potentially could provide the accuracy attendant with a high-velocity descent coupled with a lighter impact and less damage to supplies.

Aerial Delivery Training
The most essential component of any successful airdrop is rigging the loads and preparing the parachutes before any bundles exit an aircraft. That responsibility depends on the skills of our soldiers and airmen.

The responsibility for training the soldiers who serve as Army riggers in Afghanistan resides with the U.S. Army Quartermaster School’s Aerial Delivery and Field Services Department at Fort Lee, Va. Trainers at the “rigger school” rely on experience gained in Afghanistan to inform the current training program.

CWO Joe Jimenez, a parachute rigger trainer at Fort Lee, says, “We’ve taken all the lessons learned from the past years of aerial resupply in Afghanistan and other parts of the world and incorporated them into our training methods. Talented parachute riggers are crucial to these missions, and each parachute rigger soldier leaves this school prepared to meet the challenges any aerial resupply mission presents.” During the 12-week course, soldiers learn to rig loads, pack cargo parachutes for the loads, inspect and repair their aerial delivery equipment, and pack personnel parachutes. Any missed step or incorrect rigging could lead to damaged or destroyed equipment upon impact. “These guys are exceptional,” said CWO Jimenez. “When they finish training, there is nothing they can’t successfully pack, rig and drop.”

Continuing to Sustain the Warfighter
Clearly, aerial delivery technology has come a long way from the use of A-36 bomber fuel tanks to air-drop supplies during World War II. While still primarily a means for delivering relatively low volumes of supplies, aerial delivery remains a critical component in sustaining widely dispersed units operating in the demanding Afghan environment. With the ongoing deployment of an additional 30,000 troops to Afghanistan, Army logisticians fully expect aerial resupply to continue—and continue improving.

The use of current aerial delivery methods such as LCLA and the future incorporation of technology such as the free-drop system, when combined with well-trained soldiers and airmen, will ensure that our warfighters continue to get the right supplies at the right location on time.