

Serving the Warfighter  
and the Nation  
Defense Logistics Agency (DLA)

Strengthening Warfighter  
Readiness and Lethality  
DLA carries a heavy load

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# Serving the Warfighter and the Nation

## Defense Logistics Agency (DLA)

Defense Logistics Agency Public Affairs Office



Food and fuel like these being transferred during a replenishment at sea on the African coast are among items DLA buys to decrease customers' storage costs and support the local economy. Photo by Navy Petty Officer 1<sup>st</sup> Class Tyrell K. Morris.

**A**s the nation's combat logistics support agency, DLA manages the global supply chain—from raw materials to end user to disposition—for the Army, Navy, Air Force, Marine Corps, Coast Guard, ten combatant commands, other federal agencies, and partner and allied nations.

As a logistics integrator and acquisition and service provider:

- DLA acquires items from manufacturers and suppliers and provides them to DoD and other federal and regional customers, often with supplementary services such as warehousing, packaging, and transportation.

- DLA contracts for items that are provided directly by the manufacturer to DLA customers.
- DLA provided more than \$35 billion in goods and services in fiscal year 2017.

DLA's primary purpose is to meet the logistics requirements of the Armed Forces for food, clothing, fuel, repair parts, and other items. To accomplish these responsibilities, DLA has a staff of about 25,000 personnel divided into:

- Nine supply chains that contract for material across the supply classes of food, textiles, energy products, medical material and equipment, construction material, industrial hardware, personal demand items, major end items, and repair parts.

# DLA's worldwide network of distribution centers employs 2,397 battery-operated forklifts to send and receive over two thousand tons of goods every day.



- A worldwide distribution system.
- Logistics and staff planning support to DoD's geographic combatant commands.
- Operations that dispose of surplus or excess materiel from the Military Services.

Major responsibilities of DLA are to buy or contract, warehouse when needed, and distribute about 5 million distinct consumable, expendable, and repairable items. DLA contracts for high-volume, commercially available items such as food and medical supplies based on military service requirements, and delivers these items directly to the requesting customer. Repairable items, similar to repair parts, are eventually consumed, but may be repaired several times before they must be discarded.

Reporting to the DLA Director are six major subordinate commands (MSCs). Four of these are buying commands: DLA Aviation, DLA Land and Maritime, DLA Troop Support, and DLA Energy. These MSCs are directly responsible for meeting the Military Services' needs for spare parts, fuel, food, medical supplies, and other commodities. DLA Distribution provides storage and distribution services, while DLA Disposition Services provides "reverse logistics," disposing of surplus or excess materiel from the Military Services and DLA.

DLA serves three distinct classes of customers: **Deployed warfighters**—those operating forces deployed to an active theater of operations. DLA delivers supplies to various distribution points near or within the combat zone, such as Afghanistan and Iraq, as required. **Non-deployed warfighters and**

**U.S. military facilities** such as installations, depots and shipyards—those assigned to installations in the U.S. and around the world. DLA is the wholesale supplier to these operational customers, who in turn provide their own retail services—sale or distribution of individual items—to the final customer or user assigned to or transiting the base. DLA also supplies foreign military sales customers. **Other U.S. government agencies and allied and partner nations**, such as the Federal Emergency Management Agency, the Department of Homeland Security and the General Services Administration. DLA provides these and other customers with goods and services, including storage and distribution. DLA also supplies foreign military sales customers.

## Strengthening Warfighter Readiness and Lethality DLA carries a heavy load

Marc Sharp, NCMS

Where batteries are concerned, capacity equals time. Greater energy storage capacity translates into more operational time for the equipment that batteries power and less downtime related to charging or replacement. Developed in the 1970s, a lithium-ion battery is a type of rechargeable battery with a high-energy density, tiny memory effect, and low self-discharge. They are one of the most popular types of rechargeable batteries for portable electronics, and have become common in computers, cell phones, power tools, and tablets. Now, lithium-ion batteries are the preferred method of powering electric cars, backup power supplies, solar panels, and even wheelchairs.

The DLA took notice of lithium-ion battery technology's ubiquity and operational advantages, and for good reason. DLA's worldwide network of distribution centers employs 2,397 battery-operated



The lithium battery was installed easily and was immediately put to work on Day 1 at San Joaquin DDJC. Photo courtesy of Navitas.

forklifts to send and receive over two thousand tons of goods every day. In the Susquehanna, PA facility (DDSP), there is over ten million square feet of storage space, and forklifts travel over distances equivalent to the length of 30 football fields each day. The current fleet of forklifts is being powered by lead-acid batteries, a technology that has been around for more than 100 years. Each battery weighs over 2,200 pounds and requires eight hours of charging and eight hours of cooling before it can be used. With distribution centers spread across the globe, employing about 7,000 workers who manage and move \$105 billion in inventory, utilizing more agile and consistently powerful forklifts could be a huge advantage.

**Real world testing**

Operational forklifts are critical to operational readiness, but are the lithium-ion-battery-powered forklifts really the right solution for the job?

“The primary shortcomings of lead-acid batteries that we are trying to overcome include short battery lifecycles, huge battery inventories (for multi-shift operations), the size and expense of dedicated battery rooms, and the labor investment for battery exchanges and maintenance,” says Eugene Summers, a strategic planner in the DLA Distribution J5 Office of Future Plans.

Working through the CTMA Cooperative Agreement contract vehicle, DLA is partnering with Navitas Systems, an energy storage and power electronics company, using their Starlifter heavy-duty lithium forklift battery system.

The test program formally began in November 2016. At DDSP, six Crown 36-volt forklifts powered by lead-acid batteries are being tested against six Crown 36-volt

lithium-ion battery-powered forklifts in multi-shift operations. The DLA also recently began testing lithium-ion batteries in their distribution center in San Joaquin, CA (DDJC). In DDJC’s cold storage facility, five Hyster 48-volt lithium-ion battery-powered forklifts are going against five propane-powered forklifts in a multi-shift operations environment.

At DDJC, DLA would like to eliminate carbon monoxide emissions that can cause health and safety issues with the operators. Lithium-ion batteries will not only eliminate those emissions and meet California workplace standards, but will also reduce the noise produced from the propane-powered lifts. Elimination of propane will also increase operational time and reduce wear and tear on the forklifts, as they will no longer have to travel outside the warehouses to their refueling stations.

**Lithium-ion batteries will not only eliminate those emissions and meet California workplace standards, but will also reduce the noise produced from the propane-powered lifts.**

Benefits to using lithium-ion batteries include:

- Never having to remove the batteries from the forklift.
- Charging time of about one hour for eight hours of performance.
- Sealed battery packs, eliminating any odor and the hazardous task of refilling acid battery cells.
- Fewer batteries needed in inventory.

A Joint Test Protocol (JTP) was approved outlining data and metrics that were to be collected and aggregated. These metrics included information gathered from monitoring equipment, maintenance activities, battery exchanges, and driver surveys. The collected data has been documented and an operational profile of the batteries has been created.

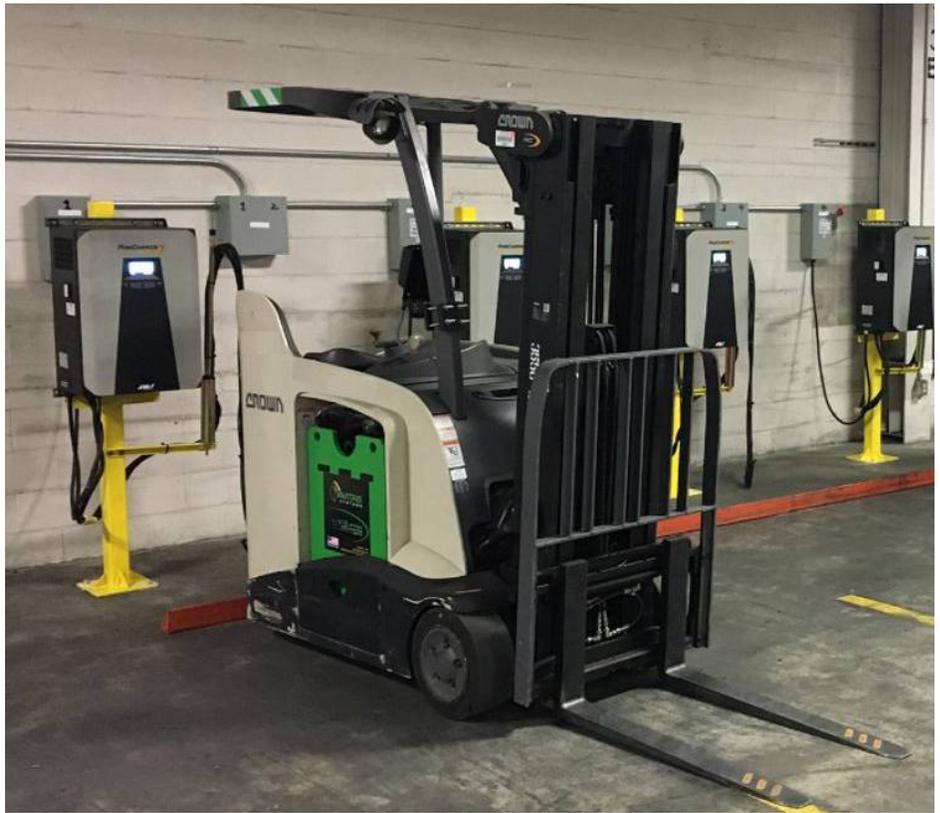
“Across both trials, we have data collection devices in place to record forklift usage times, state of charge over time, voltage, amp-hour usage, charging times, and energy consumption. Additionally, we are gathering qualitative assessments from forklift operators on their perceived performances and shortcomings of each energy solution over the course of the trials,” says Summers.

With a hint of fun, the DLA and Navitas Systems are calling the testing the Heavy Lifter Forklift Challenge. “During the testing, we are constantly fine-tuning the lithium battery systems to be more efficient. There is a lot on the line here,” says Mil Ovan, President and Chief Marketing Officer of Navitas Systems.

### The results are coming in

Since the testing is still underway, it is too early to draw conclusions. However, anecdotally, the operators seem to prefer operating the lithium-ion battery forklifts.

“We are seeing a consensus in operator feedback that eliminating the need for exchanging batteries both increases their operational availability and reduces a perceived safety risk in lead-acid



The lithium-powered forklift receiving a 15-minute charge during a driver break at Susquehanna DDSP. Photo courtesy of Navitas.

exchange. A limitation to our test is the location of the lithium opportunity chargers. If we were in full-scale implementation, we would locate them in common forklift parking areas and near break rooms. Those with a lithium charger currently installed near their work stations find the quick charging to be beneficial to their operations. Those that don't have an opportunity charger near the typical operations area don't like traveling out of their way for charging. This supports the understanding that wide-scale implementation of the lithium batteries would require detailed planning to install chargers at the most beneficial locations,” says Summers.

The testing and evaluations will finish this summer. Any change to the forklift program will likely happen incrementally after the completion and review of a full

performance analysis, business case analysis, and final report.

If lithium-ion batteries perform as advertised, the Services will want to consider adoption. For example, Ovan sees lithium-ion battery-powered forklifts as a perfect fit for Navy ships where propane forklifts vent exhaust in enclosed spaces.

The results that this CTMA project gets from the lithium-ion battery project with DLA could easily transition throughout the DoD, realizing tremendous benefits from lower costs, less maintenance, increased operational time, and a more productive workforce. 

For more information visit [www.navitassys.com](http://www.navitassys.com)

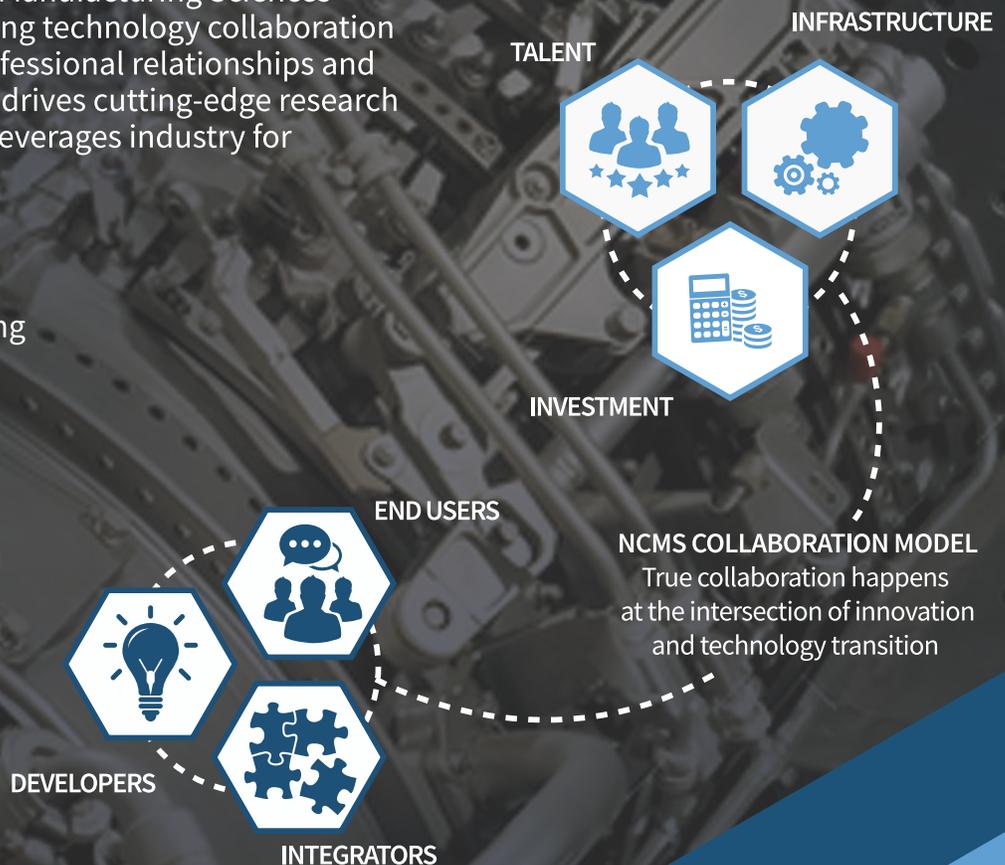
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