

Cargo Management in Palms of Sailors' Hands

By Gary Dulude

A case study from Trimble

During the first Gulf War in 1991, the U.S. military moved more than a million pieces of cargo. But without an effective way to plan and execute the loads, it typically took a team of five people as much as five days to create a loading plan for a military ship. Loading military ships is a complex process because it involves multiple decks and hundreds of pieces of cargo, much of which is hazardous material that requires special handling and storage. The military needed a faster, more efficient method for transportation planning, one that could also accommodate frequent cargo substitutions and other changes that are inevitable with large-scale shipping operations.

Another problem was documenting exactly what is loaded onto a ship and where it is located. The existing practice sent ship-loading personnel to walk around the ship, drawing boxes with 17-digit cargo codes onto a template of the deck layout to indicate where cargo was loaded. Other personnel then went through the ship completing a tally sheet with the number code and other information about each cargo item.

According to Boone Pendergrast, a customer support representative for CDM Technologies, "it is an extremely time-consuming and inadequate way to document a load plan, especially if someone wrote down the wrong code or if pages from the tally sheet were lost or unreadable."

Stages of Deployment

CDM Technologies developed the Integrated Computerized Deployment Systems (Icodes) in cooperation with California Polytechnic State University, San Luis Obispo. Two Cal Ploy architecture professors had developed an application for allocating space in a building design, such as how many offices could fit in a certain area. CDM Technologies recognized the technology could be used for ship loading because the principles of space planning are similar.

Improvements

A major function of the Icodes software is managing how hazardous materials like fuel, batteries and paint are loaded onto a ship. Depending on the type of material, storage regulations vary; some materials must be stored a minimum of 108 feet apart and have at least two bulkheads between them. Icodes automatically factors in those regulations and makes the appropriate calculations for loading planners.

To solve the problem of documenting the load plan, CDM Technologies loaded its Icodes software onto handheld computers. In addition to Icodes, the handhelds are loaded with data on the storage area and the cargo list. They are also equipped with bar code scanner to capture data for every piece of cargo.



The handheld Icodes device helps to track a ship's inventory as it is brought aboard.

The SDDC estimates the load-planning software and handheld computers save between 300 and 600 percent on the personnel needed to document a load. Previously, it took five people five days to plan a load. Now, one skilled user can complete a stowage plan in half a day. The system also helps catch and correct errors immediately. The handhelds are equipped with wireless cards that allow them to connect to a computer monitoring the load. As storage data is captured by reading the bar codes, the system checks the cargo and its location. If, for example, two hazardous items are put too close together, the loads are flagged by the system. That way, the items can be moved before any more cargo is loaded. Without the handhelds, Pendergrast said loading errors might not be caught until two or three hours later, meaning 30 to 50 other pieces of cargo might have to be moved to correct the error.

Unique Qualities

Icodes is a knowledge-based ship stow-planning software application. It incorporates artificial intelligence to help military loading specialists develop cargo stow plans. Icodes uses computer-based expert agents with knowledge in specific domains such as cargo placement, hazardous materials, trim and stability and accessibility. ICODES does not automate the stow-planning process, but its expert agents help the human users by evaluating and proposing loading recommendations and alternatives.

CDM Technologies specified Trimble's Recon and Ranger handhelds for the Icodes application because of their ruggedness. Both handhelds meet military standards for vibration and shock, humidity and temperature extremes, an important consideration when loading cargo in 120° F conditions in places like Kuwait. The units are also protected against dust and water; that means ship-loading personnel can work with the handhelds in driving rain and not worry about them getting wet.

In addition to their ruggedness, the Recon and Ranger handhelds are flexible. They run Microsoft Windows Mobile software, giving users access to thousands of applications. Both also include CompactFlash (CF) and Secure Digital (SD) ports for portable data storage, as well as for adding peripheral devices such as Global Positioning Systems (GPS), digital cameras and bar-code scanners. Protective caps protect the CF and SD ports from water and dust.

About Trimble

Trimble is a leading innovator of Global Positioning System (GPS) technology. In addition to providing advanced GPS components, Trimble augments GPS with other positioning technologies as well as wireless communications and software to create complete customer solutions. Trimble's worldwide presence and unique capabilities position the company for growth in emerging applications including surveying, agriculture, machine guidance, fleet and asset management, wireless platforms and telecommunications infrastructure. Founded in 1978 and headquartered in Sunnyvale, Calif., Trimble has more than 2,400 employees in more than 18 countries worldwide.

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