

# Sensors Track Consumer Goods Bound for Troops in Afghanistan

To combat theft or security breaches, American President Lines is using Cubic's Container Tracking and Monitoring Solution to monitor overseas shipments to U.S. post exchanges.

*By Claire Swedberg*

TRANSPORTATION AND LOGISTICS services provider American President Lines (APL) and its customer, the Exchange, are utilizing a wireless sensor solution to track and monitor cargo containers' location and status (open or closed) during transit, in order to combat the theft or diversion of containers carrying goods to U.S. forces stationed in Afghanistan. The Container Tracking and Monitoring Solution (CTMS) was provided by Cubic Global Tracking Solutions (GTS).

The Exchange, formerly known as the Army and Air Force Exchange Service (AAFES), operates post exchanges—that is, stores located at military installations, in order to sell merchandise to military personnel and authorized civilians. The Exchange uses services from APL to transport consumer goods to Afghanistan, to be sold to U.S. troops in that country. Some of the goods are high-value items, such as iPods and flat-screen televisions. Prior to employing Cubic's solution, the Exchange and APL had no way of knowing the exact in-transit location of a container and its contents, and whether they had been tampered with, thereby making them vulnerable to theft. In fact, the Exchange often experienced a loss of product before shipments reached the military store's shelves—possibly after they reached Afghanistan, though it was unable to determine exactly where such losses occurred. Typically, thieves might break into a con-

tainer to remove products, or re-route it without authorization. Therefore, knowing where containers are located, and that a given container's doors had not been opened, would provide assurance that the contents remained safe. What's more, says Mary Ann Wagner, Cubic Global Tracking Solutions' president, a container breach could not only indicate a theft, but also the possibility that an explosive device might have been placed within the container. (Spokespersons at APL and the Exchange confirmed the details of this story, but declined to comment on the record.) A secondary concern is human error: In some cases, a container can be incorrectly reported as being delivered when that has not been the case.

To address these problems, the Exchange and APL began working with Cubic GTS to develop a solution. APL was already familiar with the Container Tracking & Monitoring Solution, which features a GS-5B wireless sensing device that fits on the frame, just inside the container doors. The shipping company had piloted the GS-5B model in preparation for a modification to the U.S. Department of Defense's Universal Services Contract (USC). This modification requires what the DOD calls a Generation II Satellite-Enabled Tracking and Intrusion Detection (GEN II SETID) tag for designated containers. At that time, Cubic GTS was part of a proof-of-principle project with the Department of Defense to

demonstrate whether the GEN II tags (including the GS-5B) are more effective than earlier products, which the DOD had found to be unreliable for detecting container intrusions. After Cubic GTS successfully demonstrated its GS-5B device, APL decided to begin using the solution on shipments for the Exchange.

In spring 2011, APL and the Exchange conducted a pilot of the Cubic GTS technology on goods shipped out of the United States, using four GS-5B units. At the Exchange's U.S. distribution center, the GS-5B was attached to each container prior to departure, and was removed at the Exchange's destination DC in Afghanistan. Each unit comes with built-in sensors for measuring temperature, humidity, motion and light levels, a battery with a lifespan of up to three years or 5,000 alerts or status reports, and a GPS unit to detect location within 2,000 geofencing zones along the routes between the point of origin and Afghanistan. It also has cellular and satellite radios, as well as an 802.15.4 mesh radio, which is not being used for this application. During transit of the containers, the satellite transmission indicates each container's location, as well as any sensor data. If a sensors detect a problem, as defined by business rules written into the tag's software—such as any sudden or unexpected changes in motion or the temperature or illumination level within a container—the tag can issue an alert via satellite or cellular phone to a data server, known as the Device Management Center, which then sends a text or e-mail message to alert any authorized parties.

Throughout the pilot, the GS-5B units continuously monitored the containers' conditions, periodically reporting status updates based on location within the 2,000 custom geozones representing the expected locations of containers along a particular transit route. The reporting varies by geo-zones, based on business rules coded in software on the devices. If a container is located within an area constituting a greater threat level, the device reports more frequently than if situated in a location perceived as safer. If a situation

changes while the container is in transit, a tag's business rules can be modified from the Device Management Center via satellite link to the tag. "Any sensor anomalies, as defined by the business rules on the tag, are reported immediately," Wagner says, "with alert data usually being received by the user in less than two minutes from any point on the globe." If transmission is blocked—for example, if a container is stored within the hold of a ship at sea and thus is unable to transmit via satellite—alerts and status reports are stored and reported at the first opportunity once communication becomes available.

"By adding the Global Sentinel GS-5B for intrusion detection and container monitoring," Wagner states, "the Exchange was able to deter theft of the valuable items inside the containers and provide asset visibility for the entire move, which resulted in enhanced asset utilization."

By tracking and monitoring the containers, the Exchange hopes to deter theft before it can occur. However, in the event that goods were stolen, the Exchange would be able to determine

where this happened and take steps to prevent such instances in the future. Furthermore, if a container were breached—if, for instance, its door were opened so that something such as an explosive could be placed within—the Exchange would be aware of the situation and be able to take special precautions regarding that container.

During the DOD's proof-of-principle project, Cubic Global Tracking Solutions identified a single container that had been diverted from the scheduled route, and reported that it had been breached. Once that particular container was delivered to Afghanistan, it was moved to a secure area in which its contents were carefully inspected to determine if any items were missing, or if anything had been placed inside the container.

During the full deployment, GS-5B devices are being attached at multiple points of origin (the Exchange declines to provide specific details), and are read until being removed at multiple receiving points throughout Afghanistan. ■



The GS-5B unit is mounted to a container's frame, inside the doorway.