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PHOTO COURTESY OF PORT OF LONG BEACH

Increasingly, geospatial technology is playing a more important role in port security

by JIM HODGES

ualizing vessels

The ship moved slowly away from its berth and headed for the channel at the Port of Long Beach as dozens of vessels do every day. Suddenly the ship turned hard to port toward an anchored tanker and stopped only after a collision that punctured the outer skin of the double-hulled ship.

THE COAST GUARD'S WATCHKEEPER SOFTWARE IS ON STATION IN

29

PORTS WITH

6

MORE EXPECTED BY THE END OF FY 14.

Meanwhile on shore, Randy Parsons, security director for the Port of Long Beach, was in a meeting with Mike McMullen, project director of Virtual Port, Long Beach's ambitious attempt to link 20 data sources—12 of them geospatial, including an Automated Identification System (AIS), radar, two types of geospatial fencing, aerial map databases, and more. Virtual Port is expected to launch in late June.

"We decided to trot this thing out and pull it up," said Parsons. "In a short time, we were able to click on the [damaged] vessels. [Virtual Port] gave us the owner, how it's flagged, what the cargo is—in many instances there's a photograph. We were able to pull up the track of the vessel that left its berth."

Virtual Port also told them the location of first responders, whether other water traffic was due nearby, and who had jurisdiction in the area.

"We had the information the Coast Guard needed, the information fire needed, even the information the follow-on investigators needed," Parsons said.

The follow-on indicated the fault lie with an inattentive captain.

While planning for Virtual Port, Parsons kept in his mind's eye the small boat that pulled alongside guided missile destroyer USS Cole in the port of Aden in 2000 and detonated a bomb that killed 17 U.S. sailors. His former job was special agent in charge of the counter-terrorism program with the FBI's Los Angeles field office.

"We do a lot of petroleum business here, and [terror threats are] pretty scary to us," he said. "Part of the main thrust to a maritime environment close-in is small watercraft. We watch that pretty closely with cameras, radar, sonar."

Other ports are watching Long Beach closely as it ramps up to launch Virtual Port. They seek ideas to leverage existing—if still comparatively sparse—port security measures into a system that can offer a common operational picture largely built of geospatial information, with data layered onto a map and accessible in an instant, and a temporal element to help separate wheat from chaff.

UPGRADING PORTS

"Everyone is coming to understand that one of the major keys in fighting terrorism is sharing information, especially geospatial information," said Paul Zimmermann, director of operations for the Port of New Orleans.

Zimmermann watches approximately 10,000 ships sail past each year, many traveling up the Mississippi River. Are any of those ships carrying threatening cargo? He's adding 300 cameras to the port to help find out.

After a train derailed at the Port of Tampa, Mark Dubina, the facility's vice president of security, was able to pull up a map and quickly study the pipes of the petroleum tank farms housed underground beneath the trains.

Many of the means used to keep a port secure are adapted from the technology deployed to help fight the wars in Iraq and Afghanistan. State and local authorities are lining up to get Federal Emergency Management Administration (FEMA) grants to purchase these technologies.

"We're doing a lot of technology upgrades here that use [geospatial technology] as a part," Dubina said of the Port of Tampa, which hired geospatial manager Barry Hill to guide the port into a new information world. "Port of Tampa has been here a couple of years and is becoming very robust. We're now just starting to understand its potential for security. There's a lot of emerging port security technology that's just now coming into play."

The U.S. Coast Guard has long understood the value of geospatial information. While stories of daring air-and-sea rescues and drug busts are long on human heroics, they're often short on depicting the geospatial data and technology that guide ships and planes to the scene despite unpredictable weather and conditions.

The Coast Guard tracks ships for security and search-and-rescue efforts, employing radar and monitoring vessel movements through AIS transponders, which transmit signals to and from satellites and other sensors, including satellite imagery, then generate data layered over Google Earth or Google Maps. The Coast Guard's future could well include full-motion video from unmanned aerial vehicles being tested at Wallops Island, Va. The Coast Guard teams with the Navy for this task; although the Navy can track maritime traffic, it has to leave boarding to the Coast Guard.

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> – Paul Zimmermann, director of operations for the Port of New Orleans

U.S. Customs and Border Protection (CBP) has joined the equation, bringing video and the Vehicle Dismount and Exploitation Radar to its fleet of drones—the largest in the U.S. outside of the Department of Defense.

The Coast Guard's WatchKeeper software for information sharing and management helps fuse all of this available data, and is entering its final phase of deployment. WatchKeeper is on station in 29 ports and is expected in six more by the end of FY 14.

Developed in response to legislation mandating the Department of Homeland Security establish Interagency Operations Centers (IOCs) in key ports, WatchKeeper combines Coast Guard and CBP sensor data with that of local and state law enforcement to provide real-time awareness of the maritime domain.

"There's a democratization of geospatial," said AJ Clark, president of Thermopylae Sciences and Technology, which works with U.S. Immigration and Customs Enforcement (ICE) on its mapping efforts.

"We're starting to get the geospatial world to drive the technology forward," Clark said. "If I'm trying to have situational awareness on a number of different vessels coming into the U.S., and one of my systems is flagging one of the ships for risk … you have a tool, Google Maps or Google Earth, for example, that allows you to provide that information to a much wider audience."

Further development of these tools is spurred by commerce, which took a handoff from the military and helps to carry the ball during austere times for the federal government.

Getting everyone to use these tools is another issue.

A BEACON IN THE DARK

Port security personnel share readily with each other and are eager to involve federal organizations. However, classified data "is a huge issue," according to Parsons. Long Beach's Virtual Port is web-based and designed to be accessed by local law enforcement agencies as well as officials from the Port of Los Angeles, an economic competitor but a partner in security.

Virtual Port also has dual authentication, which compartmentalizes access to more sensitive information.

Long Beach partners with Esri for Virtual Port, using the company's ArcGIS platform.

"Long Beach is a lighthouse for this sort of port security," said Russ Johnson, Esri's director for public safety solutions. "Other ports will take their lead from Long Beach."

Although the culture of sharing is improving, some federal agencies have been slow to join in the fusion effort, in part due to cultural differences and the difficulty of establishing protocols.

"I think the handoff between intelligence agencies and Homeland Security is a key component to what we have to solve here," said Brad Ward, vice president of Geospatial Solutions for Intergraph Government Solutions, which works extensively with the Coast Guard, CBP, and other federal agencies.

"How do you hand off what can be very sensitive intelligence to someone without the proper security clearance?" Ward said. "I think that is on the horizon. It's important to monitor potential threats well before they ever get to a port."

The Coast Guard, ICE, CBP, the FBI, and others have formed teams in ports such as Hampton Roads, Va., to combine resources, information, and jurisdictions. Those teams work with port security, though sometimes the link is tenuous.

Long Beach is a breakthrough in this area. The port and its partner agencies have formed a committee to facilitate information sharing, and work with Esri to establish security protocols.

As automation arrives with the development of Physical Security Information Management (PSIM) systems, such as Long Beach's Virtual Port, some of those walls could be broken down.

"PSIM is still an evolving platform that minimizes the level of human error by taking in all of these devices and making logical sense out of what is a true threat and what is not a true threat," said Allyson Rennie, an account sales representative for Intergraph. "It's all going back to leveraging map data."

Long Beach is still developing protocols for implementing Virtual Port.

"Sonar, radar—they have algorithms that trigger an alarm if something is out of the ordinary so that an operator can see the alarm, make an assessment, then lay on the additional data sets or additional layers that will help them analyze the situation and pass that information on to a police boat, the Coast Guard, etc.," Parsons said.

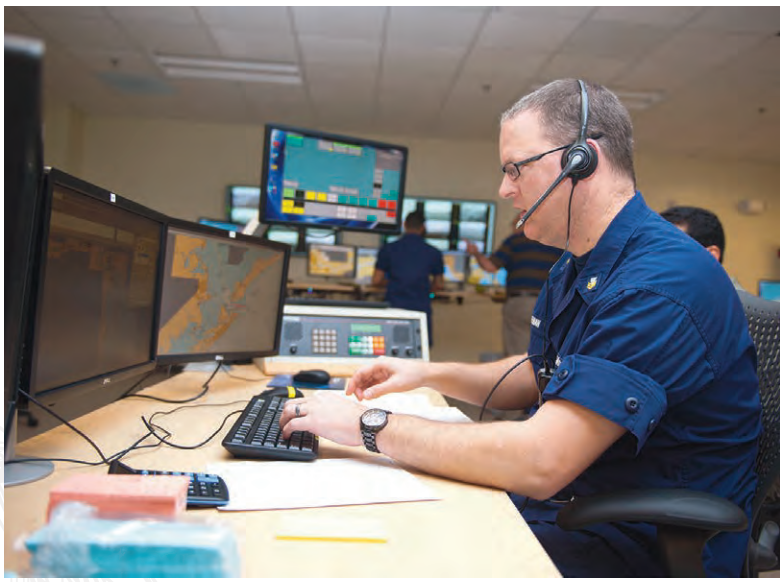
Those alarms can come from breaches in a geospatial fence built around a ship or area in a port, not so much to keep people out, but to regulate those allowed access.

In March, Long Beach set up those alarms and protocols for Virtual Port while others, such as security personnel with the new World Trade Center in New York City, took note.

Dubina and other port security personnel are also observing from a distance what they see as a geospatial testing and training ground.

"We know it's a challenge for smaller ports," Parsons said. "If people come in here and find that this is scalable for their situation, that's good. They can determine what they need for their risk threat—weather, tides, cameras, vessel tracking, arrivals, departures, whatever. They can look at this and make it work for them."

All it takes is money and education in a growing geospatial port security field, as well as the technology to grow with it.



PETTY OFFICER 1ST CLASS ERIC COLEMAN, an operations specialist at U.S. Cost Guard Sector Houston-Galveston, helps guide inbound and outbound traffic safely into and out of the Houston Ship Channel, Feb. 10, 2014.

PHOTO BY PETTY OFFICER 3RD CLASS MANDA M. EMERY