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Port Security: Organizing and Controlling Complex Environments with Wireless Connectivity

Secure seaport operations are crucial for a thriving economy and end-to-end high-speed wireless communications are vital to port safety, security and efficiency.

Managing a major container port is the ultimate test in logistical planning involving a large footprint, a myriad of activities, a host of workers, enormous cargo ships, numerous containers and a wide array of equipment and vehicles, port activities must be tightly synchronized to speed the flow of goods into and out of a country. These goods are the backbone of national and global markets, and seaports play a crucial role in enabling the economies of virtually every country in the world to grow and prosper. Today, however, security concerns—including growing incidences of theft and the pervasive threat posed by the potential of a terrorist attack—are threatening to disrupt this crucial synchronization and control.

The question is, what to do about it? It's a relatively simple question. How do you protect port facilities against the dangers of a complex new world while maintaining the crucial efficiencies so important to port operations? The answers are not so simple as the challenges are complex.

Even the idea of "protection" isn't as simple as it may seem. In seaport security, as in virtually every public safety operation, protection is a three-part process. The first part is the proactive identification of issues and vulnerabilities before they ever become problems. Part two is detection of problems as soon as they occur. Both of these are exemplified by solutions such as video surveillance, perimeter monitoring, motion detection systems and the like, allowing port management and authorities to know there's a problem or potential problem. Part three is equally important: fast, appropriate responses either to prevent damage before it happens, or to minimize damage that has already occurred.

Over the years, Motorola has developed an in-depth understanding of our customers' businesses including police, fire, airport and seaport operations. Our wireless communications expertise and our broad portfolio of high-speed wireless networks and equipment are helping to solve mission-critical issues for thousands of security-driven environments worldwide. Today, Motorola solutions are being used by a growing number of ports around the globe. Our wireless broadband solutions have been developed to help complex operations like ports enhance safety, security and productivity. Motorola solutions are able to turn basic video surveillance into sophisticated "video security" operations. They deliver high-speed mobile communications that enable more effective response to security breaches and other problems. They guard against hackers and network intrusion. They provide interoperability that enables real-time communication and coordination both within the port facility itself and with outside resources such as the public safety agencies of neighboring communities. Our advanced wireless communications solutions are designed to safeguard cargo and port facilities at the same time they help restore efficient, effective, symphonic orchestration to overall operations.

Seaports As Targets

Seaports are highly attractive targets for a rogue's gallery of criminals; two of the most dangerous are terrorist organizations and organized crime. It's easy to see why they are so tempting a target. As industry analyst Gartner notes in a 2008 report entitled *The United Nations Conference on Trade and Development* concludes, 80 percent of all world trade is shipped via cargo containers. These containers circulate among the world's major seaports more than 200 million times a year. That translates to a lot of merchandise that can be stolen and a lot of opportunity for dangerous disruption to port operations.

For terrorists, seaports are an inviting gateway to their plots for disrupting U.S. and other countries' economies and lifestyles. As the Gartner report states, "terrorists understand the fact that global economies rely on the movement of goods and that striking a port facility could significantly impact a nation's economy." For organized crime, the containers make inviting targets for wholesale theft of valuable products ranging from electronics to apparel. It's no wonder that port security has become such a high priority for the U.S. and Canadian governments as well as other governments around the world.

Port Security, Defined

How do governments themselves define port security? In a 2006 report, the Public Policy Institute of California suggests this updated definition: "protective measures taken to secure the maritime-related intermodal supply chain from terrorism, the unwitting transmission of terrorism-related assets, and crime; effective response should those measures fail; and freedom from danger, harm, and loss to person and property." It's a complicated definition because it has to be; providing effective port security is a highly complex, exceptionally difficult undertaking.

Complexities of Port Security

Just how complex are port operations in the United States? The Port of Los Angeles, for example, encompasses 27 cargo terminals and over 7,500 acres; that's nearly 12 square miles, or half the size of Manhattan, New York. But sheer size isn't the only problem. Port security is also impacted by a number of other issues, including:

- **Volume.** The volume of cargo and containers handled at an international port is staggering. For example, the Port of Los Angeles alone averages approximately 2,500 ship calls each year, which translates to about 4 cargo container moves per second, 15 moves per minute and up to 8 million moves per year.

- **Intermodal Transportation.** Port security activities not only include securing and coordinating cargo arriving and leaving by ship, but also by truck and rail.

- **Time Constraints.** With today's just-in-time production processes manufacturers rely on streamlined, coordinated port operations to move cargo quickly, efficiently and profitably.

- **Global Scope.** The international nature of the shipping industry necessitates dealing with the involvement, input, coordination and cooperation of numerous foreign governments, regulatory bodies and private enterprises.

- **Multiple Jurisdictions.** Most major seaport operations in the U.S., for example, are overseen by multiple agencies, including those of federal, state and local governments, as well as the U.S. Coast Guard and public and private port operators.

- **Number of Players.** The number of entities involved in a major seaport operation is large, and effective security systems require the involvement and support of all parties. They include government agencies, port management operations, carriers, shippers, manufacturers, logistics suppliers, labor unions and many others.

It's no surprise, then, that orchestrating effective and efficient security operations for such large, complex operations in such multi-faceted environments is such an enormous challenge.

Innovative New Wireless Solutions

Of course, these issues are well known and various organizations are hard at work developing new technology, equipment and integrated solutions that will significantly increase port security while also enhancing synchronization of port operations. Many, if not most of these new solutions, involve powerful new wireless technologies that deliver real-time information to everyone who needs it. In general, these new innovations fall into five broad categories:

• **Access Management.** The Transportation Workers Identification Credential (TWIC™) program is a massive effort involving biometrics-enabled smart ID cards—featuring leading-edge technologies such as fingerprint scanning—for more than one million transportation workers from seaports to airports. Wireless handheld devices with reader attachments verify workers' credentials. TWIC cards provide improved employee access control, as well as permit unescorted access to secure areas of the port, reducing manpower needs and increasing productivity. TWIC cards are already in use, and are proving their worth in providing both increased security and improved operational efficiency. Wireless access and integration to existing port security systems will improve both security and operations.

• **Asset Tracking and Controlled Movements.** Keeping track of port assets and containers is essential to ensuring security, guarding against theft and ensuring smooth port logistics. Tracking can be looked at on two levels: the physical containers themselves and the movements they make. RFID, bar coding and optical scanning help identify each container and asset; movements of the containers can be remotely controlled using driverless meshing technology, reducing human intervention and keeping container areas secured.

• **Video Security and Management.** As important as it is to port security, video surveillance is essentially a passive technology. A new paradigm known as video security is adding intelligence-driven capabilities that are making video more active and proactive. Besides monitoring, video security solutions generally include advanced video analytics for interpreting what cameras are seeing, video automation to help make split-second decisions based on analytics data and pre-determined criteria, and correlation of video with other input—such as 9-1-1 calls and GPS location technologies—to provide responders with all available information on an incident.

• **Real-time Mobile Communications.** The importance of effective, collaborative response to port security issues is also discussed in the Gartner report. "Demand for collaborative working methods and systems will drive the convergence of various devices on dedicated IP networks to enable individuals and groups to communicate and analyze data in more uniform manners." The report recommends high-speed mobile communications such as real-time streaming video and correlated audio and sensory data from other sources to provide more actionable intelligence to security teams and first-responders.

• **Integrated Command and Control Centers.** The constantly moving flow of goods, vehicles and workers in a port environment fuels the need for a centralized command and control center that essentially functions as a conductor of every aspect of port operations 24 hours a day. The center is where information from all security technology and operational applications is collected, consolidated, coordinated, stored, managed and distributed. Utilizing automated IP-based wireless systems and computer aided dispatch (CAD) technologies, command center personnel can analyze problem detection alerts and data, then distribute it to the nearest team of first responders, providing them with real-time situational awareness that helps generate safer, more appropriate, more effective responses.

Wireless as Catalyst

Most port facilities have installed bases of wired networks that have been in use for years. These networks are still providing productive communications, especially to large fixed assets, such as quay cranes and buildings within the port facility. But as technology requirements evolve, enhanced connectivity is needed. Adding more wired connectivity is now problematic. Digging up port facilities to install new fiber lines disrupts port operations and adds cost. Additionally, fixed connectivity is fast giving way to mobile connectivity that enables the new security applications of today and tomorrow. It's clear that momentum is shifting to wireless and IP-based networks that are able to collect data from numerous devices and transmit imagery, voice and telemetry in real time to a centralized command center, and to first-responders in the field.

In the U.S., Canada and around the world, wireless broadband networks are becoming a catalyst in transforming seaport security and operational cohesion. Crucial to this new emphasis are the security enhancing efficiency and effectiveness of powerful high-speed wireless communication and collaboration networks. But there is another somewhat more straightforward reason for the movement toward wireless. Wireless networks and infrastructure are remarkably affordable and cost-effective, and can be installed quickly, often in a matter of days as opposed to weeks or months for new wireline systems. When time is of the essence, that speed of deployment is critical.

Security Funding Initiatives

Governments understand the crucial importance of seaport security, and are supporting port operators in their efforts to deploy leading-edge security initiatives. In many countries, governments are making funds available for seaports to use in upgrading existing security systems and for the construction of new security solutions.

In the U.S., for example, ports can apply for funding to protect critical port infrastructure from terrorism as well as to enhance maritime domain awareness under the Department of Homeland Security's Port Security Grant Program. In each of fiscal year 2008 and 2009, DHS distributed just under $400 million in grants to ports. Under the American Recovery and Reinvestment Act (ARRA) an additional $150 million is being made available to seaports under this program. The priority for this ARRA funding will be to fund construction projects that not only improve security but also create jobs.

Grant Eligibility

For seaports, wireless infrastructure projects are prime candidates for securing government funding. And Motorola's wireless network solutions are fast becoming a preferred choice as ports write their grant proposals. No wireless manufacturer understands safety and security like Motorola. With over 3,000 customers worldwide and 80 years of trusted global wireless leadership and innovation, Motorola can provide guidance to seaports that need to create strong security solutions. Working closely with thousands of police, fire and other public safety agencies and departments, Motorola wireless solutions are proven to provide reliable, scalable, high-speed wireless solutions that save time, effort, and most important, lives.

To assist port operations in upgrading their security systems, Motorola will help you plan, write and submit your port security grant proposals. We can help you identify projects that are eligible for seaport grant funding under the Port Security Grant Program and ARRA. We can also provide details and information on our specific solutions that will help you make your case powerfully and successfully.
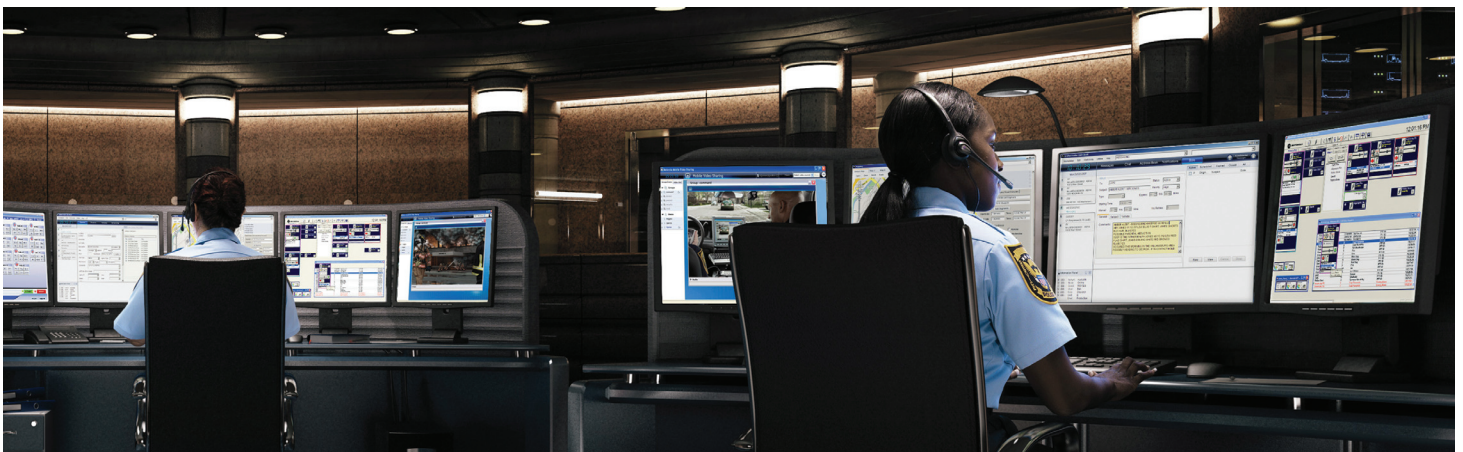
The Motorola Security Solutions Portfolio

In most port operations, both indoor and outdoor connectivity are crucial for optimum protection, detection and response. Motorola is the only industry resource offering leading-edge wireless solutions that provide and extend coverage both indoors and outdoors. These solutions are available today to help ensure security in every aspect of seaport operations, from the command and control center to perimeter monitoring to high-speed mobile communications.

Seaports are notorious for their difficult, multi-path RF environments caused by stacks and stacks of metal containers and other assets, as well as by personnel and equipment that are constantly in motion. Motorola's portfolio of wireless broadband solutions includes a wide range of technologies that empower seaports to neutralize these RF issues, enhancing security and maintaining maximum coordination and efficiency.

- **Reliable Wireless Networking.** Seaport operations needing mission-critical facility-wide coverage trust Motorola's powerful Point-to-Point wireless Ethernet bridges, Point-to-Multipoint wireless access and distribution networks and Mesh Wide Area Networks. All around the world, these solutions are proving exceptionally effective at reducing the effects of interference in seaport installations. Our wireless LAN solutions provide high-speed indoor coverage that integrates seamlessly with outdoor wireless broadband solutions to support highly orchestrated operations in every part of the port environment. And, bringing it all together, Motorola's One Point Wireless Suite enables a port operation to easily plan, deploy and manage the entire network from a single pane of glass.

- **Mobile Computing.** Motorola is a trusted and respected global leader in mobile computing. Our powerful mobile solutions enable real-time communications within the port facility, and provide the connectivity and interoperability necessary for high-speed mobile collaboration with first responders and public safety professionals from neighboring municipalities and affiliated government departments and organizations. We also offer many of the industry's most powerful, most feature-rich handheld computers and devices that are intuitive and easy to use, can be fully ruggedized and provide powerful performance and exceptional connectivity. Motorola's handheld mobile computers are powerful devices offering biometric identification and can be used as part of a video solution. Access to real-time video in the palm of your hand provides situational awareness and the confidence to make the right decisions.

- **Command and Control Centers.** The basic elements of highly efficient and effective centralized port command and control centers are Motorola's automated IP dispatch consoles and CAD systems. In today's streamlined port operations, these centers collect, correlate and analyze crucial security data, and distribute relevant information in real-time to improve problem detection and response. In addition, the centers are the hub of records management operations that include the storage and retrieval of video and other data.

- **Security Systems.** Port security demands end-to-end physical and network security solutions ranging from perimeter-protective systems such as advanced sensors and wireless broadband

video security solutions that help protect facilities, equipment, cargo and personnel around the clock. With our enhanced outdoor network security solutions that offer state-of-the-art encryption including 3DES, AES and WPA2 WiFi security plus GPS synchronization and authentication technology, Motorola is able to provide the highest levels of network security. Our powerful AirDefense solution provides indoor WLAN network security with 24x7 continuous sensing, intrusion protection, rogue termination, vulnerability management and troubleshooting capabilities.

- **Land Mobile Radio.** Many port operations also rely on Motorola's two-way portable and mobile radios to provide mission critical public safety communications networks with integrated voice and data supporting day-to-day operations and emergency response under the most difficult conditions. Offering advanced applications such as geo-tracking and over-the-air programming, our solutions support the Project 25 standard and provide gateways that support interoperability with affiliated agencies.

Improving Security and Restoring Control

Ports are leveraging Motorola's resources to help identify new funding opportunities represented by both the Port Security Grant Program and the ARRA. A number of seaports have selected Motorola's wireless broadband and wireless LAN technologies to dramatically improve security with the industry leading detection and emergency response solutions mentioned in this brief. These technologies provide seaports with the control needed to function more safely, more efficiently and more productively.

Innovative Security Services Designed For Seaports

Seaports need an end-to-end backbone security network that enables leading-edge services and applications for even the largest, most active port facilities. These include:

- **Identity Management.** Motorola solutions support TWIC enforcement and other applications that provide fast and accurate identification and access control, and allow seaports to leverage advanced biometrics.

- **Perimeter Security.** Motorola provides highly sophisticated applications for enhanced perimeter security; these include advanced sensors, intelligent video cameras and automated analytics and data correlation.

- **Situational Awareness.** High-speed mobile networking empowers the command and control center to stream real-time video and other crucial data that enables first responders to better understand an event or incident before they arrive on the scene.

- **License Plate Recognition.** Automated license plate recognition (ALPR) solutions continuously scan license plates on vehicles entering or leaving the facility's gates. Our ALPR systems can read plates under even the toughest lighting and weather conditions, matching them to databases to quickly identify and confront suspicious vehicles. Fixed ALPR cameras can be placed on nearby access roads used by vehicles near the port, recording each vehicle, citing the time and location. With this real-time intelligence, port security personnel can determine that certain vehicles that frequently park near the facility may actually have no business with the port.

- **Interoperability.** Motorola's MOTOBRIDGE™ IP-based hardware and software solutions are vendor- and frequency-agnostic. They automatically convert data and allow disparate networks to communicate and collaborate seamlessly in times of disaster or during daily operations.

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