

# Marine Control: Video Content Analytics Protecting the Seas

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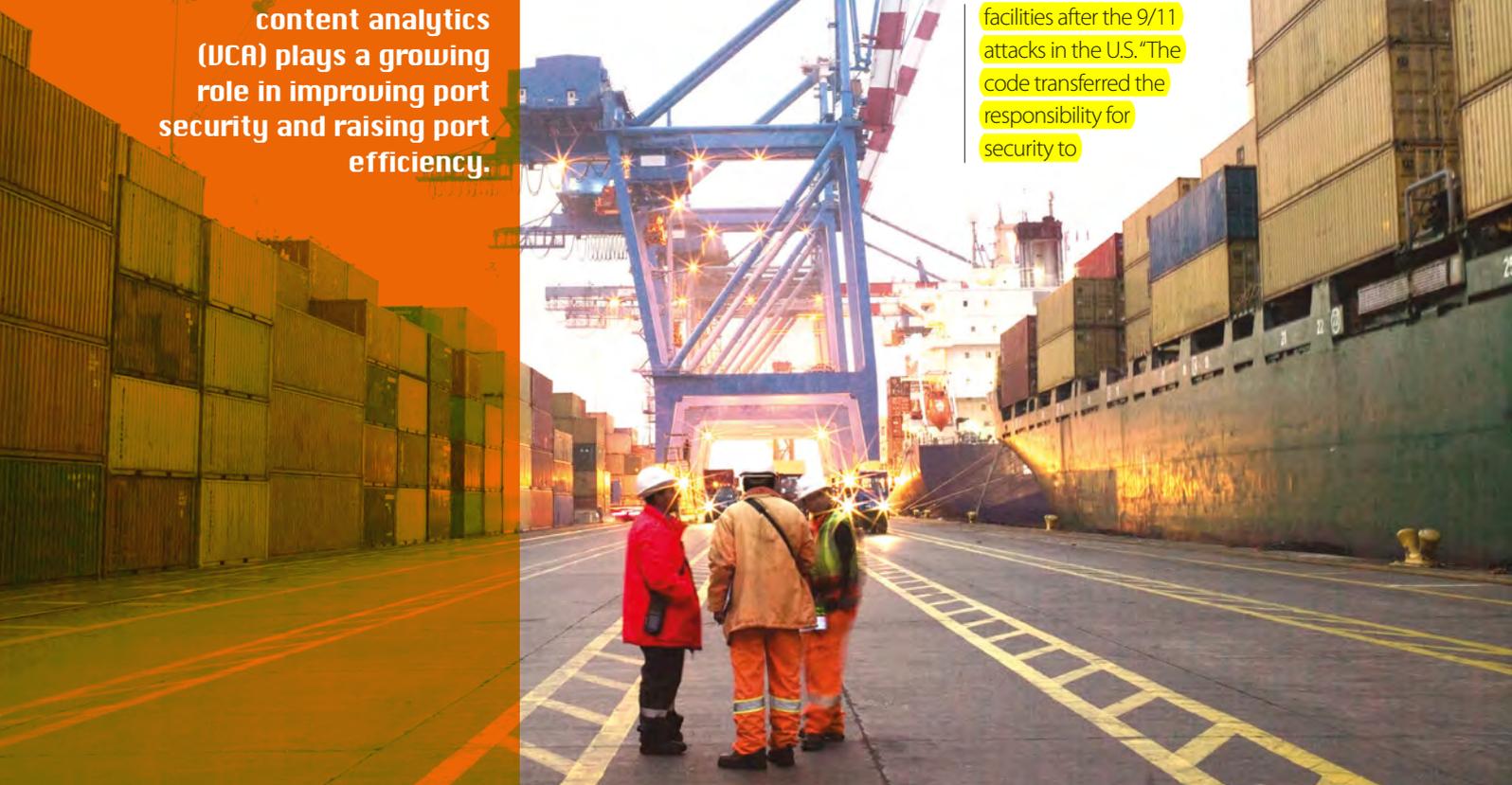
According to the International Maritime Organization, 90 percent of the world's trade is carried by sea. Seaports play a crucial role in the world's economy and their efficient and safe operation influences every one of us. However, hand-in-hand with their importance, seaports have a major weak spot, namely the open seas. Video content analytics (VCA) plays a growing role in improving port security and raising port efficiency.

Airports and seaports are key links in the global supply chain, allowing for the transfer of people and goods. Any disruption to the operation has grave economic consequences. Due to the complexity of these environments, they are also a high-potential security threat.

Threats to seaports include terror attacks, piracy, drug and contraband smuggling, cargo theft, etc. In addition to security risks, seaports constantly seek ways to improve their efficiency and competitiveness. Ports aim to avoid

longer load and docking times, misplaced containers, and damage to goods. Security systems can also offer operational value to a port's ongoing work.

"One of the key drivers for seaport security is the ISPS Code," explained Hagai Katz, Senior VP of Marketing and Business Development at Magal Security Systems. Katz is referring to the International Ship and Port Facility Security Code (ISPS), a set of measures to enhance the security of ships and port facilities, developed by the IMO (International Maritime Organization) in response to the perceived threats to ships and port facilities after the 9/11 attacks in the U.S. "The code transferred the responsibility for security to



the port-of-origin. The initial incentive for ports to meet the standard is to be able to ship goods faster and cheaper. Today, many ports in developing countries invest in port security systems to assist their growing trade," added Katz.

"Unlike airports which focus on people movement, seaports tend to be much more focused on moving materials, containers, and cars. Ports also have different requirements with a higher focus on managing logistics, theft detection, monitoring vehicle movement, and speeds and the dwell time of trucks in the port. However, when considering the use of video analytics or any other technology, the same process should be used to ensure a successful implementation. The customer needs to first analyze what problems he is trying to solve and then design the solution accordingly. Very often we find users put in the cameras first and then ask what they should do with them," explained Dr. Rustom Kanga, CEO of iOmniscient.

## USES OF VCA IN SEAPORTS

The variety of video analytics used in seaports is similar the ones used in other critical infrastructure: intrusion detection, LPR detection, motion detection, etc.; however, there are uses and characteristics unique to this environment. "The use of different video analytics is basically the same, whether on land or sea," noted Denis Castanet, Director of Business Development for EMEA at Bosch Security Systems. "There are of course unique use-cases, for example one application on cruise

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ships at sea is continuous monitoring for people or luggage/drug packages falling off the ship."

In shipyards, VCA has been used to mitigate smoke and fire concerns resulting from welding activities. "Normally a smoke detector will not work in such an environment because of high warehouse ceilings or even no ceiling at all. Video can be used for detecting both smoke and fire. We have also used our smell analytics to pick up the smell of smoldering plastic (for electrical fires) which can give an early warning even before the smoke is visible," described Kanga.

## THE CHALLENGES OF SEASIDE PROTECTION

The sea poses a big challenge to VCA: constantly moving waves, changing light conditions, and reflections. Unlike land which can be illuminated at night, it is impractical to light the sea. The solution is coupling video analytics with thermal cameras. Thermal cameras, whilst more expensive than traditional visual-range cameras, offer cost saving benefits due to their range and lack of dependency on artificial lighting at night.

"VCA is commonly interfaced with thermal cameras, especially at seaports as the thermal cameras can detect objects in the dark better than visual cameras. Interfacing to radar and sonar can also enhance detection. For example, upon a radar or sonar detection, they direct the cameras to the area of concern," noted Kirk Huss, System III Engineer for G4S Technology USA.

"We are also able to interface with sensors such as PIDS and sonar systems to offer a 'double-knock' detection system which will improve the accuracy and resilience of the security system whilst reducing false alarms," explained Bill Flind, CEO of Ipsotek.

In these "double-knock" scenarios the

video analytics system is configured so that if one system detects an intrusion the operator will receive a pre-alarm. When both systems detect the same intrusion a high-level alarm is sent to the operator.

## PSIM INTEGRATION

The complexity of seaport environments, involving multiple systems and stakeholders drove them to be among the first adopters of PSIM solutions. "In large projects we will install PSIM software to connect the different sensors, legacy systems, and a GIS map. As opposed to VMS systems which are 'closed', PSIM allows for an open platform that enables special screen designs, combining different systems and alerts, and giving different functionality at different levels," explained Katz. In this way the guard at the gate can get the information that is relevant for him, e.g., a truck driver's details, and make the decision whether to let the truck

1 Dr. Rustom Kanga, CEO, iOmniscient  
2 Denis Castanet, Director of Business Development, EMEA, Bosch Security Systems



## INTELLIGENT VIDEO SOLUTION

enter the port or not. A supervisor in the control room will see additional information, such as video feeds and relevant details about the truck's cargo.

"We have seen a clear trend towards PSIM, integrating safety and security systems to deliver a common operating picture. By having these systems working as one it enables VCA (and all the other systems) to be used to their fullest potential," said Jamie Wilson, Marketing Manager of Security for EMEA at NICE Systems.

NICE has implemented a PSIM solution at Naftoport, the major oil transshipment port in Poland. The project integrated nine existing gateway security systems

● **Bill Flind**, CEO, Ipsotek  
● **Jamie Wilson**, Marketing Manager of Security, EMEA, NICE Systems  
● **Kirk Huss**, System III Engineer, G4S Technology USA



including surveillance cameras, radar, intruder and hold up alarms, passive infrared, ACS, GPS, and automatic identification systems including sonar that is being fed into the system to detect intrusions from underwater. Other seaport specific systems that can be also integrated using PSIM include vessel tracking systems and AIS, long-range acoustic devices (LRAD), perimeter intrusion detection systems, weather feeds, and mass notifications.

One of the key operating principals of PSIM is process automation and pre-determined response plans. Naftoport is using its PSIM to optimize its day-to-day security operations in order to minimize down times and ensure operations continuity. Roughly 40 procedures are being automated with the system.

### VALUE BEYOND SECURITY

"End users that are familiar with the VCA of old now have more realistic expectations of the software than ever. Their primary demand is that the system operates as intended and with a minimal amount of nuisance alarms," said Huss. "VCA that can 'learn' how to recognize anomalies in the camera's field of view and continuously adapt itself to constantly changing conditions is an upward trend. Another trend is the calculation of the ROI as our clients realize they can do more with less when using VCA in the right applications."

Most recently the demand for video analytics to be used for increasing port security has been matched by the demand for video analytics to be used for improving health and safety and optimizing port operations. "As port operators understand more about the capabilities of video analytics there is an increased appetite for it to also deliver operational improvement and better safety. For example, the same system

that's used for perimeter and intrusion security can also be configured to raise alerts for smoke detection, speeding vehicles, and vehicles making prohibited maneuvers," noted Flind.

Currently in most cases security and operations are run by different departments at the port, not always communicating effectively with one another. A possible future trend is the integration of the two systems into one holistic management system. "We already see some initial requirements for these integrated solutions. In most cases, it is partial integration between the cargo management and the security system," said Katz. "In the long run we should see management and security as a combined process. For example quickly identifying the trucks and drivers by the security systems also shortens wait times in the entry and exit gates. With combined optical character readers (OCR) systems that detect the container number and LPR readers that detect the truck number the port can make sure the cargo reaches the right storage spot and then loaded to the right ship by the cranes. Security cameras can record the cargo in different stages not just to prevent theft, but also for insurance and liability claims, recording any damage sustained by the container."

In the future, as VCA capabilities increase so will their presence in seaports. Their effective integration with thermal cameras makes them an ideal solution for protecting a harsh environment such as a port's seaside. As port operators learn the benefits of VCA technology the industry predicts that VCA installations will go beyond security, supplying greater benefit and improving port efficiency. **ANS**