



# **Current and Future Uses Of ARES Video Data Intelligence At Maritime Ports**

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## Executive Summary

Approximately 7 million cargo containers are offloaded at America's maritime ports each year, comprising almost half of incoming U.S. trade. Additionally, 90% of trade worldwide is conducted via cargo ships. This international trade is vital to U.S. economic interests; however, it is also a potential source of vulnerability. Of necessity, ports must be considered part of the U.S. border and, as such, must be treated with appropriate security safeguards. This is especially vital when one considers the recent resurgence of radical Islamic terrorism in the form of ISIS and its followers.

In addition to U.S.-led global efforts such as the Container Security Initiative, which works with host countries to examine high-risk containers before they are shipped to American shores, individual ports are using the latest technological tools to enhance internal security. ARES, the Video Data Intelligence solution from Cyclops Technologies, is already being used at one of the largest ports in the country to identify and track incoming and outgoing road traffic. However, this functionality only scratches the surface of how the ARES system can be used for the purposes of port security.

Most cargo containers, referred to as intermodal containers, contain alphanumeric codes that identify them. These codes, which in most cases adhere to an international standard known as ISO 6346, identify the container's owner as well as its type. Additional codes contain supplemental information such as width and height. All containers must be registered with an international standards bureau known as the BIC; therefore, for all intents and purposes, the identification code for a container functions in much the same way as a license plate number does for a motor vehicle.

Cyclops' ARES Video Data Intelligence solution is based on a groundbreaking object recognition engine that has until now been primarily used for License Plate Recognition (LPR). What makes this innovative engine unique, however, is its ability to be "trained" to recognize any type of alphanumeric code or object. Therefore, the future will see solutions such as ARES used not only in the identification and tracking of vehicles entering and leaving port facilities, but also in the identification and inspection of incoming and outgoing cargo.

## Ports as Borders

Oceangoing ships have been the primary method of international trade for several centuries, and despite the rise of new forms of transportation, little has changed in that regard. Approximately 90% of internationally traded goods still reach their destinations by means of the high seas. In the United States, this applies to approximately half of imported goods, with a total of 7 million cargo containers being offloaded in American ports each year.

With such a large percentage of this incoming traffic originating from abroad, the Federal government considers ports to be U.S. border crossings and treats them as such. In recent years, with the threat of radical Islamic terrorism again on the rise in the form of the Islamic State in Iraq and Syria (ISIS) and its followers, security at these ocean-bound American borders has become an increasingly vital task. This sense of urgency is only compounded when one considers that, as a response to the terrorist attacks of September 11, 2001, Congress mandated 100% screening of all cargo containers entering the United States. According to Homeland Security Secretary Janet Napolitano, those standards still had not been completely implemented as of July 2012 and were not likely to be in the foreseeable future with existing technology.

The most recent information available states that over 80% of cargo containers bound for the United States are prescreened as part of DHS' Container Security Initiative (CSI), usually at the port of departure. High-risk containers, identified by means of advance information and strategic intelligence, are scanned with x-rays, gamma rays, and radiation detection devices, among other technologies. While this is a major improvement in security since the program was announced in 2002, there is still a significant gap between current levels and the 100% mandate handed down by Congress. To fill that gap, newer, faster, and smarter technologies are required.

## **ARES at Seaports Today**

The ARES Video Data Intelligence solution from Cyclops Technologies is already proving itself to be among the best available security solutions for U.S. seaports. In operation for many months now at Port Tampa Bay, the 16<sup>th</sup> largest port in the country, ARES has been employed in identifying and tracking incoming motor vehicles to the port facility via License Plate Recognition (LPR). ARES' video data analytics features assist the port in assessing the volume of traffic the facility handles on a daily basis. The software has been so successful in this regard that the Tampa Port Authority has ordered an expansion of the ARES presence at the port, which will be operational in the fourth quarter of 2014. The expanded ARES functionality includes enhanced, more accurate tracking ability of visiting traffic as cameras are added to the outgoing lanes as well as the incoming. In addition to vehicle counts, this will allow Port security personnel to know how long vehicles remain on the property and also recognize suspicious vehicle entry and exit patterns. Additionally, Cyclops is training ARES' object recognition engine to distinguish between commercial and non-commercial vehicles entering the facility, a capability vital to port security.

As important as these functions are, however, there is still more that ARES can do to help secure the world's seaports. The core of ARES is a versatile object recognition engine that

can be trained to read alphanumeric characters in any configuration as well as to recognize various kinds of objects. As such, its potential goes beyond LPR in several significant ways.

## Identifying Intermodal Containers

In January 1996, the ISO 6346 standard for coding, identifying, and marking of intermodal (used in multiple modes of transport such as truck, rail, and ship), cargo containers was established. Most cargo containers in use today adhere to this standard, which requires that a series of alphanumeric codes be present on the front door of the container for the purposes of identification. A complete set of mandatory ISO 6346 codes identifies the owner, the type of container, its serial number, and its dimensions. Some optional codes can also be added to identify the country of origin and other data points. Containers and their identification codes must be registered with the International Container Bureau (BIC) in Paris, France.

The following is an example of an ISO 6346 container identification code:

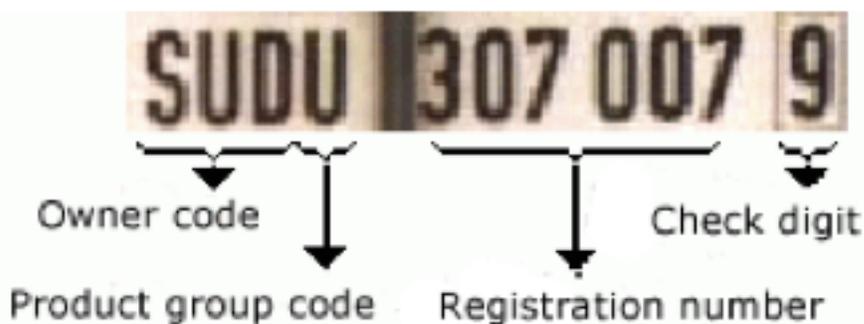


Figure 1 - Source: GDV Berlin

Much as license plate numbers in various areas of the world must adhere to specific formats, so too must container identification codes. Therefore, this code is for cargo containers essentially what a license plate number is to a registered motor vehicle.

## ARES at Seaports Tomorrow

Just as ARES' cutting-edge object recognition engine can be trained to read license plates from anywhere in the world, it can also be used to recognize the identification markings on intermodal containers. In combination with its LPR capabilities, ARES can provide security personnel a complete and automatic record of a container's progress through a port. An incoming container, for example, can be automatically recognized by ARES and be recorded complete with location, time and date stamps, and full-color images. The truck that picks it

up can also be recorded—at entrance, at pickup, and at exit, with license plate number and vehicle make and model. At the same time, the container can be associated with the vehicle in the ARES database. If any vehicle or container in this chain triggers an alert (for example, if the vehicle license plate is registered to a known associate of terrorists), security personnel are notified immediately, and both the vehicle and the container are stopped. Additionally, multiple cameras can be triggered to record events from multiple angles, virtually eliminating the possibility that persons of interest will go undetected. Meanwhile, the entire incident is stored for easy access, providing solid forensic evidence for law enforcement should it be needed.

Homeland Security personnel can also make use of ARES in conjunction with the Container Security Initiative (CSI), which works in cooperation with a host of countries around the world. With ARES in place at multiple ports, both domestically and abroad, collaborative networks can be established with shareable hotlists of suspects. If a suspicious container or vehicle is detected at any of these ports, the entire global network can be notified of the alert as well as of any persons of interest associated with it. Authorities in any countries where associated suspects are known to be can immediately investigate them before the container goes anywhere.

Future additions to the data acquisition capabilities of ARES will further expand its utility for ports. In the near future, Cyclops Technologies will be implementing facial recognition and thermal imaging to the ARES system in addition to its object recognition and LPR features. ARES will also have the ability to import data from third-party sources. In the case of Homeland Security and the ports, this means that the identification and tracking of cargo containers can be associated not just with vehicles, but also with faces of individuals. Moreover, ARES will be able to import and associate the x-ray and gamma scan data currently being collected by Homeland Security under the auspices of the CSI. Using ARES' video analytics feature set, port and Homeland Security personnel will be able to assimilate all of these disparate streams of data into one set of actionable, mission-critical intelligence in real time.

## Conclusion

The security of U.S. ports is more important now than it has ever been. The resurgence of terrorist factions in the Middle East makes the diligent screening of cargo containers arriving in those ports a critical necessity. While advances have been made under the auspices of the Container Security Initiative, using advanced scanning technology and in cooperation with countries around the world, Homeland Security is still only able to prescreen approximately

80% of oceangoing cargo bound for the United States, well short of the 100% mandate handed down by Congress.

The ARES Video Data Intelligence solution from Cyclops Technologies is a technology that can be of tremendous help in closing that gap. It is already proving itself at the 16<sup>th</sup> largest port in the U.S., assessing traffic volume, identifying and tracking vehicles that enter the facility, recording the length of vehicle visits, and differentiating between commercial and non-commercial vehicles. It will be a simple matter to train ARES to recognize the ISO 6346 standard identification markings on cargo containers, allowing them to be tracked on their progress through the port along with any vehicle associated with them. ARES not only has the ability to alert security personnel upon detection of any suspicious vehicle or cargo container, it also completely documents every incident with time, date, location, and full-color images.

Additional features soon to be deployed on the ARES platform are facial recognition and thermal imaging capture, as well as camera coordination and the ability to import third party data for a more complete record of any incident of concern to authorities. By establishing collaborative networks with ARES, Homeland Security officials all over the world can be instantly alerted when a suspect vehicle or container is detected, allowing for immediate investigation of associated persons wherever they are in the world.

Finally, ARES will provide port security and Homeland Security personnel with an unparalleled set of video analytics features to merge many sources of data into actionable real-time intelligence. For all of these reasons, ARES is the best choice for Video Data Intelligence at seaports now and in the future.