

# ***Greater Lafourche Port Commission***

## **Maritime Domain Awareness System GLPC-C4 (Command, Control, Communications, Collaboration)**



**Bringing Security, Emergency Response and Operations into one Common Operating Picture for Greater Situational Awareness and Interoperability with Local, State and Federal Agencies.**

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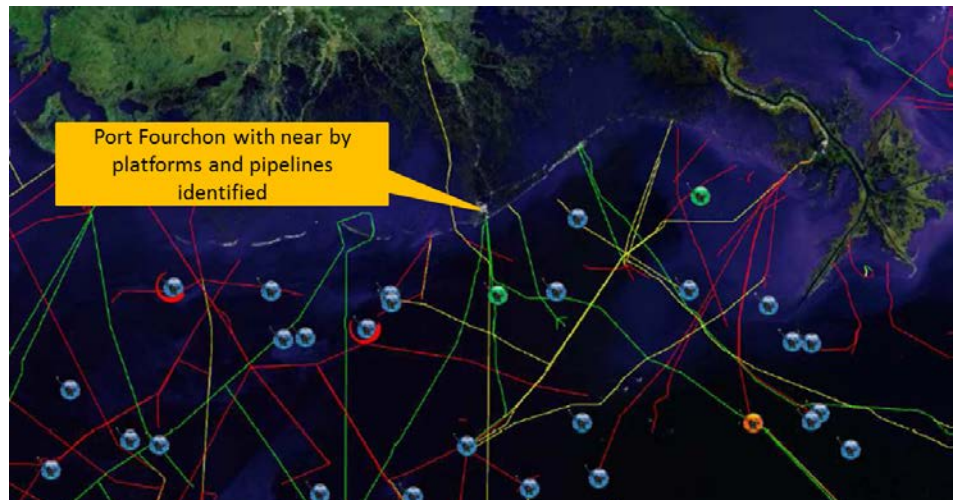
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## Port Description

Port Fourchon, located in Lafourche Parish in southern Louisiana, is the primary port for servicing the offshore oil and gas platforms in the Gulf of Mexico and supporting the local commercial fisheries. Port Fourchon is governed by the Greater Lafourche Port Commission (GLPC). The GLPC was established as a political subdivision by the State of Louisiana in 1960, and exercises jurisdiction control over an area of Lafourche Parish south of the Intercostal Waterway, including the South Lafourche Leonard Miller, Jr. Airport. The Port is accessible only by Louisiana Highway 1, which was designated by Congress as a High Priority Corridor based on its role in supporting the nation's critical energy infrastructure, and as the only evacuation route for Grand Isle, Louisiana, the only populated Barrier Island.

A major tenant for the GLPC is the Louisiana Offshore Oil Port (LOOP), the nation's only deep water oil port.

Located 18 miles off shore, this platform provides direct pipeline support for the offloading and loading of the Ultra Large Crude Carriers (ULCC) and Very Large Crude Carriers (VLCC). This platform is



**Image 1: C4 map displaying various offshore oil platforms and the underwater pipeline network.**

responsible for 18% of the country's entire oil supply, and provides direct pipeline service from the oil producers to over fourteen refineries around the United States. Approximately 547 million barrels of crude oil, per year, are transported through the Port Fourchon. Additional Port tenants

and duties include Fortune 500 companies, like Halliburton and Chevron, and supporting the promotion of tourism and the protection of recreation areas.

The GLPC is also the authority for the Port's Harbor Police (HP). HP has the primary law enforcement duties and security activities at each Maritime Security (MARSEC) level managed at the Port. HP is also the primary GLPC agency for coordinating with the Lafourche Parish Sheriff's Office, which is the primary law enforcement agency in the Parish, and with the U.S. Coast Guard.

## **Introduction:**

Since the events of 9/11, improving port security has been in the forefront of America's efforts to protect against criminal and terrorist activities. Funding through a variety of federal programs has enabled cargo inspection programs in foreign ports and a wide variety of improvements in the security of domestic cargo ports. Through successive grant programs, federal funding has supported the development of worker identification systems; the acquisition and deployment of camera systems, alarms and other basic detection systems; and the purchase a wide variety of response equipment, including basic software programs. It is now time for the next generation of port security.

Major ports encompass a multitude of piers and other resources, and can be spread out over almost unmanageable geographical areas. They are subject to adverse conditions that may arise from land or sea. Their operations depend upon networks of resources, not only utilities but pipelines, roads, rails, and equipment that move goods, containers, and personnel to and from platforms, piers and warehouses, off-site and on. Monitoring the security posture of such a dispersed asset and responding to alarms or conditions that may threaten the continued operation of the port or the safety of its personnel is a full-time job. It requires all the assistance that advanced technology can provide.

Port security is a multi-faceted task. But in fact, the term "port security" does not correctly describe the real task. The real task is port resiliency – making sure that, whatever happens, the port

has programs in place, and the ability to properly implement them, to prevent loss of life and property and to return to normal operations as quickly as possible if damage or injury should occur. To do this involves:

- Identifying critical assets and key resources for the port, whether on shore or at sea.
- Assessing threats and vulnerabilities that may arise, and the nature and extent of the damage or injury that may result.
- Inventorying not only security assets, but assets needed to recover from adverse events; and positioning them to the greatest effect to deter, detect, respond to and recover from activities that might prevent on-going operations.
- Planning and training to establish and maintain appropriate levels of skills and experience to monitor on-going operations and respond to and recover from adverse events.
- Monitoring on-going conditions to identify when threats have become reality.
- Deploying resources to respond to and recover from adverse events, while monitoring the overall environment to maintain the big picture.

The good news is that technology is available to help meet significant portions of the port resiliency challenge. Technologies for collecting and reporting information about the port's facilities and environment, for instance, have proliferated. Underwater sensors, surface and air radar, CCTV, pressure sensitive and other penetration alarms, GPS, equipment sensors and other devices are available in amounts and with capabilities that are limited primarily by the budget of the buyer. Multiple communications technologies make it easy to transmit photos, text messages and verbal reports about existing conditions. Simulation and modeling software programs exist that, for a given set of circumstances, can produce a plan for an evacuation of a building or a particular facility; and can produce portfolios of plans to fit a wide variety of circumstances dictated by a port's customary daily or

monthly cycle of operations. On the response side, there are numerous software programs that address the management and operations of first responders.

The bad news is that the welter of new technologies and the visible benefits they have brought have obscured the failure of technology to provide more effective tools to satisfy the more sophisticated demands of port resiliency. For instance, although there are a plethora of technologies available for gathering information, there are fewer technologies that make it easier for port operators to understand the information they are getting; and there are almost no technologies that enable port operators to tackle the challenges of creating an operationally sound port resiliency plan and being able to put it into action. The GLPC-C4 MDA next generation system is the first step in providing comprehensive port resiliency.

## **Goals and Objectives / Business Problem:**

Business Problem:

- How can the Port better manage its risk exposure prior to and during a disaster?
- With grant funding not as readily available, how can the Port leverage its current systems to create a security system?
- How can the Port improve real time collaboration with its tenants and with local and regional first responders?
- Can the Port create a system that focused as an emergency response tool but can be used day-to-day?

Goals and Objectives:

- Streamline the information flow about an incident at the Port to the various Port partners.
- Leverage existing investments in technology
- Implement a standards based application to implement new data feeds to create a cost savings

- Have an easy to use interface
- Support day-to-day operations while being the emergency response application

**Background:**

The GLPC-C4 system, as a next generation MDA as described above, results in the creation of a single total resiliency platform where it integrates all of the current functionality described loosely under the heading “port security” with advanced functionality that addresses the hard challenges of port resiliency. In the hands of a port operator, the GLPC-C4 provides a crucial tool for insuring the ability of the port to protect against, prevent, mitigate, respond to and recover from current and future adverse events of any nature.

The GLPC-C4 system was created on top of the commercial software package TACCS™ (Touch Assisted Command and Control System), developed by Priority 5 Holdings; and by leveraging a plug-in to TACCS™ used by the Department of Defense (DoD) called the “Knowledge Display and Aggregation System” or “KDAS.”

KDAS was developed to respond to the DoD’s need to streamline the reporting and understanding of how any hazard might impact the Defense Industrial Base (DIB). KDAS maps the various DIB assets, allows the operator to link external critical needs for those assets, add interactive vulnerability data, receive real time threat data, and run on the fly threat assessments on potential DIB impacts. Utilizing of the KDAS plug-in to TACCS™, the GLPC was able to leverage and save millions on development costs, as well as move up its implementation timeline as it established its system.

## Objective and Methodology:

The GLPC-C4 system is a visual, geospatially based application that aggregates data dynamically to build real-time situational awareness. The system can be deployed on a video wall for EOC support, three screen monitors set up for analyst stations, and mobile devices for field personnel. The system is a client-server application that allows the various workstations to collaborate and share data in real time while role based access controls ensure sensitive data can be accessed but shared on an as needed basis. The system is loaded and utilized from the Port's network with VPN access for the regional partners. Data currently available in GLPC-C4 includes:

- Satellite Imagery
- AIS
- Street Map
- Radar
- CCTV with Analytics
- Port lease Information
- Variable Message Board interaction
- Traffic Cameras
- Weather Display and Weather Alerts

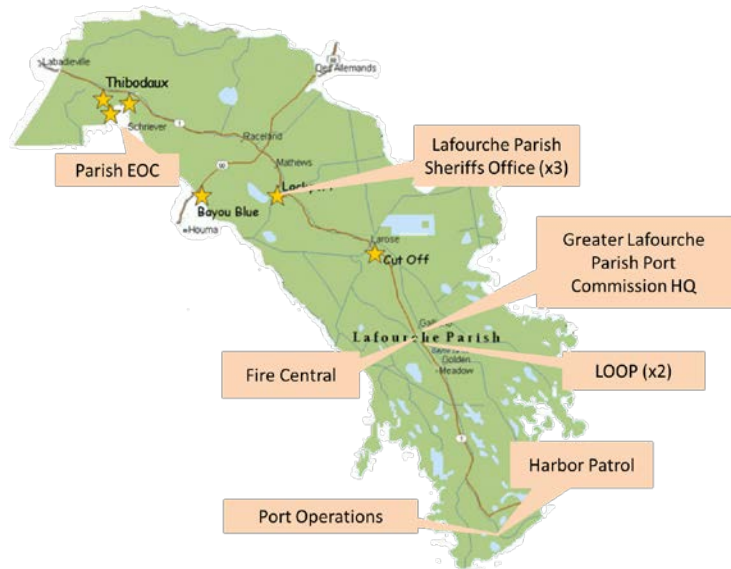


Image 2: Map of the various agencies utilizing the C4 system



- GIS base layers (Police station locations, Fire station locations, etc)

The system is currently deployed with Port Operations, Harbor Police, Fire Central, Lafourche Parish Sheriff's Office, Lafourche Parish Office of Emergency Management, and the Louisiana Offshore Oil Port

Aspects of the GLPC-C4 include:

- ✓ Integrated Information: For the most part, current technologies merely co-locate information displays. GLPC-C4, on the other hand, fully integrates information, meaning that all of the information sought by the operator from individual data feeds is represented in appropriate context in a single, dynamic display with a focus that is operator controlled (a user defined operating picture, or UDOP). The UDOP is geospatially organized, using satellite imagery, street maps and other geospatially-based reference material from a variety of sources; and in-coming data are automatically located, or manually located if not geospatially tagged.
- ✓ Single Interface: GLPC-C4 uses the UDOP as the single interface for all critical information, including alerts, so the operator's attention is not constantly rotating among separate stovepipes of information co-located in independent windows on a computer screen.
- ✓ Automated Alert Notification: GLPC-C4 is able to continuously scan incoming alerts for those creating a pattern of occurrences that indicate the possibility of an existing threat. Once a possible threat is detected, the software brings that threat to the attention of the operator.
- ✓ Interoperability: GLPC-C4 is designed to operate with all data feeds and other information sources, as well as with legacy software and any new software. In so doing, the return from any investment in existing IT resources is maximized, new system investments are able to be focused on best-of-breed applications, and upgrades and replacements are possible on a modular basis.
- ✓ Information Sharing: GLPC-C4 incorporates role based access controls and other technologies that enable seamless information sharing among different organizations, databases and jurisdictions without revealing sources, methods or confidential information that is not relevant to the operator.

- ✓ Automatic Status Monitors: GLPC-C4 provides operator defined status monitors that automatically keep track of the projected condition of individual assets or individual missions, and indicate when the functionality of an asset or the completion of a mission is or may be projected to be impaired.
- ✓ Multiple Response Capability: Although it would be convenient if each adverse event were to be limited in scope and well-defined in its application and effects, neither acts of God nor plans of man are likely to be so circumscribed. Should an adverse event encompass multiple sites, for instance, the GLPC-C4 provides for multiple UDOPs that can separately be dedicated to different response teams engaged in separate efforts.
- ✓ Enhanced Field Coordination: GLPC-C4 enables the UDOP to become a common operating picture, a display that shows all of the critical information available regarding the challenge in the field. With a common operating picture shared by responders using mobile devices, members of response teams tackling the same conditions from different directions can understand what they shouldn't do as well as what they should. In addition, off-site responders aiding in the prosecution of an on-site response can quickly coordinate their efforts by being provided with access to the common operating picture.
- ✓ Testing Responses: GLPC-C4 allows the decision-maker, using the simulation engine, to test possible response scenarios to a given set of conditions. Using the data derived directly from the operating picture, the decision-maker can recreate the existing circumstances in a simulation environment, simulate the effects in that environment of implementing a proposed response, and evaluate the projected effects of the proposed response against his or her objectives or other proposed responses.

### Hardware/Software

Component	Recommendation
Enterprise Server	Quad Core (2.6GHz) RHEL 6.x x64

	16 GB RAM (1333MHz) 2TB HDD 15k RPM RAID 5
UnitySM Server (Simulation)	Dual Quad Core (3.0 GHz) RHEL 6.x x64 24 GB RAM (1333 MHz) 2 x 500GB HDD RAID 1 (Mirror)
Workstation	Quad Core (3.0 GHz) Windows 7 x64 12GB RAM (1333 MHz) 300GB HDD 10K RPM High Performance NVIDIA Graphic Card, (Minimum specification GeForce GTX 460 with additional power)
Monitors	Dual/Triple 24" Monitors for each Client (1920x1080 Resolution or greater for best resolution)
Touch Screen	Multi-touch :Nextwindow Optical Touch Technology, 1920x1080 Resolution Single-touch: Microsoft
Mobile Devices	iPAD 2 / Android Devices / Laptop

## Project Cost

- \$611,552.48

Project started in 2010 and includes: COTS software licensing, multi-year maintenance, customization support, data integration, system training, CONOP development, and exercise support. Cost for hardware, network infrastructure and the establishment of new systems are not included in the cost.

## Performance Measures

Performance Measure:	Result:
Has the Port reduced its risk exposure prior to and during a disaster?	Within the GLPC-C4 system, the Port now has the capability to model dependencies and vulnerabilities of the Ports critical assets. The Port can also link its critical assets to external critical needs, creating the ability to conduct link analysis. This became critical during the Deepwater Horizon incident when the port was reviewing boom placement, the projected oil path, and conservatory areas.

<p>Has the Port been able to create a cost savings utilizing legacy systems or when purchasing new systems to create the GLPC-C4 system?</p>	<p>Yes, with the newly acquired CCTV and Radar projects, the Port did not have to duplicate equipment and training time to teach personnel how to use the various systems. Having both piped into the GLPC-C4 system has generated cost savings in:</p> <ul style="list-style-type: none"> <li>• Hours saved maintaining each individual system</li> <li>• Hours saved in training personnel on new systems</li> <li>• Not needing to customize several front-end applications, since all we needed was the data feed.</li> </ul>
<p>Has the Port improved real time collaboration with its tenants and with local and regional first responders?</p>	<p>Yes, during a recent Oil Spill exercise, LOOP, Central Dispatch, and Harbor Patrol all utilized the GLPC-C4 system in real time to review the collaboration capabilities. Items identified as beneficial included:</p> <ul style="list-style-type: none"> <li>• Ability to easily identify the location of the incident, as opposed to having to describe the location</li> <li>• Ability to whiteboard the location of the spill, where it originated and its projected path.</li> <li>• Ability to create collaborative sitrep reports to minimize confusion in data flow.</li> </ul>
<p>Is the GLPC-C4 system utilized day-to-day and not just for emergencies?</p>	<p>Yes,</p> <ul style="list-style-type: none"> <li>• Central Dispatch utilizes the cameras to monitor traffic flow and update the dynamic message boards</li> <li>• Status of Lease locations is updated daily</li> <li>• Alerts and incidents are created daily</li> </ul>

### How the Project Fulfills the Award Criteria

Item	Meet Criteria	Justification
<p><b>Port Operations and Management Systems</b></p>		
<ul style="list-style-type: none"> <li>• New innovations in technology to enhance data flow for Port Operations</li> </ul>	<p>✓</p>	<ul style="list-style-type: none"> <li>• Creating an access point for interoperability to share data and information in real time between the Port and its partners</li> <li>• Aggregating the various stovepipe applications into a single application to generate to analytical opportunities.</li> </ul>
<ul style="list-style-type: none"> <li>• Technologies to improve the safety and productivity of cargo and container handling</li> </ul>		

<ul style="list-style-type: none"> <li>• Technological innovations for the tracking and maintenance of chassis, containers, cranes, and other yard handling equipment</li> </ul>		
<ul style="list-style-type: none"> <li>• Methods to improve traffic flow and improve truck turnaround time entering and leaving a terminal</li> </ul>		
<b>Improvements in Intermodal Freight Transportation</b>		
<ul style="list-style-type: none"> <li>• Technologies to improve vessel transportation safety within a harbor or port, including approaches to the port</li> </ul>	✓	<ul style="list-style-type: none"> <li>• Providing access to data such as Radar and AIS to Port partners that did not have easy access to this data</li> <li>• Able to review real time alerts with the radar and AIS to review impending issues</li> </ul>
<ul style="list-style-type: none"> <li>• The application of intelligent transportation systems</li> </ul>	✓	<ul style="list-style-type: none"> <li>• Implementing the Traffic Cameras, Security Cameras, Video Analytics, Dynamic message board with ship radar and AIS within a single application to create a consolidated view.</li> </ul>
<ul style="list-style-type: none"> <li>• Technologies to enhance intermodal freight movement</li> </ul>		
<ul style="list-style-type: none"> <li>• Technologies to enable the effective tracking and tracing of cargo from the Port to the consignee</li> </ul>		

## Conclusion

Port Fourchon plays a strategic role in furnishing this country with 18% of its entire oil supply. This Port serves as the land base for Louisiana Offshore Oil Port (LOOP), the nation's only deep water oil import facility. The Greater Lafourche Port Commission is responsible for the tenant management, operations, security, and hazard mitigation for Port Fourchon and key assets stretching 30 miles from Galliano, Louisiana to the Port. Port Fourchon, Louisiana is a key port in the delivery of personnel and materials to the gas and oil platforms and infrastructure in the Gulf of Mexico. Within this context, the GLPC implemented the innovative GLPC-C4 technology to bring security, emergency response, and operations into one common operating picture for greater situational awareness and interoperability with Local, State and Federal Agencies to enhance both business and response operations.

Appendix A



Image 3: Example of critical infrastructure presented on the map with an interactive panel about the critical infrastructure and their interdependencies illustrated.

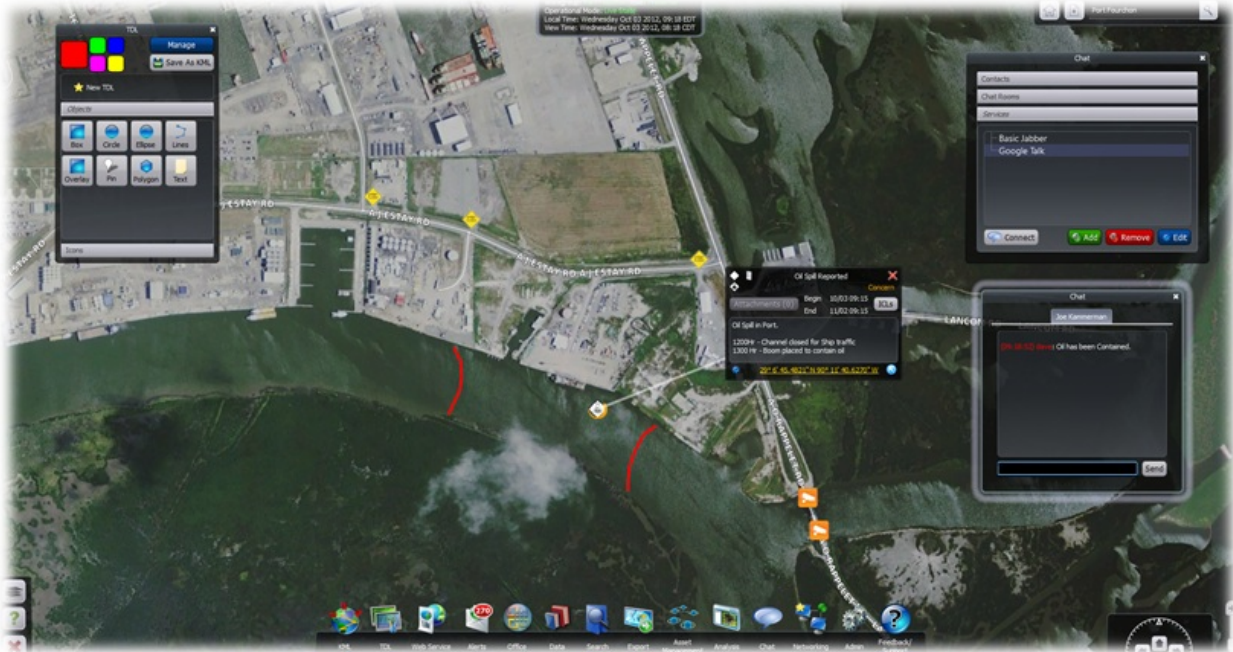


Image 4: Example of an active alert at the Port with a Tactical Data Layer created outlining the response plan.



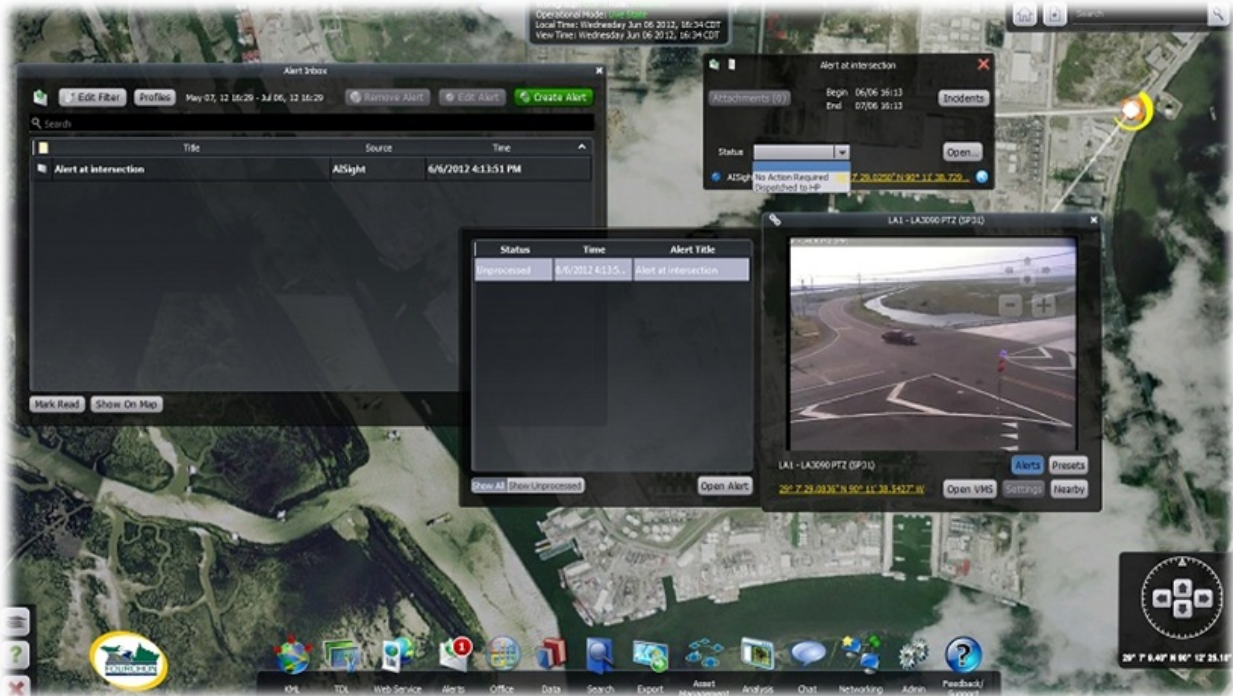


Image 5: Example of the video cameras integrated into C4. Associated with the cameras are video analytics issuing alerts of anomalies appearing in the camera.

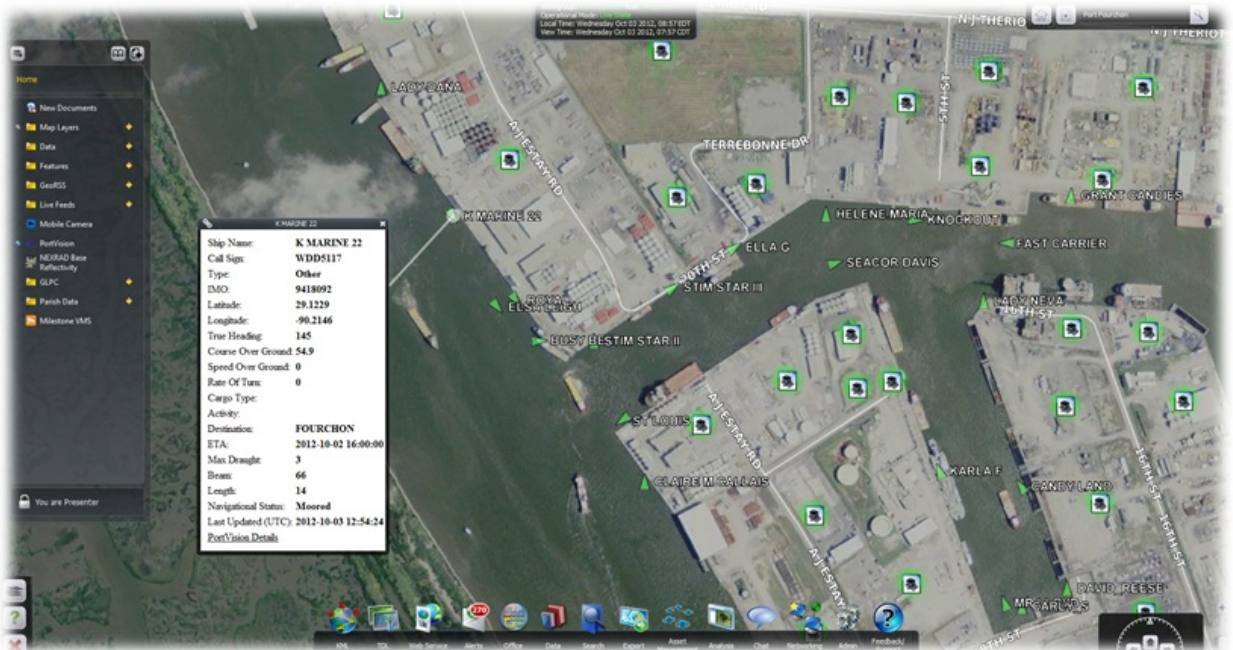


Image 6: Example of AIS and Radar feeds integrated into C4. Alerts are issued for wake zone violations or when AIS feeds are turned off.

Partner	Capability	Contact Info
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