Chinese ports starting to use wide-area surveillance solutions

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Throughout 2007 and 2008, intelligent video systems have seen substantial growth. There have been adoptions of intelligent video systems in many critical infrastructure industries including ports, airports, power plants, large infrastructure projects etc. This has also made huge impact in the large infrastructure security markets. An integrated and intelligent security platform can provide safety and security, reduce cost on security spending such as personal and hardware, help users manage their sites more efficiently and improve operational efficiencies at their sites. The need for security has also driven the development of video analytics market. According to IMS research, the market for video analytics will grow to US$807.7 million in 2012 at annual growth rate (CAGR) of 69.3 per cent. This article intends to looks at the challenges of video surveillance and how intelligent video systems help combat those problems.

Challenge facing traditional surveillance systems

Video surveillance has gone through continuous evolution over the past 20 years. The surveillance technology has gone from bulky video tapes to digital networked systems, which can capture video contents and store them directly to a PC hard-drive. During the process, functionalities and performances have been greatly enhanced. However, security and practicality of the systems are still limited due to certain constraints including:

1) Security personal can be distracted or inattentive while watching CCTV monitors. Research has shown that after approximately 12 minutes of continuous viewing of two or more sequencing monitors, operators can miss up to 45 per cent of scene activity. After 22 minutes, operators miss up to 95 per cent of scene activity.
2) Cost of true 24/7 operations can increase if the system is not properly utilised. Need to employ more guards to cover critical areas.
3) Reactive incident response. Currently, most traditional surveillance systems can only serve as monitoring and recording systems. They record video content and store them in DVRs. When accidents or a security breach take place, the recorded videos are reviewed for forensic purpose only. Therefore, the systems are not utilised to prevent security breaches.
4) Long reaction time, low systems utilisation rate, inconsistent policy enforcement etc.

In order to overcome those challenges, intelligent video analysis intends to provide security personnel with the tools needed to move from today's reactive approach to a proactive strategy and

Figure 1. With SiteIQ, users interact with the software through a graphical model of their site.

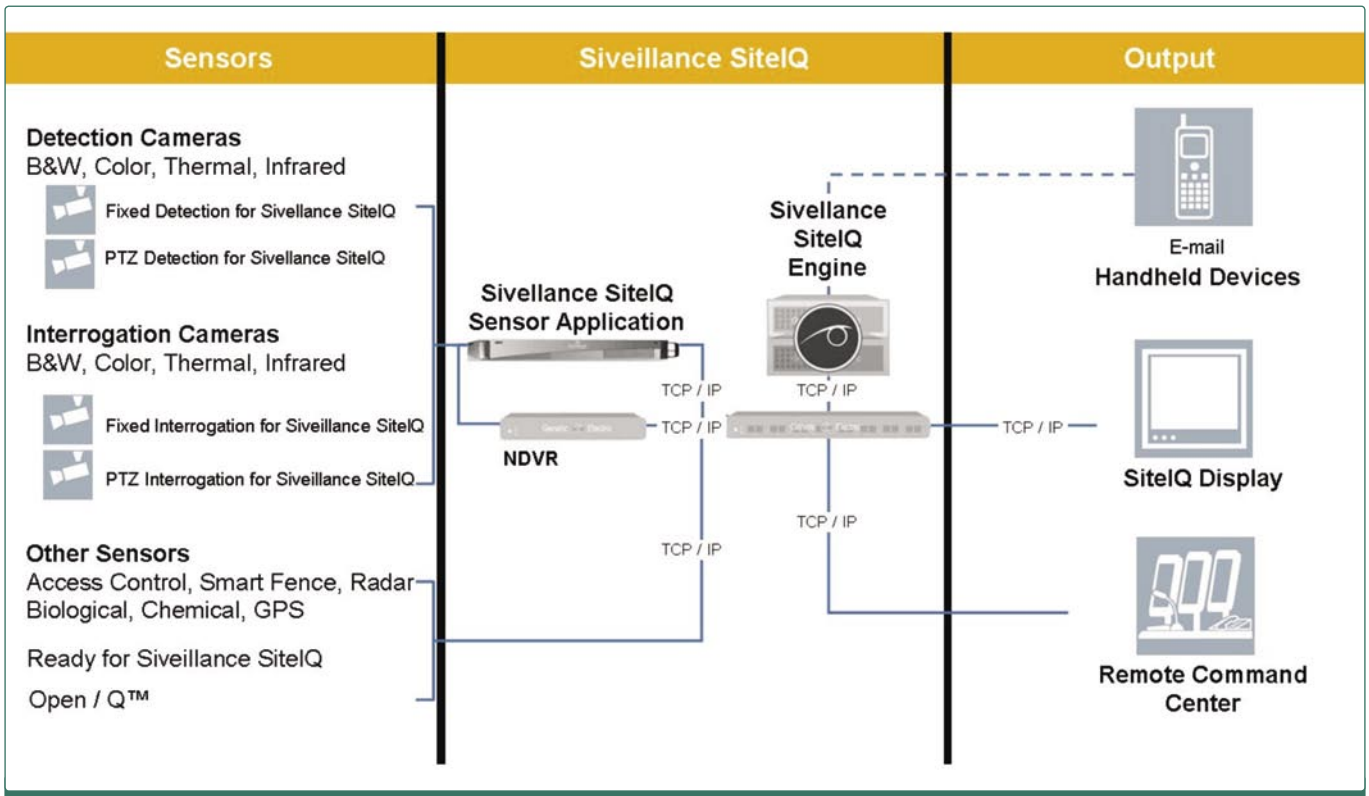

Figure 2. Three main components to the SiteIQ architecture.

possibly preventing incidents before they occur. As there is a lot of information available to us today with live feeds from cameras, intelligent video analysis is designed to take advantage of this information. It does this by using computer vision rules to make decisions about what is happening in the camera video feed lead. This can lead to increased understanding and awareness of the situation.

Technology

The Siemens Siveillance SiteIQ is a security solution that goes beyond traditional video surveillance. It can proactively detect attempted security breaches before they occur and show what is happening throughout the site by displaying all surveillance input on a single screen.

Siemens SiteIQ changes the way security professionals view security. Users interact with the software through a graphical model of their site.

The background is a static digital image upon which objects, like people, vehicles, planes or ships, are plotted in real-time to provide immediate situational awareness. Thus situational awareness is based on the inputs of possibly hundreds of cameras visualised on a single screen.

This example, shown in Figure 1, is from a major port terminal operator.

SiteIQ features adjustable alerts, which allows the users to escalate security levels across an entire site with just a single mouse click. In this example, the user has set up a series of policies that form larger and larger buffer zones as the alert condition is raised. SiteIQ can conform to the sites' own security levels.

SiteIQ works with any camera technology, allowing the customers to select the best mix of technologies to secure their unique environment.

SiteIQ is a cost-effective approach to securing large sites, critical infrastructure in any wide area environment. It is the industry's only single-view, multi-sensor solution and it is currently used by many ports globally.

System design

There are three main components to the SiteIQ architecture as shown in Figure 2:

- Sensors
- SiteIQ Sensor Appliance (Intelligence)
- Display output

Sensors: Provide the data for intelligence processing.

- Detection cameras are the primary sensor type for use in intelligent video analysis. These are mounted in a stable secure fixed position and connected to the SiteIQ sensor appliance.
- Interrogation cameras are mainly the PTZ cameras used to monitor activity after an alarm zone has been triggered or any time the operator wants to get further information about objects moving in the SiteIQ map display.
- Other sensors: These can be a number of different sensor types from access control to GPS and fence sensors. These are integrated into SiteIQ via the OpenIQ software interface specification.

SiteIQ Sensor Appliance: a 1U rack mounted appliance supporting four camera connections. This is where the video analysis software rules operate to detect, recognise, track and classify objects. The SiteIQ Sensor appliance sends its analysis information to the SiteIQ Engine via IP communication.

SiteIQ Engine: The SiteIQ engine is the central database repository that gathers the data from all sensors and processes that data. It outputs the processed data to the SiteIQ display. The SiteIQ Engine runs alarm zone policy, video clips server, and reporting.

SiteIQ Display: SiteIQ Display is the end-user graphical map display that provides real time site awareness.

Case study – Dalian Free Trade Port

Dalian Free Trade Port is a major port in northern China, which is under direct control of the Dalian Municipal Government. It is the most northern ice-free port in China. It is also the largest multi-purpose port in Northeast China serving the seaports in North Asia, East Asia and the Pacific Rim. It is the second largest container transshipment hub in mainland China. It has been one of the focuses of economic development and fund investment of Dalian city.

The total perimeter of the Free Trade Port, which requires protection, is approx. 10 km (including seawater and land). In addition, the Free Trade Zone requires perimeter protection 24/7.

The functional requirements from the port are:

- Integrated management platform
  - SiteIQ system can integrate all security information from various sub-systems in the port and display that information on the virtual GIS map. All security information is in real-time. Therefore, the customer can have a birds-eye view of the security situation in the port. This allows the customer to better manage resources and free personnel for various tasks.
- Virtual fence
  - Users can define virtual security zones as well as the respective security levels according to their needs. Different security measures can be associated with different security levels. For example, the system can provide protections to various security policy zones, such as the stacking area, around a ship or office buildings.
- Proactive alerts
  - According to the behaviour of objects, the system can actively track them and raise alarms.
- Scalable System
  - Ability to utilise existing security infrastructure such as cameras and cables to save on costs for the customer.
  - Can easily add additional cameras or other sensor types while minimising the need for additional personnel.

SiteIQ can even monitor objects left behind or stopped, such as a car stopped at an un-authorized location. The user also determines how the software alerts an operator when a security zone is violated. Alerts include live video, audible alarms and pager notifications to remote security professionals. Video will automatically pop up when a policy zone is violated.

One of the key differences between SiteIQ and other intelligent video solutions is that SiteIQ supports multiple sensor types, such as GPS, ground radar, thermal imaging cameras and access control systems.

Conclusion

Siemens SiteIQ wide-area surveillance solution can provide ports with many benefits including:

- Covering the full perimeter
- Minimal impact on operations during construction
- Use of existing infrastructure when possible
- Proactive security to help facilitate incident prevention
- Increased response time through early detection
- Increased level of protection
- Increased effectiveness and productivity of security staff
- Less judgment and interpretation errors
- Reduced total cost of ownership for security operations

Dalian Port is now a benchmark in Chinese port security. The Intelligent Security System ensures the operational safety of the port.

Siemens SiteIQ wide-area surveillance solution has been deployed in many critical infrastructures sites around the world. It automates video surveillance, enforces port security policy, and increases the effectiveness of its security staff in responding to and preventing security breaches.

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ABOUT THE COMPANY

Building Technologies, an operating division of Siemens, combines offerings for security and life safety and building automation within one company as a service provider, system integrator and as a manufacturer of respective products. By virtue of the unique combination of these business sectors, the company occupies a leading position worldwide. In the growth market for electronic security, Siemens ranks among the five top global players and offers integrated total solutions that are more efficient and more advantageous in terms of operating costs for use in both the private and the public sector. Services encompass video surveillance, tracking and tracing, access control, intrusions protection as well as command and control.

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