Wireless Network Video in Airports and Harbors
A Milestone Blueprint Article

Large Ports have very sophisticated control rooms where they receive a continuous stream of information regarding vehicle and container movements. In addition to video cameras, radar, RF tags, magnetic sensors, unmanned vehicles and other sophisticated devices may be in use. But what about the hundreds of smaller ports that serve our nations' rivers and coast lines?

Marinas and Civil Aviation airstrips have many of the same concerns as their larger counterparts, but without the large budgets. A typical port might consist of a recreational boat harbor, a commercial fishing dock, a boat repair yard, and a collection of leased properties occupied by local businesses. The common denominator is that there is a large physical area to cover and a lot of high value property to protect. Managing an enterprise such as this takes diverse skills:

Challenges faced by smaller Harbor Masters and Port Managers:
- Vandalism and theft
- Storm damage
- Damages to tenant property (including boats and planes)
- Operations (lifts, hoists, dredges)
- Access to gangways, docks, tie-downs, and runways

The most urgent problem is usually vandalism to public rest rooms, walkways and docks. When drugs are in the area, thefts occur from parked vehicles and boats. Costs can easily run into thousands of dollars per incident and occur frequently. At unattended airports cars are driven onto the field, causing damage to the turf. The key to this application is good quality gear. Police won't act on a report unless they can get a positive identification.

To help defray some of the costs, consult with your state Department of Transportation, Aviation, or Fisheries resources. Surveillance systems are categorized as safety equipment and are eligible for public grants. For example, a pilot will be able to view the cloud formations, wind sock, and runway condition before taking off on a flight. Several states have programs to encourage harbors and airports to install cameras and make them available to transportation officials and the general public.

The Wireless connection

The large distances involved and the lack of CAT5e cable between buildings mandates a wireless connection for most installations. Harbors and airports often lease out building sites to local shops, hotels and fishing charters. These businesses are usually pleased to host a camera and can provide power, but no network. Wireless bridge components from Airaya and Proxim provide a reliable high speed connection.
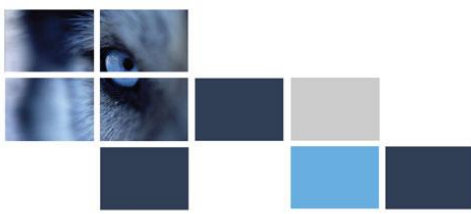
Ports tend to have a lot of wireless communications already in operation. Selecting the 5 GHz or Public Safety frequencies eliminates interference with other wireless sources, but there can also be radar and microwave communications in coastal areas. A wireless spectrum analysis can show where other point sources are and what frequencies are occupied. Using directional antennas will also help eliminate noise and interference.

Weatherproofing

Coastal locations are especially tough on equipment. The salt environment is brutal on unprotected metal and wood. Start with a good quality IP66 rated enclosure. Vandal resistant housings are recommended for all locations, since they are usually made of coated aluminum, rather than thin plastic or painted steel. Cutting corners on low cost enclosures will prove to be penny smart and pound foolish!

Material	Pro	Con
Plastic	Good corrosion resistance	Some have UV degradation
Coated aluminum	Salt protection	Watch out for screws and bolts
Galvanized steel	Inexpensive, sturdy for mounts	Rusts where cut or drilled
Stainless steel	Use for all screws and bolts	Cost

All materials wear quickly in a marine environment, but some do better than others. All hardware (screws and bolts) should be stainless steel. Galvanized steel is good for building mounts, but will rust when cut or drilled. Polyurethane NEMA boxes are recommended if vandalism is not a problem. Most of the metal NEMA enclosures are made out of painted steel.

Wind resistance

In December of 2007 a powerful wind storm hit the Washington coast. Wind speeds of 140 mph were recorded for over an hour. The storm caused a lot of damage – roofs were blown off, windows shattered, and there was extensive flood damage everywhere. Coastal residents are used to that – they regularly get 60 mph gales, and at least one storm per winter will pack a real punch.

Whenever possible, mount cameras under eaves and close in to buildings. If there is an overhang above the camera, you will get much less water accumulating on the camera and it will be protected from the wind. Camera motion in a wind storm can easily render a picture useless.

Motion Detection Issues

Everything is always in motion at the coast. Boats bob, waves roll in, and seagulls circle overhead. Without sensitivity adjustments, the system would record constantly and quickly fill up the available storage space. The Milestone XProtect software provides three controls which are helpful in this situation. The 'Noise Sensitivity' control is used to filter out fine motion like waves or rain drops from the scene. The "Motion Sensitivity" control is good for controlling the size of the object detected: Humans need to be detected, small animals do not. You can also
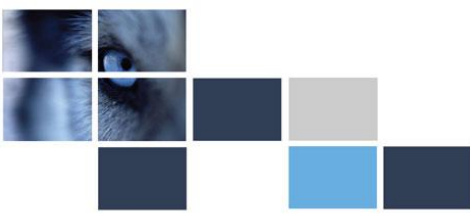
exclude sections of the picture so that clouds and Sea Gulls are ignored. Bear in mind that Exclusion Zones don't work well on PTZ cameras, because the scene is constantly changing.

PTZ Programming

Pan Tilt Zoom cameras are a good choice for Ports because there is so much area to cover, and only a limited choice of mounting sites. Most of the time the Harbor PTZ's watch the gangways, but periodically the camera will shift to watch other objects like statues, garbage bins, and the promenade along the front of the harbor. The Milestone Scheduler function is used to implement a different patrol scheme at night than during the day. At night, the camera avoids dark spots where image quality will be poor. The Milestone XProtect software also manages permission levels and access control rights. The public may be able to view a camera over the Internet, but only Port Managers and Security Officers can change its' programming.

Public/Private Viewing

In Web Cam installations the video on a public website comes from a web server built into the cameras. Using a static IP or DNS name, you can quickly integrate live video into a web page, including sophisticated features like turn taking (for PTZ control) and timed access (you get 30 seconds). Once a public user releases control of the camera, the regularly scheduled patrol takes over again.

The Milestone Smart Client software is also used for remote viewing, but not by the general public. Port employees can log onto the system from home to check on weather damage during a storm. State Transportation officials can use the 'Browse' function to investigate accident reports and verify arrivals. When local vandalism is detected, the police will have access to video data.

Summary:

Wireless networks tend to consist of a series of small jobs, rather than one easily coordinated install. IP cameras and wireless networks are a perfect match since only a small number of components are required at each remote node. The network signal at the back of the camera is ready to go to the wireless radio without any conversion or encoding.   High quality cameras from Axis, IQEye, and Sony provide the reliability and feature set required for this demanding application.

The Milestone XProtect software is intuitive and easy to use. After one short training session, Port employees spend a couple hours experimenting with the Smart Client application and are quickly proficient with the system.

Ultimately the success of a video surveillance system will depend on results. Port Managers can visualize the entire facility from their office and can better manage both emergencies and routine operations like the arrival of a large ship. Public reception tends to be favorable as well. Merchants and visitors appreciate the added measure of public safety and security the cameras add to the port.