



APPLICATION STORY



Port Authority of Ravenna installs FLIR Systems HRC-S MS Multi-Sensor.

Thermal imaging camera raises security level at the port of Ravenna.

Thanks to its strategic geographical position in the north-east of Italy, on the Adriatic Sea, the Port of Ravenna is an Italian leader in commercial trade with the East Mediterranean and the Black Sea. It plays an important role in trade with the Middle and Far East. The Port of Ravenna is one of the major Italian ports as far as break bulk cargo is concerned: in particular, it is the Italian leader in the handling of raw materials for ceramics, cereals, fertilizers and animal food. It is also an important port for general cargo, in particular timber and coils. The port of Ravenna is also the most important centre for offshore activities in the Adriatic Sea. One third of the methane gas consumed in Italy is produced offshore from Ravenna.

The Port Authority of Ravenna

The Port Authority of Ravenna has the task of allocating, planning, coordinating, promoting and controlling port operations and other commercial and industrial activities taking place in the port. It invests heavily in the port to improve its infrastructure and to extend its service offerings, in order to reach the highest quality standards.

Recently, the Port Authority of Ravenna has decided to install a FLIR Systems HRC-S MS

Multi-Sensor. This thermal imaging camera intends to raise the level of security at the port of Ravenna from the harbour front to the adjacent coast. This is yet another step taken by the Port Authority to raise the standards of security at the port of Ravenna. With the HRC-S MS the Port of Ravenna installed one of most innovative and powerful night vision systems.

HRC-S MS Multi-Sensor System

"We originally demonstrated the Port Authority a system composed of a

The HRC-S MS in the port of Ravenna is installed on a 14 meter high mast, located at the end of a 3 kilometer long pier.

FLIR Systems PTZ-35x140 MS.", explains Miss Elisabetta Minghelli head marketing at A.ST.I.M. S.r.l. The company designs and develops integrated security systems and is a FLIR Systems distributor in Italy for FLIR Systems security and surveillance and maritime products. "During the demonstration it became immediately clear that they needed a more powerful solution. Seeing a small vessel at approximately 20 kilometers, as requested by the Port Authority, requires a thermal imaging camera with a cooled detector. We decided to propose the FLIR Systems HRC-S."

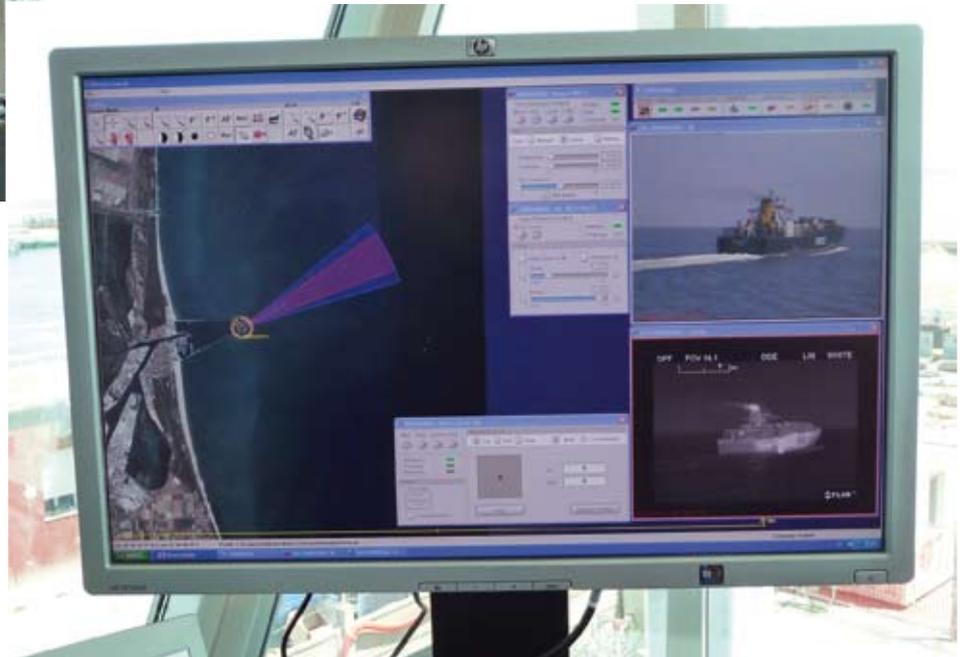
"The Port Authority was immediately convinced when we demonstrated the FLIR Systems HRC-S MS. The HRC-S MS is based on military technology and it is fully military qualified. Since the military is the most demanding customer in the world, the Port Authority knew immediately that the HRC-S MS would do a great job in the Port of Ravenna as well."





Claudio Fuzzi, one of the HRC-S MS operators at the Ports Pilot Organization in Ravenna.

The HRC-S MS is controlled with FLIR Sensors Manager software. It not only shows the thermal and visual image of the HRC-S MS, it also clearly indicates where the Multi-Sensor System is installed and the direction in which it is looking. It offers numerous features such as a video motion detection, E-stab, electronic tracking that can be accessed by the touch of a button.



"Since they not only wanted to have a thermal imaging camera but a daylight camera as well, we opted for the HRC-S MS Multi-Sensor system. Not only it is installed on a robust pan/tilt which allows the operator to look anywhere he wants, it is equipped with a daylight camera as well. Optionally they ordered a laser range finder. This allows the operator to see at which distance from the camera vessels or other objects are located.", explains Miss Minghelli.

Installing the HRC-S MS

"A.ST.I.M installed the HRC-S MS on a 14 meter high mast in order to have an excellent overview over the area."

"Temporarily, the images of the HRC-S MS were transmitted wireless to the control room which is 6 kilometers away from the location of the HRC-S MS. Although this was giving excellent results, we are replacing the wireless signal with a fiber-optic cable. This will even further increase the image quality of the HRC-S MS.", says Miss Minghelli.

"The Port Authority is not operating the HRC-S MS itself. Once it was installed the control was handed over to two important authorities within the port of Ravenna: the Coast Guard and the Port Pilots organization."

Coast Guard

The Italian Coast Guard is a branch of "Marina Militare" (Italian Navy) that has tasks and functions connected mostly to the use of the sea. The Italian Coast Guard has exclusive responsibility for search and rescue missions. It systematically examines the entire national merchant fleet, fishing and pleasure boating and through the activity of Port State Control, also the foreign flags that are calling at Italy's ports. Other tasks include the protection of the marine environment and control of maritime fishery, pleasure yachting.

"Our task is to ensure that the port of Ravenna is safe.", says Captain Roberto Rufini, head of the Coast Guard at the Port of Ravenna. "We not only control and maintain the safety and security of the ships that come to our port; we also have the responsibility for the entire port security as well."

Vessel Traffic Monitoring

"Every vessel entering or leaving the port of Ravenna has to give an "arrival notice" at least 24 hours before it plans to enter the port. We can monitor their movements with the automatic identification system (AIS). AIS is a very effective way to track and monitor commercial traffic through a flow of information and data. It helps to identify the ship, see its location, direction and speed, type of cargo and its "relationship" with other nearby ships and Marine Traffic Control Stations."

"Although the vast majority of ships have AIS on board, not all are equipped with it. Off course we can still monitor these vessels by radar. But now, especially for the sensitive sea area that affects the entire harbour, we have a new tool as well. With the HRC-S Multi-Sensor System we get a visual, real-time image of these vessels. During the day, we use the daylight camera.



The HRC-S MS is equipped with a continuous optical zoom on the thermal image. It allows to have a closer look at objects which are far away.

But more spectacular, when it gets dark we switch to thermal. The HRC-S MS is really turning night into day. This allows us to monitor all ship traffic, 24 hours a day."

International Ship and Port Facility Security (ISPS)

"The thermal imaging camera also helps us to comply with the International Ship and Port Facility (ISPS) regulations. A comprehensive set of measures to enhance the security of ships and ports developed in response to the perceived threats to ship and port facilities in the wake of the 9/11 attacks in the United States.", adds Captain Francesco Frisone of the Ravenna Coast Guard.

More Coast Guard applications

"The HRC-S MS is used for more than vessel traffic monitoring only," continues Captain Frisone. "In front of the coast of Ravenna there are several offshore platforms that extract natural gas. The nearest are located three miles from the coast while others are located approximately 10 miles away. With the HRC-S MS we are able to monitor what is happening around them without any problem. If we see that vessels, which have not announced their presence beforehand, are close to the platforms, we are able to intervene immediately. The HRC-S MS has such a long range performance that we can see what is going on close to the platforms. Even in total darkness".

"Another application is the control and supervision over everything that is happening on the beaches. During summer there is an increased inflow of tourists and there are more beach activities. With the FLIR Systems HRC-S MS we can see clearly what is happening on the beach. Day and night. If there is a problem that requires activation of the planned emergency procedures, such as swimmers or recreational boats in distress, we can act immediately".

Spotting a diver at a distance of more than 1,500 meter

"Recently, thanks to the HRC-S MS, we observed a sports diver inside the port, while snorkeling at a distance of more than 1,500 meters away from the camera, near the docks of the south dam. We noticed his head when it was above water. On the thermal image we also noticed that hanging on his belt was a fish that he had caught illegally, in a prohibited

area. We immediately intervened to end a potentially dangerous situation. Dangerous not only for the port but also for the diver since he was swimming in an area that is frequented by large ships and motor vessels."

"For us this is just one example of the great benefits of thermal imaging and particularly of the HRC-S MS. Here at the Coast Guard we are convinced that there is a bright future for thermal imaging and its applications.", concludes Captain Frisone.

Port Pilots Organization: seeing objects which are undetected by radar

Another user of the HRC-S MS is the "Corpo dei Piloti del Porto di Ravenna", the Port Pilots Organization. It is composed of 13 maritime port pilots. These qualified seafarers operate 24 hours a day with 3 pilots per shift. A Vessel Traffic Service guarantees safe piloting and traffic assistance in the outer and inner waters of the Port of Ravenna.

"The Port Pilots Organization is responsible for carrying pilots to the ships. The pilots go to the ships with small boats and they guide and control the entry of the vessel in port.", says Captain Andrea Maccaferri, Head Pilot.

"We share the use of the HRC-S MS with the Coast Guard. Although they are the main users of the system, we can request control of it at any time and use it to our benefit. We use it to see that large ships can manoeuvre safely. Often there are small sail boats and yachts around the ships that are not being spotted by the radar. With the HRC-S MS we can see them seamlessly. If this is the case, we can warn our pilots in



HRC-S MS overlooking the entrance to the port of Ravenna.

order to make sure that the small vessels are not overrun by the huge container ships."

Thermal imaging and fog

"During daytime we use the daylight camera. But on foggy days, we are happy that we can switch to the thermal imaging camera. Also in daylight. The FLIR Systems HRC-S MS is a tremendous help in foggy conditions. Although the range performance of the thermal imaging camera is affected by the fog, it still allows us to see considerable farther than with any CCTV camera. Even in heavy fog, when

HRC-S MS configuration in Ravenna

The HRC-S MS as installed in Ravenna is a Multi-Sensor System. It contains a thermal imaging camera equipped with a cooled Indium Antimonide detector (InSb) that produces crisp thermal images of 640 x 480 pixels. The thermal imaging camera produces a clear image in the darkest of nights. It needs no light whatsoever to operate. It can also see through light fog, smoke, in practically all weather conditions. The thermal camera has an optical zoom on the thermal image. It zooms between 1.13° and 14.6° field of view. It is complemented by a long range daylight camera that can be used when condition permit. It has a 60x zoom capability between a 0.48° and 28.7° field of view. Both cameras are installed on a rugged pan/tilt. Optionally a laser range finder has been installed.





Elisabetta Mighelli from A.ST.I.M – Marco Forinnati of the Port Authority of Ravenna and Captain Andrea Maccaferri of the Port Pilots Organization.

we can see barely with the naked eye, the thermal imaging camera of the HRC-S MS allows us to see small vessels at a distance of about 2 kilometers away."

Controlling the HRC-S MS Multi-Sensor System

The FLIR Systems HRC-S MS is being controlled by the FLIR Sensors Manager Software. This out-of-the-box software offers powerful and efficient management capabilities for any security installation with FLIR Systems thermal imaging cameras.

"FLIR Sensors Manager is extremely easy to use," explains Mr. Claudio Fuzzi, one of the Pilots operating the HRC-S MS. "It allows access to numerous useful features. Not only can I pan/tilt the system, I can switch between thermal and daylight video or look at both at the same time. I also have access to features such as the Digital Detail Enhancement. This ensures a clear thermal image, in all weather conditions."

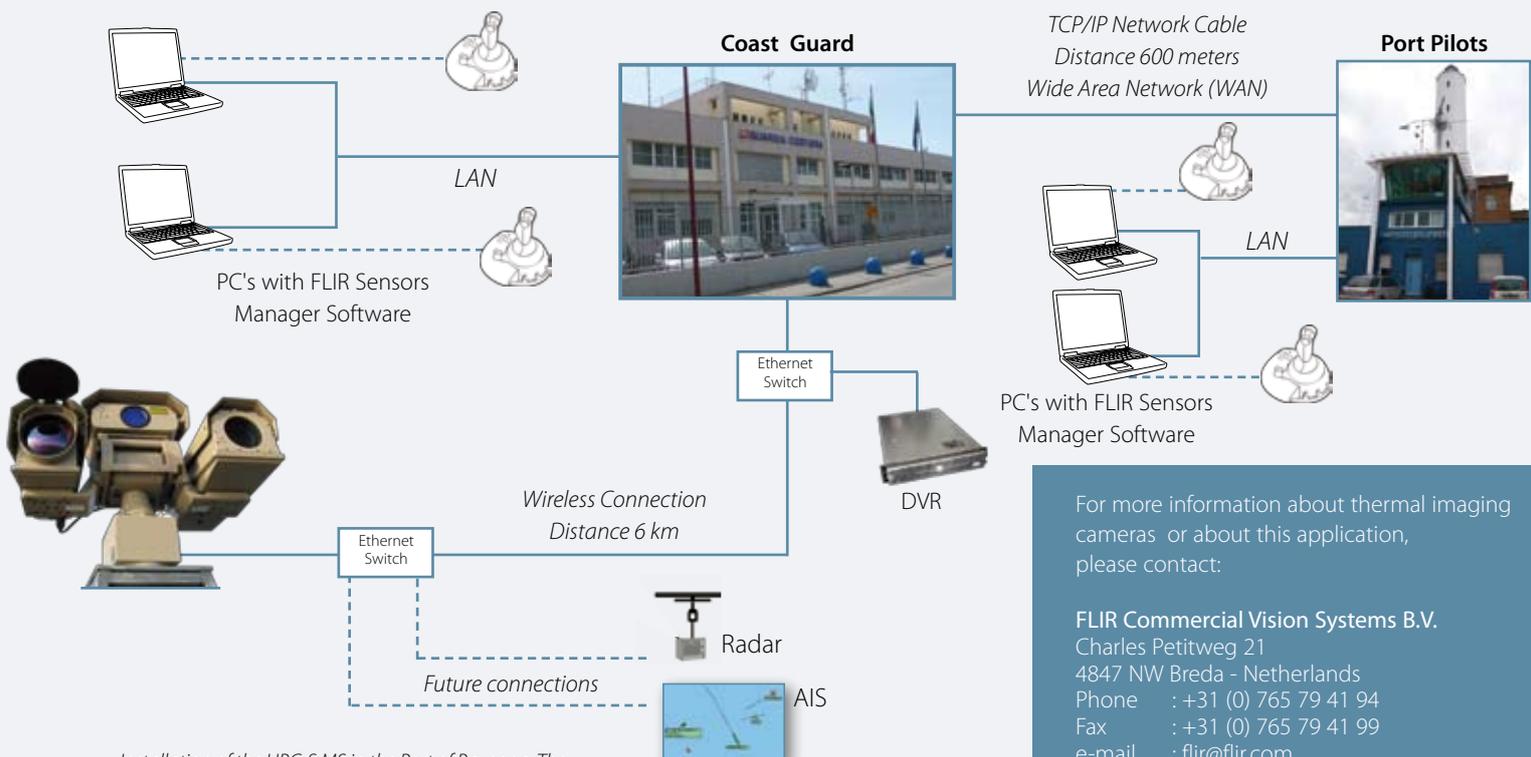
Sharing control of the HRC-S MS

"FLIR Sensors Manager also allows to share

the use of the HRC-S MS with the Coast Guard," continues Claudio. "They are the main user of the system and usually they have the control, but any time I need to use the HRC-S MS, I can send the request through FLIR Sensors Manager to the operator at the Coast Guard. A small message will appear on his screen so that he knows that I am requesting access to the system. He can allow or deny the access to the HRC-S MS depending on the situation. If he wants to continue chasing a target he will deny the access, otherwise he will permit it," Claudio says.

Future improvements: radar and AIS connection

"Once the wireless signal will be completely replaced by the fiber optical cable, the goal is to integrate the HRC-S MS system to the VTS system consisting of Radar and AIS, so that if the Radar detects an object the HRC-S MS immediately turns in the right direction so that the users can see what the "blip" on the radar really means. The HRC-S MS will also be connected to the AIS so that it will be possible get a visual image of the movements of a ship when necessary. Both during the day and the night," concludes Miss Minghelli.



Installation of the HRC-S MS in the Port of Ravenna. The wireless transfer will be replaced shortly by a fiber optic cable: The HRC-S MS will also be linked to radar and the AIS.

For more information about thermal imaging cameras or about this application, please contact:

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