Coastal Surveillance
The night is completely dark, no moonlight no starlight, and it's raining. With a high-end thermal imager, port authority officers detect an unidentified object heading into a forbidden area. The thermal imager fails to identify the boat, the number of people aboard and several other details.

The officers set the ARGC-2400 in the slave-to-thermal imager mode, and in seconds, they can see a small go-fast boat loaded with three men aboard, heading towards the harbor at 10 kilometers. These clear images are seen on screen and through a video feed in the officers' control room. Zodiacs, go-fast boats and RIBs are difficult to detect by radar except on flat calm seas or at very close range.

At 6 km, the officers using the ARGC-2400 can now identify men armed with rifles. An alarm is sent. In choppy waters, a go-fast boat can typically travel at speeds over 90 km/h, giving the officers only 4 minutes to assess the threat, select the proper response and give the appropriate command. Moreover, if the coast guards want to intercept the boat at least 2 km away from high-value assets, they need to take a decision within 1.5 minutes, embark in their speedboat and then in a best-case scenario, meet the suspect boat at 2 km from the harbor. It leaves only 3.5 minutes to avoid a disaster.

Typical cameras might have revealed the information only at short distance, perhaps at 1 kilometer, therefore allowing the threat to get close enough to trigger an explosion. Under such conditions, a possible collision with a high-value asset could happen in less than 40 seconds, which is clearly not sufficient, to allow authorities to take a decision and intercept the speedboat.

With range-gated cameras such as the ARGC-2400, the port authority officers have additional valuable time to respond to a possible threat.

Here is a realistic scenario:
Today’s challenges not only require long-range detection systems; professionals need identification cameras with the longest range, in order to adequately assess the security threats 24/7, in a very short delay. Obzerv’s cameras have been developed to specifically compensate the weaknesses of existing/conventional detection and recognition devices.

In high traffic areas like commercial shipping channels, it is particularly important to properly distinguish between civilians rightfully exercising their professional or leisure activities (pleasure boating, fishing…) and those attempting to commit illegal trades such as drug trafficking, illegal alien smuggling, terrorism and piracy. Law enforcement needs convincing information to execute their judgment call to label a contact “suspicious”. Conventional technologies have excelled at detecting contacts and, traditionally, armed forces could declare the contact hostile by its simple presence in a forbidden area. Nowadays those criteria are inadequate. Law enforcement personnel need to correlate different sources of information to validate their veracity. It is no longer sufficient to detect a warm spot in a scene with a thermal imager. With the active range-gated solutions, they are now capable of reading a ship’s name 6 km away from shore, identifying its activities as well as classifying a ship located well beyond 10 km.

**ADVANTAGES**

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<th>ADVANTAGES</th>
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<tbody>
<tr>
<td>Read ship names.</td>
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<tr>
<td>Measure ship size and floating line.</td>
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<tr>
<td>Recognize target details such as rifles, weapons.</td>
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<td>Recognize and identify threats sooner, react faster.</td>
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<td>See through wheelhouses.</td>
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<tr>
<td>Reduce the number of cameras, infrastructures, maintenance and personnel.</td>
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<td>See invariant signature of objects no matter their temperature or the environmental conditions.</td>
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<tr>
<td>Clearly see speedboats and zodiacs.</td>
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<td>Locate buoys, markers and identify floating objects.</td>
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<td>See in adverse weather conditions.</td>
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<td>Easily detect reflective objects such as life jackets for search-and-rescue application.</td>
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**24/7 THREAT ASSESSMENT AND IDENTIFICATION**

Advanced security criteria now require a visual confirmation of the number of people declared by the crew. It is also important to identify people aboard and see what they are doing as well as if the personnel on the bridge seems under duress. In our day and age, surveillance solutions must provide the ability to see if people or certain merchandise are being transferred between a ship and a small craft such as a zodiac or if goods are simply thrown overboard.

**OCCUPANT IDENTIFICATION**

![ACTIVE ARG-2400 CAMERA](image1.png)

**ACTIVE ARG-2400 CAMERA**

Counting the number of people and identifying their activities at 1.8 km.

![THERMAL CAMERA](image2.png)

**THERMAL CAMERA**

Counting the number of people and identifying their activities at 1.8 km.
SHIP IDENTIFICATION

With the increasing acts of piracy and terrorism at sea, it is now essential to identify a ship and corroborate that the declared identity is the same as what can be read from the hull. It is also critical to have a coherent identification (name and registration number on the bow and stern of the ship, bridge, life rafts, ring buoys...).
ACTIVITIES IDENTIFICATION

The security team also wants to identify nearby activities, distinguish between terrorist threats (man holding a rifle) and harmless civilian activity (man holding a fishing rod).

**ACTIVE ARG-C-2400 CAMERA**

Identifying activity at 1.1 km.

Distinguishing a civilian activity from a terrorist threats at 2.3 km.

Differentiating a boat on the move from a boat stopped doing harmless activities at 900 m.

**THERMAL CAMERA**
DIMENSION AND LOAD CORROBORATION

It is important to corroborate the information given by the boat crew with regards to the load transported. As an example, a boat crew can declare that they are not transporting merchandise, yet their flotation line indicates that the boat is loaded. Using the ARGC cameras, with two mouse clicks on the screen, you can measure the flotation line or the ship dimensions.

All that information is simply not available with other technologies that were mainly developed with detection missions in mind.

MULTIPLE SENSORS FOR DAY AND NIGHT OBSERVATION

The ARGC cameras have two sensors that can be used with the high magnification telescope: a color camera and an Intensified Charged-Couple Device (ICCD) camera, gated to the laser pulse. The telescope design is achromatic and therefore the camera can provide the same high magnification at day or night. Moreover, a wide-field-of-view color camera is also available for day observation. A thermal camera can be installed on the top of the ARGC-2400 or inside the enclosure of the ARGC-750 based on required performance.
INTEGRATION VERSATILITY

The integration of the ARGC family of cameras is very straightforward and has been done through various network-enabled strategies, depending on the customer’s operational and maintenance objectives. Network-enabled capability means that all services involved share information and are able to coordinate their efforts. Typically, the queuing information comes from a Radar Processor, but the simple format of the information packet can also be generated by other systems such as vessel traffic systems, thermal cameras, intrusion detection systems, targets or site databases containing points of interest. A map display system can also generate such packet. This packet mainly includes information regarding the azimuth, elevation and range of the target from the camera.

The information packet about the target location is transmitted to the Master Control Unit (MCU) and the ARGC camera using TCP/IP. Furthermore, this queuing information channel is bi-directional and therefore the ARGC sensor will send back its actual pointing orientation information. This information can also be displayed over a map to confirm that the camera is indeed being slewed to the new position.

After integration, the ARGC camera is either moved manually or slaved to an external control system. When the camera is slaved to a radar, the radar operator uses the ARGC to assess the designated targets. The integrated camera system links the image with the targeted object and its position within a mapping display providing a global view of the traffic.
Possibilities of new passageways through the northern parts of this world quickly prompted the need for a versatile and powerful surveillance network for northern countries. In one case, a whole system was defined to understand activities and events on and under the sea, on land and in the sky. Choke points were then surveyed and terrestrial surveillance sensors selected: radar, Automatic Identification System (AIS), thermal cameras and near infrared cameras. This is where Obzerv came into play. Obzerv’s camera versatile integration capabilities made it possible to slave it to the radar and AIS positioning system, in order to get long-range imaging and display it on a digitalized map. The whole ARGC system was placed in rugged rackmount transport cases and the actual camera with its pan and tilt was deployed on a sturdy tripod, making a quick setup possible in these remote parts of the world.

Upon completion of all the project milestones, Obzerv will deliver a fully integrated situational awareness solution, which combines its ARGC-2400 long range identification camera, a high-end thermal camera and a moving map display developed by CarteNav Solutions of Halifax, Nova Scotia. The system will be referred to as Canadian Arctic Night and Day Imaging Surveillance System (CANDISS) and is developed involving Canadian Defense Research and Development Canada (DRDC) Valcartier.
The French Army (DGA) wanted to secure the maritime traffic and prevent criminal activities as well as pollution risk. For this reason, they initiated the Spationav project to upgrade two semaphores at Toulon and Brest. Ultra long-range ARGC-2400 cameras were integrated to existing radar stations. While radars are dedicated for the detection of unusual activities and threats, ARGC-2400 cameras are used to recognize and identify those targets. EADS/Sofrelog integrated the ARGC-2400 to the radar, Vessel Traffic System (VTS) and mapping display.

"When given the capability to recognize and identify a potential threat sooner, the port authority officers will react faster and have more time to avoid a catastrophe" says Mr. Laurent Michoux from the DGA.
It is known that international terrorism, human trafficking and drugs smuggling occur over coastal waters. For Maritime Domain Awareness (MDA) systems, the process is divided in three steps: objects detection, their classification or identification, and separation of suspect from non-suspect target. Detection is performed by the radars. Classification is accomplished by electro-optical devices such as the ARGC-2400, along with Identification Friend or Foe (IFF) system or Automatic Identification System (AIS) that separate regular liners from others. For visual identification of threats, accuracy is of the utmost importance. At that stage, Obzerv’s accuracy become clearly necessary.

The figure below depicts a screenshot of the HITT electro-optic display showing a target that can be clearly identified with a laser range-gating camera. The narrow laser beam, which perfectly matches the field of view, allows for a high magnification of the image. Lighting conditions are such that the color camera cannot deliver useful imagery, whilst the thermal imager cannot identify the target. "HITT’s integration of the ARGC camera with a radar-based Vessel Traffic Monitoring system greatly enhanced its operational capability," says HITT traffic B.V. IR. L.G. Bohmer, "it brought "clarity" in situations where operators run the risk of saturation due to high traffic."
**SOFRELOG’S MALAYSIAN INTEGRATION**

Growing piracy threats are a problem to the Strait of Malacca, Malaysia, carrying 70,000 vessels per year, which is the main passageway for oil tankers, on their way to world consumers such as Japan and China. On March 21st 2009, the Japanese government offered three cameras to the Malaysian Maritime Enforcement Agency (MMEA) to complete its surveillance system network. The ARGC-2400 cameras were integrated to existing radar stations, enhancing the smooth flow of sea traffic along the 900-kilometer channel. While the radars detect the location of unusual activities and threats, the ARGC-2400 cameras classify and clearly identify these targets.

**LONG-RANGE PERFORMANCE**

The political/economical context requires that nations enforce their borders more thoroughly and gather more intelligence on the activities of criminals either during the day or at night, as well as in degraded atmospheric conditions. Maritime borders and strategic waterways are of critical importance in war against terrorism, piracy, illegal fisheries, smuggling and war on drugs. Those who have thoroughly investigated all available technologies have selected Obzerv’s cameras.

**ACTIVE ARGC-2400 CAMERA**

Intruders spotted 3.5 km away with the ARGC-2400.

**THERMAL CAMERA**