



# APPLICATION STORY



## FLIR cameras help save lives in Norwegian waters

'All search and rescue teams all over the world should have these FLIR-cameras'

*Everyone that has been at sea at night will agree that being able to see in the dark is a very important asset to any sailor, but for the Norwegian Society for Sea Rescue (NSSR) it quite literally makes the difference between life and death.*

*In the winter months the northern parts of Norway are enveloped in utter darkness for months at an end, which would seriously reduce the effectiveness of the NSSR crews in emergency situations. But now that FLIR cameras have been installed on their vessels the darkness no longer limits the NSSR crews, not even during that long winter night. "Each search and rescue society should equip their vessels with FLIR cameras", claims Search and Rescue Inspector Ronny Pedersen. "I am absolutely certain that these cameras will save human lives. It's really just a matter of time."*

The NSSR was founded on July 9th, 1891, with a clearly defined goal: to save lives at sea. Since that day, the NSSR's boats and crew have saved over 6,200 people from certain death and over 500,000 people have received assistance.

### Including night vision technology

To cover the entire Norwegian coastline, from the Swedish border in the south to the Russian border in the north, 25 permanently manned rescue boats are stationed at strategic points all

along the coast, supplemented by an additional 16 boats manned by trained voluntary crew. Recently the decision was made to add six new rescue boats to the NSSR fleet. "Coastal traffic is in a continual process of change and modernization and that means that as a rescue organization we have to keep up with new developments", explains Pedersen. "And we feel that to keep up with modern times, our equipment should include some kind of night vision." After comparing several options the NSSR decided



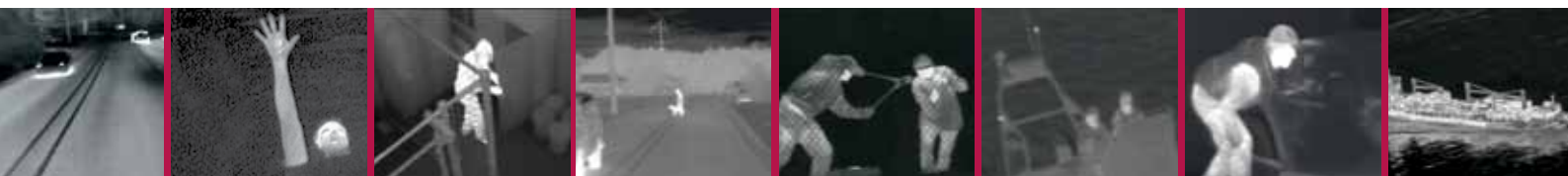
The ability to see at night with the Voyager camera allows the crew of the Stormbull to more effectively save human lives.



Four people peddling along in canoes, as seen from the Voyager's daylight camera.



The same four canoe enthusiasts stand out very clearly on the Voyager's thermal imaging camera.





From left to right: Per Andresen, Navy Electronics, and Ronny Pedersen, NSSR Search and Rescue Inspector.

to opt for thermal cameras from FLIR Systems. "The FLIR cameras simply deliver the best quality nighttime vision for the lowest price."

### Thermal cameras on the entire fleet

As a test the NSSR had several FLIR cameras installed on different types of rescue boats. "We ordered 9 Voyager cameras and 4 Navigators and recently we have had one M-series camera installed. And due to the positive feedback of the crews we are now considering to install FLIR cameras on the entire NSSR fleet."

In doing so, the NSSR will set a real precedent. The Norwegian rescue organization is among the first of its kind in the world to adopt FLIR cameras in earnest. Pedersen: "As I explained earlier, we are constantly looking for new technologies to help us perform our task as a rescue-organization to the best of our ability. FLIR cameras are simply the latest addition."

The installation of the FLIR cameras on NSSR rescue boats was performed by Navy Electronics, the only nationwide dealer of maritime electronics in Norway. According to Per Andresen installing FLIR cameras is relatively easy, compared to other navigation tools. "It's just a matter of finding the right position on the ship for the camera to be mounted, then drilling a few holes for the cables and such and making it waterproof again afterwards."

### Thermal imaging has numerous possibilities

Andresen is very pleased with the NSSR's intention to install the FLIR cameras on the rest of the fleet and he urges others to follow suit. "The moment I got in touch with FLIR I immediately saw the potential these cameras have for all types of maritime applications. I'm convinced that these FLIR cameras are a valuable asset to everyone who owns or operates a maritime vessel of any kind, for instance for navigation during dark or foggy conditions or for saving human lives when someone has fallen overboard."

One of the rescue boats on which Andresen installed a FLIR camera is the RS 146 Stormbull. This Petter C. G. Sundt class rescue boat is based in Oscarsborg near Oslo. The Stormbull is 17 meters long and weighs almost 28 ton. With its top speed of 39 knots it is one of the swiftest rescue boats the NSSR has at its disposal. When it was built in 2009 the Stormbull was fitted with state of the art equipment, with the FLIR Voyager camera as its latest addition.

### Voyager: more than just a camera

The FLIR Voyager contains not one, but two thermal imaging cameras. One camera, the so-called wide-angle camera, is mainly used for navigation. It allows you to easily detect other boats or hazard in the direct vicinity. The other one, the long range camera, allows you to zoom in. The ability to look further ahead allows you to pick up potential hazards from a larger distance, allowing you more time to react.

Not only does the Voyager incorporate those two thermal imaging cameras, it's also equipped with a daylight / lowlight color camera that lets you see harbor entrances and other vessels very clearly in the half-light of dawn and dusk. With the total of these three cameras the Voyager provides ideal imaging capability 24-hours a day.

### Thermal images deliver crucial information

On the Stormbull the Voyager camera is connected to two multifunction screens that can either display the radar, the chart plotter or the images from the FLIR camera, but it is also connected to one dedicated screen that continually shows the FLIR camera's images. This ensures that all three crewmembers have access to the thermal images and due to the dedicated screen one of them is always watching the FLIR camera's thermal images, to prevent that some piece of crucial information is overlooked.

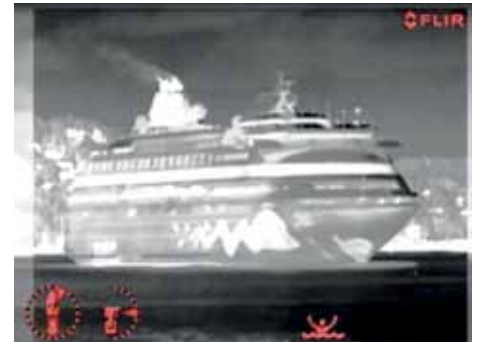
The Stormbull's crew has used the Voyager camera for about a year now and they are very pleased with it. The ship's captain Glenn Pettersen: "During the winter period, when the water gets really cold, time is of the essence. Anyone who is exposed to the cold Norwegian waters without proper protection will die of hypothermia within 10 to 20 minutes. The FLIR Voyager helps us to get there before it is too late."

### Easy and intuitive

Usually the ship's chief engineer, Andreas Grorud, is the one who operates the camera. "In my opinion it is very easy to use, especially if you compare it to other navigational tools like the radar. Unlike radar the FLIR camera is very intuitive and I found that I could start using it right away."



A cruise ship as seen with the Voyager's daytime camera.



The same cruise ship with the thermal imaging camera, note the visibility of the paint on the ship's hull.



In the Stormbull's cabin two multifunction displays and one dedicated display give all three crewmembers continual access to the Voyager's thermal images. The ergonomic Joystick Control Unit (JCU) is mounted in the middle.



*The Stormbull's crew of three: from left to right rescuer Svein Larsen, chief engineer Andreas Grorud and the ship's captain Glenn Pettersen. The Voyager has been installed on the roof of the cabin, to maximize both stability and long distance effectiveness.*

The ergonomic Voyager's Joystick Control Unit (JCU) allows for easy and intuitive operation. With a nudge of the finger you can easily pan and tilt the camera and all the other camera commands are right underneath your fingertips.

Grorud is very pleased with the sturdy build of the Voyager. "The FLIR camera sometimes takes quite a beating when the weather gets rough and it gets sprayed with salt water almost on a daily basis, but this does not hinder it. Even during the winter, when the seawater freezes as soon as it gets in contact with the boat, this doesn't impair the effective use of the Voyager camera at all."

The Stormbull crew uses the FLIR camera mostly to navigate in dark conditions, but according to Grorud it is in man over board situations where the camera really shines. "Due to the difference in temperature between the water and the human body, you can easily spot the person from a very large distance. We tested the Voyager by having someone jump in the water so that only his head was above the water and we could easily spot it and recognize it as a human head from a distance of over one thousand meters."

### Voyager stabilization

Tests with the new version of the Voyager camera show that people floating in the water, with all but the head submerged, can be detected from a distance of up to 2.2 kilometers. Small objects of proximally 2 by 2 meters can even be detected from a distance of 5.8 kilometers.

When using the FLIR camera at such long distances Grorud is very glad that the Voyager has an automatic stabilization function. "When the sea gets rough you really need the stabilization to be able to use the FLIR camera effectively at that kind of distance. If in those situations I switch the

stabilization off I'll be looking at either the sea or the air most of the time instead of looking at whatever I'm trying to look at."

### Also useful in broad daylight

According to Grorud the FLIR camera is also very useful in broad daylight. "Naturally it is a great tool for navigating during the night and it even works when in slight fog. So it makes sense that the FLIR camera is of vital importance in those conditions. But sometimes we even use it in daylight conditions. A little while ago we received a call that a large wooden pole had gotten loose during a storm and was floating around, forming a potential hazard to ships in the area. But it was hard to spot the dark tree-trunk sized pole with the naked eye, due to its camouflage against the dark water. But when we switched on the FLIR-camera we could make out the floating pole quite easily, because the warmer wood showed up on the IR-camera display in stark contrast to the cold water. So even in full daylight the FLIR camera proved itself to be a useful tool!"

### Iceberg ahead!

"In the winter we also use it to avoid collision with drift ice", adds captain Pettersen. "When there are lots and lots of those large chunks of ice floating around in this bay, it can get very dangerous. And unless they are extremely large, as in the size of an iceberg, the radar doesn't pick them up. The Stormbull has not been designed to withstand the impact of drift ice, so in the past we had to be very careful when we had to move out in the dark winter months. But now that we have the Voyager, it's really easy to navigate around the floating ice-chunks. Due to the difference from a thermal point of view between the liquid water and the frozen ice, we can see the ice very clearly from a long distance and comfortably avoid it. This allows us to perform our tasks without slowing down, which is extremely important when lives are at stake."

Kent Andersen, volunteer on the Simrad class rescue boat RS 128 Gideon, couldn't agree more. "In the past nighttime and winter-operations proved to be quite tricky. The Gideon is a smaller vessel that often operates in shallow waters, where most other boats will not go. In dark conditions we had to use torches and searchlights to scan for floating debris or other hazards, which slowed us down a great deal. With our new FLIR camera we can go in a lot faster than before, we don't have to slow down as much."

### M-Series thermal imaging camera

Based over 1500 kilometers north of Oslo, in the city Tromsø, the Gideon, which is manned by a crew of volunteers, is at the heart of the area where most incidents take place. With its length of just under 13 meters, a weight of 9.7 ton and a maximum speed of 34 knots it is one of the lightest and smallest NSSR rescue boats.

Recently the maritime electronics dealer Navy Electronics installed the M-series FLIR camera on the vessel and Andersen was pleasantly surprised. "Beforehand I was afraid the camera would



*According to the volunteer crew of the NSSR rescue boat Gideon, the FLIR M-Series thermal camera so far lives up to its sturdy reputation.*



NSSR Volunteer Kent Andersen: "I had been hoping to get a FLIR camera for a very long time."

produce unstable pictures during rough weather or when we accelerate at full throttle, but even though the M-series FLIR camera does not have stabilization like the Voyager, I was amazed at the quality of the image it produces, even in rough conditions."

The M-Series' Joystick Control Unit (JCU) is even easier to use than the Voyager's JCU. With a simple tap of the finger you employ the camera's continuous 360° pan and tilt +/-90° field of view, for horizon to horizon visibility. The flexible M-Series is available with a variety of sensors and resolutions to meet a wide range of maritime needs and with its rugged waterproof exterior it is truly built to last.

The M-Series thermal camera that was mounted on the Gideon incorporates two sensors: a thermal imaging camera with a resolution of 320x240 pixels and an extreme lowlight micro-lux TV camera, to provide the best night vision possible in any given situation. It is connected to all three multifunction screens in the cabin so the crew



Kent Andersen operates the FLIR M-Series thermal camera on the bridge of the Gideon. "It rapidly became part of my routine to check what's on the FLIR camera."

can always choose what to watch simultaneously: radar, chart plotter or the images of the FLIR camera. Andersen admits that during nighttime operations he almost always has the images of the FLIR camera on-screen. "It rapidly became part of my routine to check what's on the FLIR camera now and again."

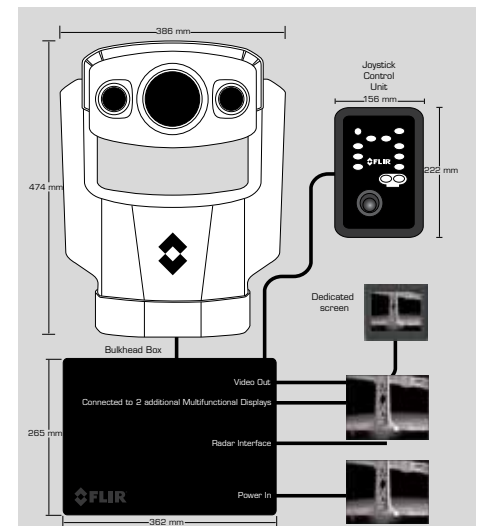
### Sturdy

According to the enthusiastic volunteer the M-series camera so far lives up to its sturdy reputation. "A relatively small boat like the Gideon is less stable in rough weather than larger boats, so the FLIR camera has to be able to put up with quite a lot of stress. But so far the camera could easily cope with even the harshest of conditions." Andersen has not yet been able to test the camera during the winter cold. "The M-series camera has a built in heating system, so it should be able to cope with the cold, but the conditions here get really tough in the winter. The cold seawater freezes up as soon as it touches the hull of the ship and there can be some very heavy snowfall in this area, so I'm really curious to see how well the M-series will cope with that."

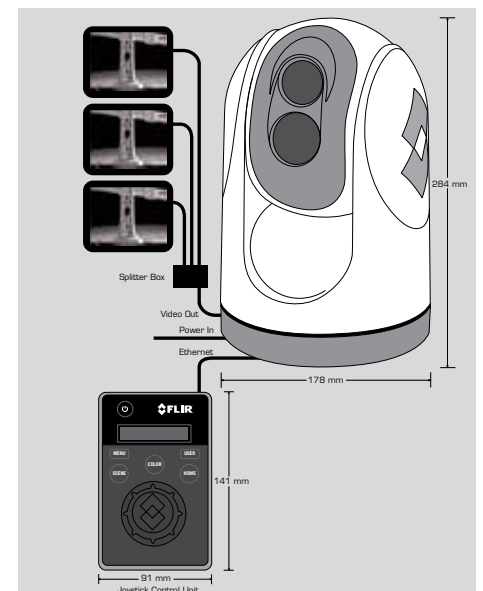
### Thermal imaging: an affordable technology that saves lives

When the news arrived that the Gideon would be equipped with a FLIR camera, Andersen was very excited. "I had been hoping to get one of these cameras for a very long time. Years ago I attended the demonstration of a FLIR camera on a military helicopter and I immediately realized the potential these cameras have in the area of search and rescue missions. But in the past the prices of thermal cameras would be quite steep. Those cameras were simply too expensive for our budget. Only recently, as in the last couple of years, those prices dropped to a level that we can afford."

Even though the prices of thermal cameras have been drastically reduced the past few years a FLIR camera's price tag might still seem like a lot of money, but according to Search and Rescue Inspector Ronny Pedersen it is worth every penny. "As of yet we haven't had to use our new FLIR cameras to save someone's life, but I'm convinced that these cameras have the potential to be a true lifesaver. It really is just a matter of time. And in my opinion this means that the investment of purchasing a FLIR camera certainly is worthwhile."



Schematics of the installation of the Voyager aboard the RS 146 Stormbull.



Schematics of the installation of the M-Series camera aboard the RS 128 Gideon.

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

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