



APPLICATION STORY



Thermal Imaging Shows the Way to a Safer Sydney Harbour

The FLIR M320L thermal imaging camera situated above the bridge on the Sydney ferry the Golden Grove.

Harbour City Ferries has developed as a high-reliability organisation concerned with the safety of its staff, vessels and other users of Sydney Harbour. Now its entire fleet are equipped with FLIR M320L thermal imaging cameras to further improve safety on the waters of Sydney.

Sydney's ferries have been servicing Sydney Harbour for more than 135 years. Harbour City Ferries operate approximately 175,000 services, transporting nearly 15 million people 1.3 million kilometers across the busy and scenically beautiful Sydney Harbour and the Parramatta River each year. Locals embark on Harbour City Ferries for their daily commute and visitors, who flock to this internationally recognised tourist destination, enjoy this captivating form of transport to explore Sydney's beautiful waterways, its vibrant city centre and surrounding areas.

This bustling harbour is not only a thriving port, catering to an unmatched array of commercial shipping and recreational boating; it is also a "circuit" to recreational paddlers and kayakers. With all this activity, and Harbour City Ferries' strategic focus on safety as its first priority, it was decided to install thermal imaging cameras on board the entire fleet of 28 vessels, six of which are double-enders, so 34 FLIR M320L cameras were purchased in total.

A dangerous place

In a crowded waterway such as Sydney Harbour there are countless opportunities for accidents to occur. Thankfully, with the installation of FLIR thermal imaging cameras on its fleet, Harbour City Ferries have made the harbour a safer place than in days gone by when only radar systems were fitted.



The joystick is on each bridge console, as close to the wheel as possible, so all features are right at the master's fingertips.



The M320L provides crisp, clear thermal imagery in total darkness and light fog or smoke.





The ergonomic M-Series joystick control unit provides ready access to all critical system functions and smooth, effortless control, even in rough seas.



The radar shadow and visibility issues cast by the Sydney Harbour Bridge is not an issue with thermal imaging technology.

The Sydney Harbour Bridge casts a radar shadow underneath it that limits the utility of radar in the area. The usefulness of radar is also adversely affected if the target vessel is small and not constructed of radar-reflective materials or does not have a radar reflector installed on it. Down-lighting from the Harbour Bridge, and background lighting and reflections off the water can also make spotting some vessels difficult. So in 2009, Sydney Ferries (as it was then known) advanced the technology of its fleet by including the installation of FLIR M320L cameras to assist in night and low visibility navigation.

The introduction to thermal imaging

The history to FLIR's relationship with Harbour City Ferries commenced with The Office of Transport Safety Investigations contacting FLIR Australia to take part in a re-enactment simulating a collision. FLIR contacted its distributor, Coursemaster

Autopilots, based in Sydney. "We provided a FLIR Navigator and personnel for the re-enactment" said Paul Garske, General Manager of Coursemaster Autopilots. "Subsequently Sydney Ferries purchased a Navigator for the purpose of trialling it. They were happy with the performance but in the end went with the FLIR M320L, which the masters preferred as it comprised both low light and thermal imager."

"Although thermal imaging cameras produce clear images in total darkness, we are also operating during the twilight hours of the day, when some sunlight or moonlight is present. Also during docking operations there is some light from the marina present. For these situations we wanted a lowlight camera as well," stated Glenn Young, Harbour City Ferries General Manager Operations and Asset Management

FLIR M320L: the perfect solution

"When we understood that Sydney Ferries wanted to have a combination of a thermal imaging camera and a lowlight camera, we decided to demonstrate the FLIR M320L," explains Paul Garske.

Installation of the FLIR M320L commenced in 2009 along with other NavAids equipment, supplied, installed and supported by Electrotech Australia. "The FLIR thermal imaging cameras are navigational aids for the masters and crew of the ferries to assist during times of poor visibility, such as fog, rain, glare, low light and at night," said Stephen Penny, Project Manager of Electrotech. The systems are also used for incident recording in conjunction with GPS, time stamp and speed overlay; all of which were installed by Electrotech.

Installing a FLIR Systems M320L

"The M320L is a small, ultra-compact gimbal, able to rotate 360° continuously and can tilt plus or minus 90° vertically. This means that the master can look wherever he needs," said FLIR's Maritime Distribution Manager, Peter De Ieso. "Cameras are installed in positions on the Ferries giving best view forward and to port and starboard. The compactness of the M-Series thermal imaging cameras allowed them to be accommodated within real estate constraints of what was already fitted to each vessel, such as radars. For most vessels this was just above the bridge.



"The M-Series can be easily mounted ball-up or ball-down. A menu setting allows the user to turn the direction of the image on the screen", explained Mr De Ieso. "The M-Series are extremely easy to integrate on board of any vessel, said Mr De Ieso. The images from the M-Series can be displayed on virtually any existing multifunction (i.e. chart plotter) display that accepts composite video.

"An M-Series camera provides two video outputs: one output is for the video signal from the thermal camera only; the other output is for video from either the thermal camera or the lowlight camera and is switchable from the Joystick Control Unit. The video from the M-Series camera can therefore be displayed on one or two video displays. Extra JCUs, to operate the M-Series cameras from different locations on the vessels, are an option and are simple to install."

"At Harbour City Ferries we decided to connect the M320L to one dedicated 15" Hatteland LCD screen. The master can easily switch from the image of the lowlight camera to the thermal image, and back, whenever he wants, at the



Different display settings let the operator choose between two black and white or three color display schemes that are easy on the eyes and help operators see better.



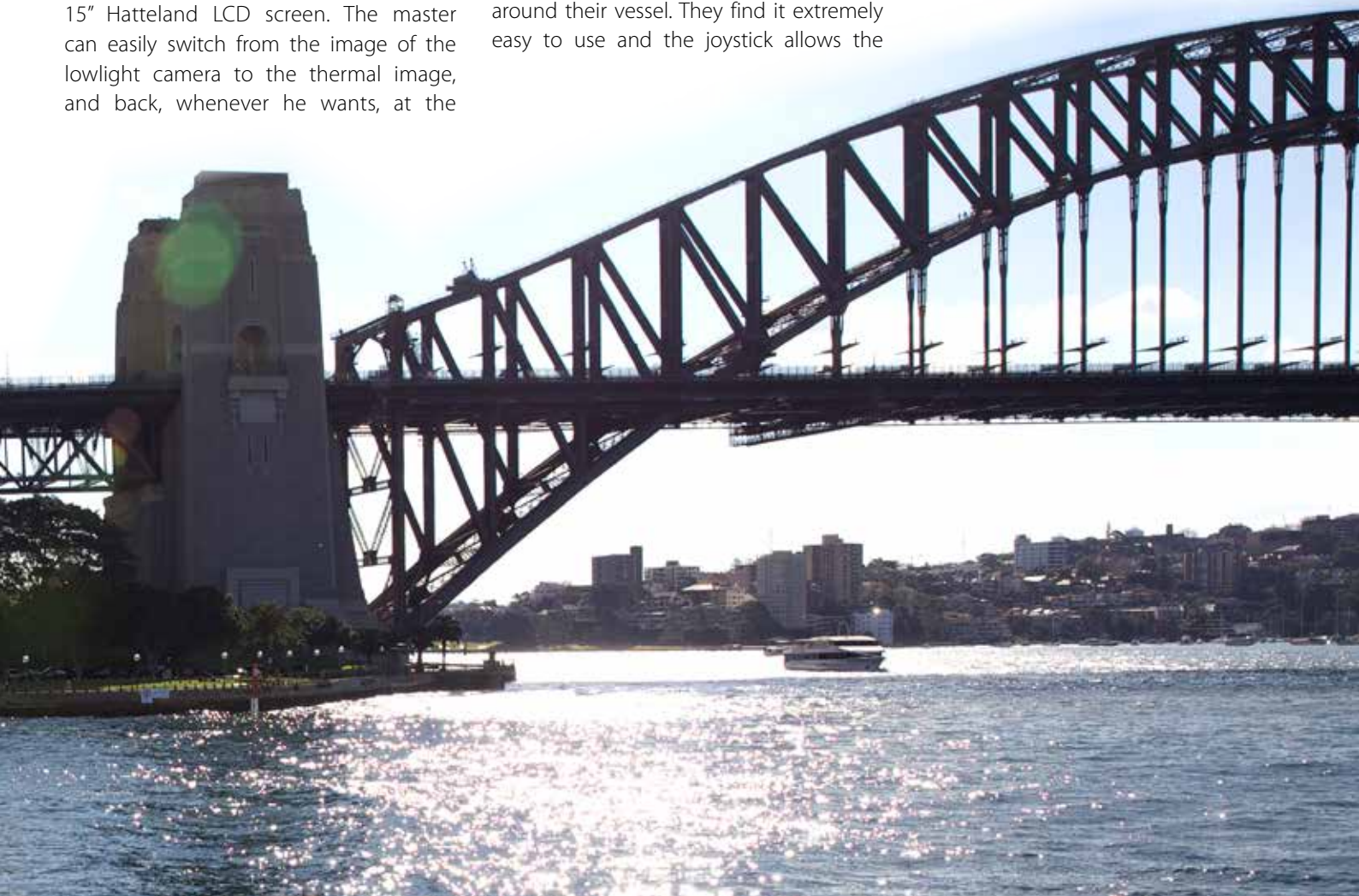
touch of a button. The cameras are set up in home position, which is useful, and each master also sets them to their own personal preferences," Glenn Young, General Manager Operations and Asset Management, Harbour City Ferries.

Excellent feedback from masters

"The feedback that we are receiving from masters on the FLIR M320L has been great," continues Mr Young. "They all report that the M320L helps them to get a better understanding of what is happening around their vessel. They find it extremely easy to use and the joystick allows the



The compactness of the M-Series thermal imaging cameras allowed them to be accommodated within real estate constraints of what was already fitted to each vessel.



master to operate all the features of the M320L such as pan/tilt or switching from daylight to thermal image. The joystick is on each bridge console, as close to the wheel as possible, so all features are right at the master's fingertips.

"Thanks to the crisp images the M320L is producing," continues Mr Young, "the masters' situational awareness has improved drastically and they have more

time to anticipate and react to what is happening around their vessel. During twilight hours, or when some light is present, they can use the lowlight camera. Once it is getting too dark they just switch to the thermal imaging camera and maintain a clear overview of the situation."

During the warmer weather and when the sun rises later of a morning, kayakers

and rowers are out on the water during periods of darkness, reported Sydney's The Daily Telegraph. Prior to the thermal camera installs, ferry masters were regularly radioing warnings of unlit kayakers and other vessels, fearing the possibility of a fatal collision. "Small craft are difficult to spot using radar", said ferry master Wayne Pritchard. "They are designed so they don't have a lot of superstructure above the water so it is difficult for the radar to pick them up." Now armed with the FLIR M-Series thermal imaging cameras the masters have a clear view of the water, even in total darkness. One ferry master even commenting that the FLIR was the only reason he was able to spot an unlit kayaker in time to avoid a collision.

Sightings of unlit vessels, usually small boats that are not required to carry fixed lights, are common but there are also regular sightings of unlit vessels that ought to have fixed navigation lights illuminated at night.

"At Harbour City Ferries, we are convinced that thermal imaging cameras are a great tool to increase safety on board any vessel." concludes Mr Young.



Ferry Master at the helm with FLIR's Maritime Distribution Manager, Peter De Ieso and Electrotech's National Service Manager, Zeb Taylor.



FLIR M-Series

The FLIR M-Series thermal imaging camera is available with a variety of sensors and resolutions to meet a wide range of maritime needs.

- Thermal imaging camera with an uncooled VOx microbolometer, thermal images up to 640 x 480 pixels
- Lowlight CCD camera
- Rugged and waterproof
- 360° pan and +/- 90° tilt
- Detects 2.3 m x 2.3 m objects at a distance of more than 3 km in total darkness

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

FLIR Commercial Systems
Luxemburgstraat 2
2321 Meer
Belgium
Tel. : +32 (0) 3665 5100
Fax : +32 (0) 3303 5624
e-mail: flir@flir.com