THERMAL VISION FOR RECREATIONAL BOATING

NIGHTTIME ON THE WATER MADE SAFER WITH FLIR

FLIR maritime thermal imaging systems turn night into day, keeping you safe and secure on the water and letting you boat with confidence.

SEE THE HEAT

Thermal imaging cameras detect and display images based on tiny differences in heat, not light. From pitch black, to moonlight, to severe midday glare, FLIR detectors capture the thermal energy emitted or reflected by everything, even ice. FLIR cameras then convert the small differences in temperature into easy-to-interpret infrared video images, allowing you to see at night and navigate in total darkness.

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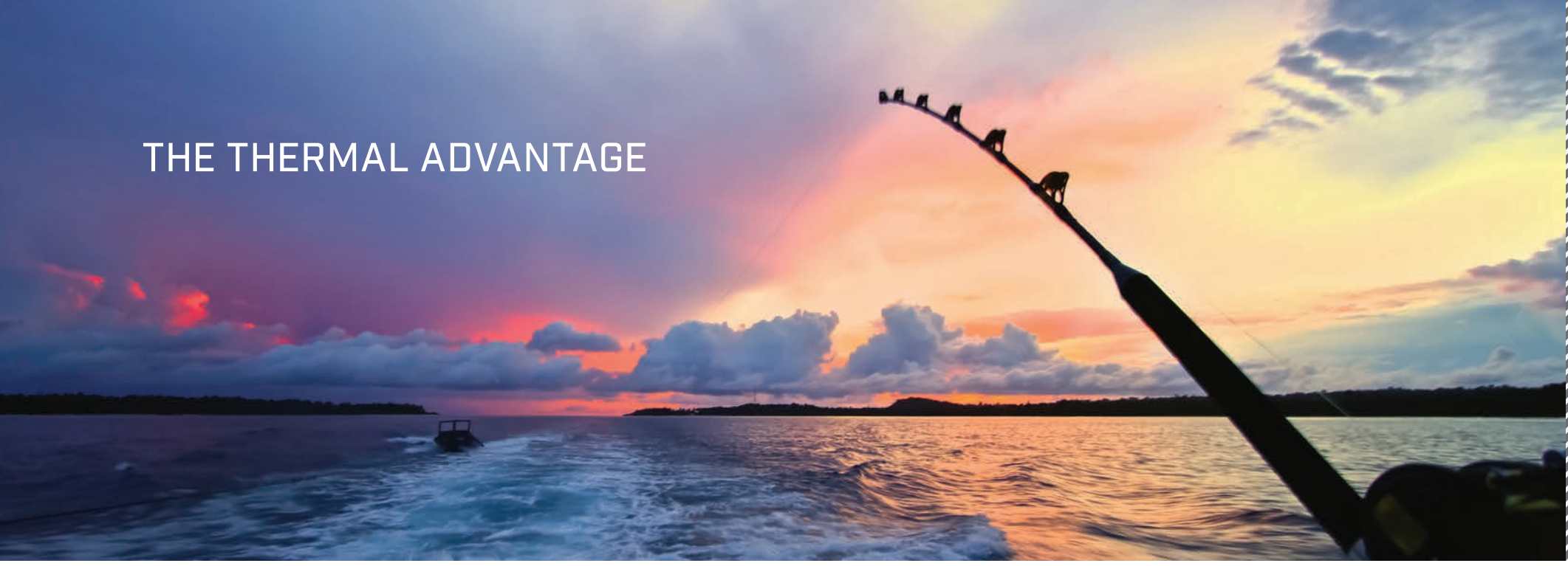
FOR EVERYTHING FROM KAYAKS TO SUPER YACHTS, FLIR OFFERS CUTTING-EDGE MARINE THERMAL CAMERAS THAT ARE RUGGED, RELIABLE, AND SIMPLE TO USE.

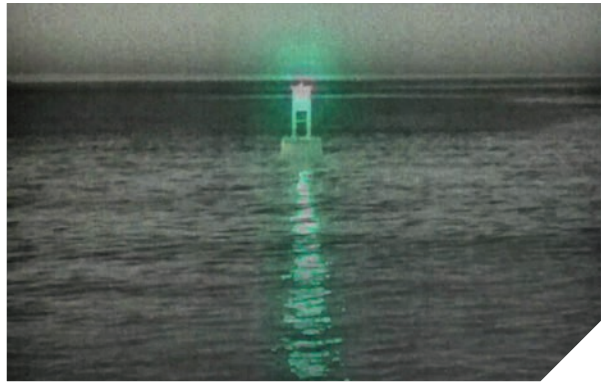


THE THERMAL ADVANTAGE

BOAT SAFER AND AVOID DANGER

Day or night, FLIR thermal imaging detects obstacles, such as jetties, rocks, navigation aids, and more. Charged by daylight, these objects continue to emit infrared heat all night long.

Thermal imaging instantly detects kayaks, paddleboards, and personal watercraft. The kayaker's own body heat makes him a bright target for FLIR thermal imaging.



Color Thermal Vision™ (CTV) technology blends thermal and HD color video for enhanced identification of buoys and other vessels.

ENHANCED SITUATIONAL AWARENESS

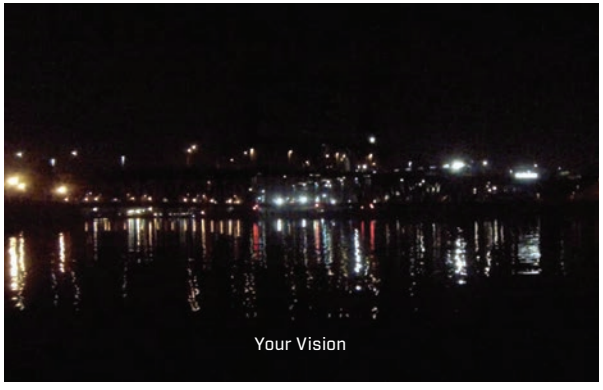
FLIR thermal imagers make it easy to confirm the positions of navigation aids and landmarks. Systems with pan/tilt/zoom (PTZ) gimbals can even integrate with select multifunction navigation displays and radar systems, making target ID even easier.

Thermal imaging instantly reveals other vessels masked by background lighting and solar glare. Because they see heat, rather than visible light, FLIR cameras deliver the same high-quality images day or night.

NAVIGATE SMARTER

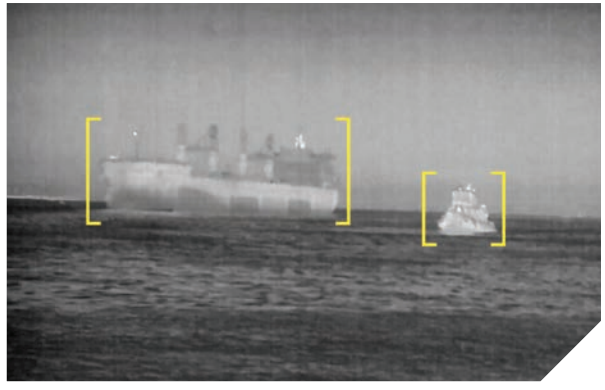
Thermal imaging not only lets you see approaching vessels, but also the activities of those onboard. Many systems offer digital and optical zoom to further enhance small or distant objects.

SEE AT NIGHT



Your Vision: Floating debris is almost impossible to spot at night, especially with bright urban back lighting.

FLIR Vision: Thermal imaging easily detects the floating box, as well as the bridge span ahead. The thermal camera is completely immune to the effects of bright city lights and glare.



In addition to the power of thermal vision, many FLIR maritime cameras feature ClearCruise™ Object Detection technology for recognizing and highlighting non-water objects, such as boats, buoys, or floating debris.

YOUR VISION VERSUS FLIR VISION

Your Vision: Emergency lights on a police boat mask its navigation lights, making it hard to determine its aspect at night.

FLIR Vision: Thermal imaging is immune to visible light and glare. Not only can we clearly see the police boat, we can also see the buoy and jetty astern of it.

Thermal imaging works night and day, in total darkness or bright sunlight, through smoke, dust, and even light fog to keep your passengers and crew safe from hazards and threats.

FLIR - THE WORLD'S SIXTH SENSE

At FLIR, we develop a wide range of technologies that enhance perception and awareness. We bring innovative sensing solutions into daily life through our thermal imaging, visible-light imaging systems, location technologies, measurement and diagnostic products, and advanced threat detection systems. Our products improve the way people interact with the world around them, enhance public safety and well-being, increase energy efficiency, and enable healthy and entertained communities.

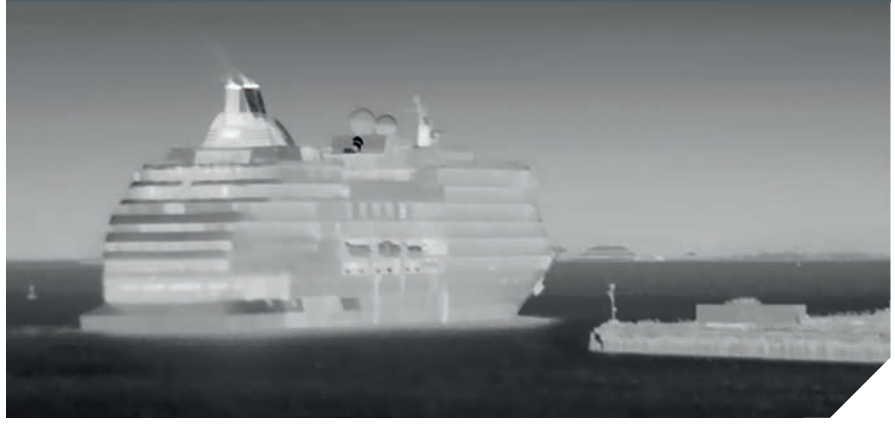
UNDERSTANDING RESOLUTION AND RANGE

FLIR offers a range of thermal imaging cameras with varying levels of image resolution. Much like a digital camera, FLIR cameras with higher pixel counts offer more detail, but more importantly, high resolution thermal cameras see objects at greater distances. For example, an uncooled, 640-resolution FLIR camera can detect a vessel at almost twice the range of a 320-resolution camera. Premium cameras with enhanced optics and cooled thermal cores offer even longer-range target detection capabilities.

Lower Resolution

Thermal imagers with lower resolutions provide good basic target detection and identification at short to medium ranges.

Higher Resolution



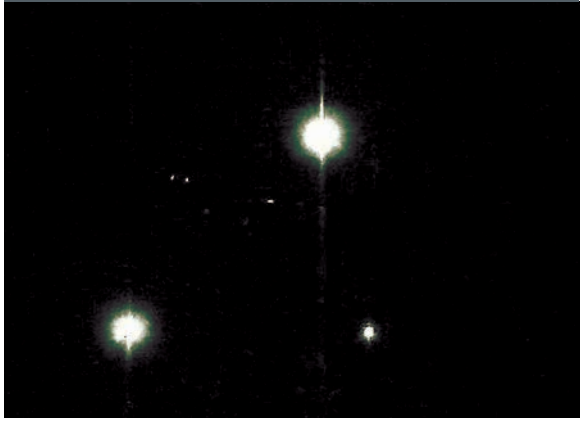
The increased pixel density of high-resolution systems gives them increased contrast, more lifelike detail, and higher sensitivity at long range.

VISION IN TOTAL DARKNESS

Daylight cameras, image intensified night vision (I^2), and the human eye all create images from reflected light. Traditional green night vision scopes and goggles all magnify small amounts of visible light. However, traditional imagers have the same limitations as the human eye. If there isn't enough light available, they don't work well. Plus, during daylight and twilight hours, they aren't useful either because there is too much light for them to work effectively.

FLIR thermal cameras work both day and night, regardless of light. They're totally immune to the effects of darkness, glare, or even direct sunlight.

Your Vision



The human eye can't react well to darkness pierced by bright lighting. The lights of the approaching vessel are blinding, making it impossible to see the details.

Traditional Gen3 Image Intensified Night Vision

Image intensified night vision scopes and goggles are also at a disadvantage. They over-magnify the lighting in the scene, hurting your eyes and concealing important details.

FLIR Thermal Image

Since the thermal camera sees heat, rather than light, it is immune to the blinding effects of the boat's navigation lights. We can clearly see two occupants in the approaching RIB.

FLIR SCION® OTM

SCION OTM FEATURES

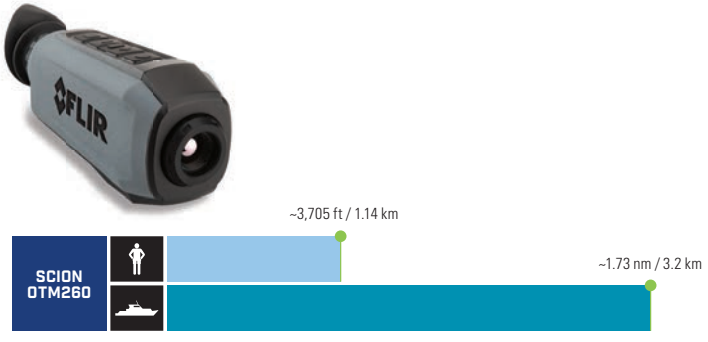
- Rugged IP67-rated housing
- Easy-to-use interface
- Onboard video and image recording
- White Hot, Black Hot, Iron Bow, Rainbow, Graded Fire, and Lava thermal palettes
- Built-in Bluetooth® and Wi-Fi capabilities
- Available in 320 × 256 and 640 × 512 (9 Hz) resolutions
- 2x/4x E-Zoom available on 320 models, 2x/4x/8x on 640 models

HANDHELD THERMAL CAMERA

The FLIR Scion® OTM captures clear thermal imaging and leverages an easy-to-use interface to quickly detect objects of interest in complete darkness and through glaring light or haze. Scion records geotagged video and still images for playback long after the day is done. Operation is simple with intuitive on-screen graphics and a simple, single-handed control.
A rugged, IP67-rated housing allows Scion to deliver reliable thermal imaging in the harshest weather and most demanding outdoor environments.

The high-resolution Boson™ core in FLIR Scion delivers detailed, high-contrast thermal images day or night.

SCION OTM DETECTION RANGES*



*Actual range may vary depending on camera set-up, environmental conditions, and user experience.

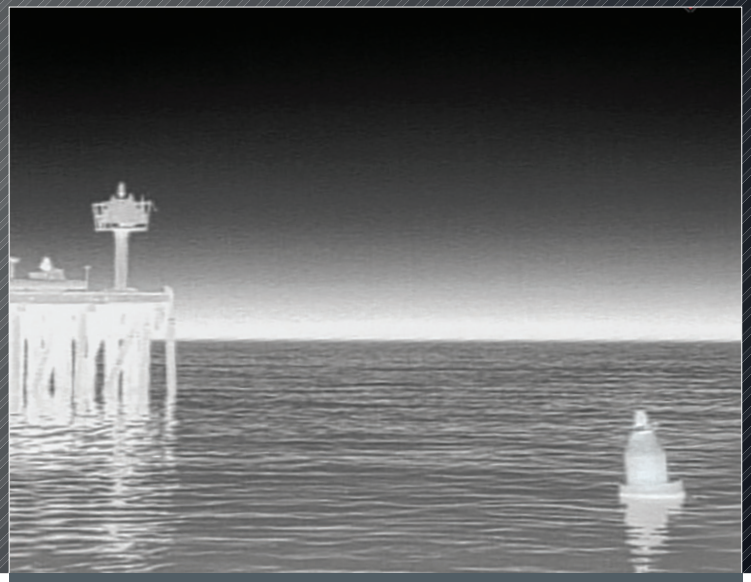
FLIR MD-Series™

MD-SERIES FEATURES

- 320 × 240 or 640 × 480 resolutions produce clear, detailed images
- 2x E-Zoom available on MD-324, 2x and 4x on MD-625
- Automatic window heater keep optics free of ice
- Ethernet-enabled for simple integration into your current electronics
- Slim profile (7" high and only 1.36 kg/3 lbs) for an unobtrusive mount
- Analog video output for easy connection to onboard monitors, recorders, or DVR systems

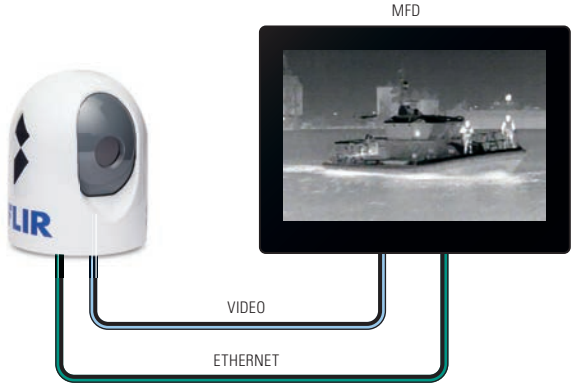
FIXED-MOUNT MARINE THERMAL VISION

This affordable, fixed-mount thermal night vision system helps you steer around obstacles, avoid collisions, and find people in the water, day or night. The MD camera body is simple to mount and easy to integrate into existing electronics. Mount the display separately on your helm, or view the video feed using existing multifunction navigation displays from leading manufacturers, including Furuno, Garmin, Raymarine, and Simrad.



Easily see navigation aids

MD-SERIES DETECTION RANGES*



*Actual range may vary depending on camera set-up, environmental conditions, and user experience.

FLIR M232 Series

M232 SERIES FEATURES

- 320 x 240 resolution for clear, detailed images
- 4x continuous E-Zoom magnifies distant targets for easy identification
- Ethernet-enabled for simple integration with your other electronics
- 360° pan and +/-90° tilt capability
- Rugged, waterproof gimbal enclosure with automatic window heaters for ice management
- IP video for integration with latest state-of-the-art navigation displays (check FLIR.com for a list of compatible displays)
- ClearCruise™ Obstacle Detection when connected to Raymarine Axiom systems.

COMPACT MARINE THERMAL VISION

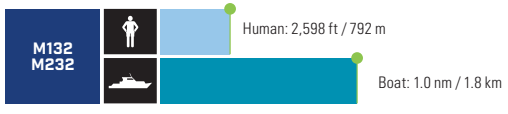
The M232 marine thermal camera takes affordability and easy integration to a whole new level. Incorporating 320 x 240 thermal resolution, video over IP, and digital zoom, M232 the smallest FLIR PTZ marine camera housing.

Available ClearCruise™ object detection technology alerts you to non-water obstacles and hazards.

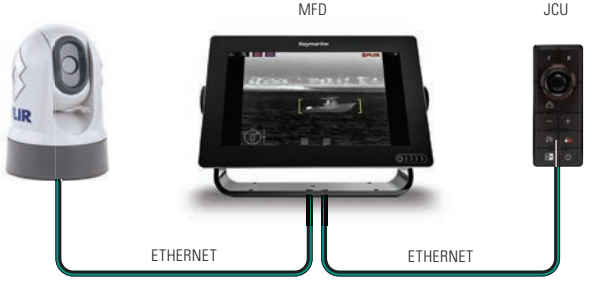
IR ANALYTICS FOR ENHANCED AWARENESS

Combine the M232 with a Raymarine Axiom MFD and take advantage of FLIR ClearCruise™ object detection. ClearCruise provides audible and visible alerts to non-water objects such as boats, obstacles, or navigation markers in the scene.

DETECTION RANGES*



*Actual range may vary depending on camera set-up, environmental conditions, and user experience.



REMOTE CONTROL

Control the M232 from your MFD or add the optional JCU-3 control unit.

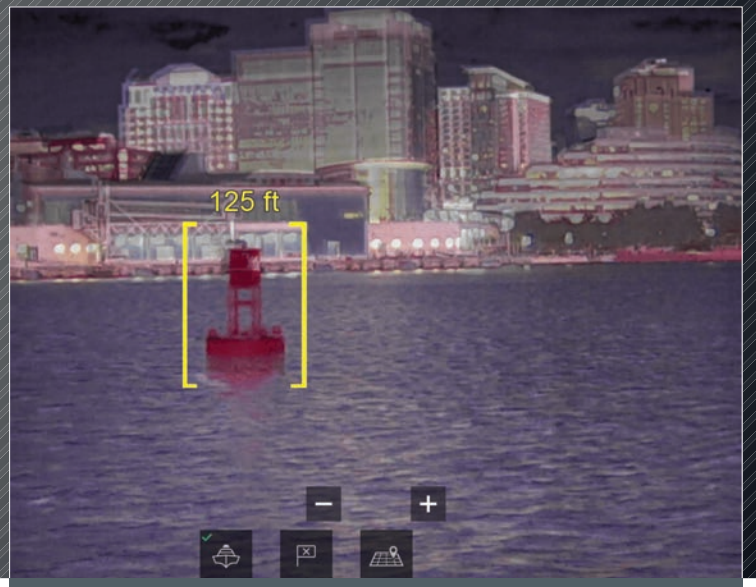
FLIR M300 Series

M300 SERIES MARINE CAMERAS

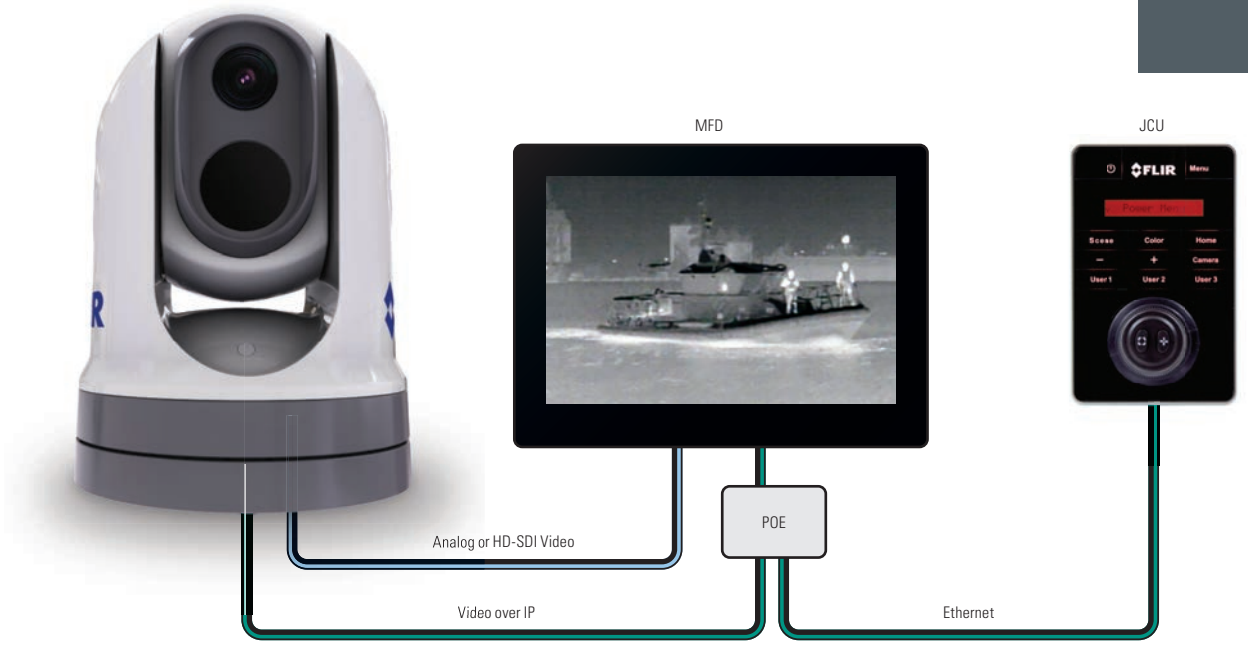
- Latest generation FLIR Boson™ sensor provides thermal vision in complete darkness, glare, and light fog
- Two-axis mechanical stabilization virtually eliminates the effects of pitch, heave, and yaw
- FLIR Color Thermal Vision™ and MSX® visible and thermal image blending technology for enhanced awareness
- Available low light HD visible imaging sensor with long-range zoom offer enhanced target identification
- FLIR ClearCruise™ object detection technology alerts you to non-water obstacles on both thermal and visible cameras
- IP video, HD-SDI, and analog video outputs and integration with navigation displays
- 360° pan and +/-90° tilt capability

THE NEW STANDARD

The M300 Series sets a new standard for safe marine navigation and situational awareness. Applying marine video analytic technology to high-performance visible, thermal, or multispectral imaging, M300 Series marine cameras deliver unwavering vision in high-stakes environments.



Clearly identify navigation aids with Color Thermal Vision



Control and view M300 Series direct from your MFD. The M300 Series integrates seamlessly with existing electronics, including select multifunction displays from Furuno, Garmin, Raymarine, and Simrad. An optional joystick control unit offers more precise control of M300 Series cameras.

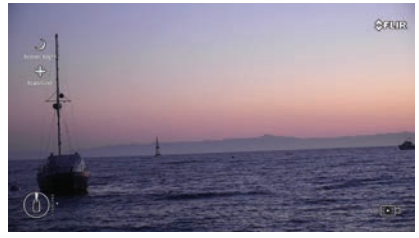
GYRO-STABILIZATION

M300 Series cameras feature active gyro-stabilization so the cameras always deliver steady images, even in rough seas.

FLIR M300 Series

LONG-RANGE VISION

The M300C, M364C, and M364C LR are equipped with a high definition visible camera with 30x optical zoom and gyro-stabilization for exceptional long-range target identification.



Human: 1,833 ft / 559 m

Human: 3,038 ft / 926 m

FLIR COLOR THERMAL VISION™ AND MSX®

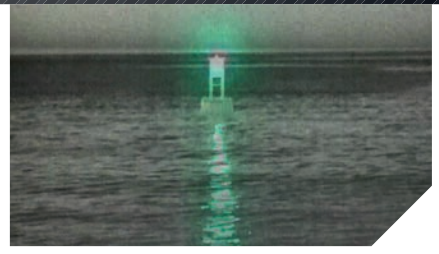
While thermal cameras give mariners superior awareness on the water, thermal imaging alone does not capture important color information from other vessels or navigation aids. The dual sensor M364C and M364C LR offer mariners a new level of awareness via patented FLIR Color Thermal Vision (CTV) technology. This proprietary multispectral imaging technology for the FLIR M300 Series blends thermal and high definition visible color video for enhanced identification of buoys, vessels, and other targets at night. Additionally, the M364C and M364C LR models feature exclusive FLIR MSX® imaging technology, which blends edges and borders from the HD visible camera with the thermal image, giving operators improved visual recognition of distant objects.

Cameras can be installed ball down if required

Color Thermal Vision brings enhanced awareness at night of surrounding traffic with true color navigation lights, deck lighting, and much more.

Color Thermal Vision provides easy identification of illuminated navigation aids, such as lighthouses, daymarkers, and floating aids.

Exclusive FLIR Multi-spectral Dynamic Imaging (MSX) technology enhances thermal images with edges, patterns, text, and other high-contrast elements not always visible to the thermal camera alone.



Color Thermal Vision helps provide positive identification of fixed and floating navigation aids when running, day or night.

*Actual range may vary depending on camera set-up, environmental conditions, and user experience.

FLIR M400™/M400XR™

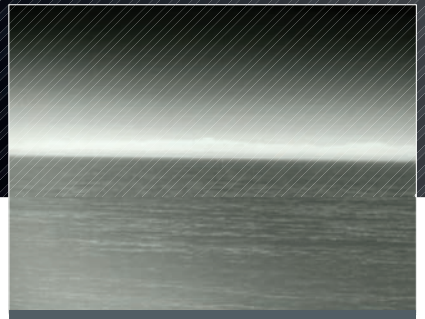
M400 AND M400XR FEATURES

- High-intensity LED spot-beam can highlight targets of interest while preserving the night vision of on-deck personnel
- HD color low light camera with 30x optical zoom
- Gyro-stabilized to ensure steady viewing in heavy sea conditions
- High-resolution 640 x 480 thermal sensor with 4x continuous optical zoom and 4x digital E-zoom
- Rugged, waterproof gimbal enclosure with automatic window heaters for ice management
- 360° pan and +/-90° tilt capability
- IP video, HD-SDI, and analog video outputs and integration with navigation displays
- Video tracking follows objects in the camera's view (M400XR only)
- Firefighting mode optimizes color palette to see hot spots and measure temperature on-scene (M400XR only)

MULTI-SENSOR MARINE CAMERA SYSTEM

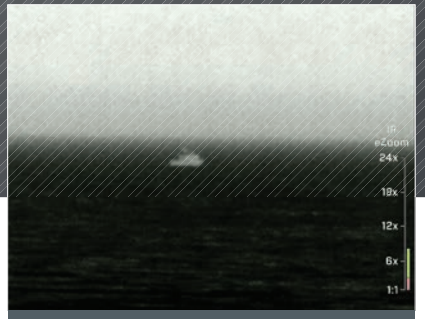
THERMAL CAMERA WITH CONTINUOUS OPTICAL ZOOM

The M400 thermal camera features a 4x optical zoom lens, plus an additional 4x digital zoom. See beyond visual range to identify distant contacts, or magnify small objects for easy identification. With continuous optical zoom, targets remain in clear, crisp focus right up to maximum magnification. Use the digital zoom to further expand the thermal image, making maximum usage of even the smallest pixels.



Normal wide field of view

Intermediate zoom

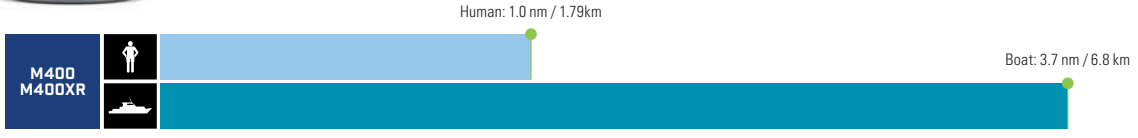


Intermediate zoom

Maximum zoom - narrow field of view

The optical zoom on the M400 helps positively identify distant targets

DETECTION RANGES*

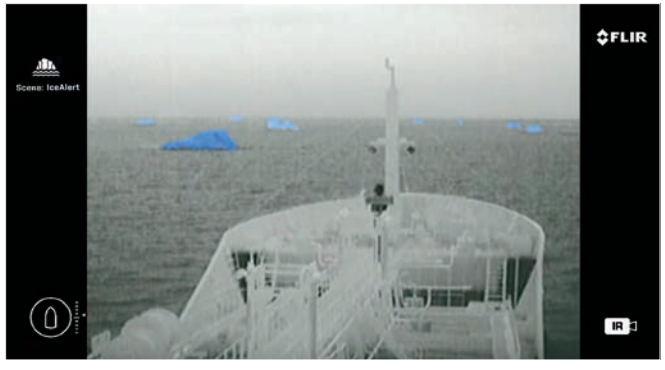


*Actual range may vary depending on camera set-up, environmental conditions, and user experience.

FLIR M400™ / M400XR™

FLOATING ICE DETECTION AND AVOIDANCE

Nighttime collisions with sea ice are a legitimate hazard to expedition yachts, commercial vessels, and rescue craft operating in high latitudes and wintery conditions. FLIR systems with IceAlert™ mode can enhance situational awareness by highlighting growlers, bergy bits, and icebergs in shades of blue.



Ice detection mode

MULTI-SENSOR MARINE CAMERA SYSTEM

HD ZOOM VIDEO CAMERA

Better than binoculars, M400 is equipped with a built-in color high definition camera with optical zoom and lowlight imaging. Use the video camera to make positive identification of other vessels, navigation aids, and more. Use its 30x optical zoom to see all the details and assess situations from a safe distance. Video and thermal zoom controls can be linked for easy comparison or simultaneous viewing.

M400XR VIDEO TRACKING

Video tracking keeps the M400XR locked on any target using the visible or thermal cameras. Once engaged, the system will pan and tilt the camera automatically to keep that target in view until it drops over the horizon.

Video tracking

The M400 HD camera features a 30x optical zoom and gyro- stabilization. This ferry is well over 1 nautical mile away.

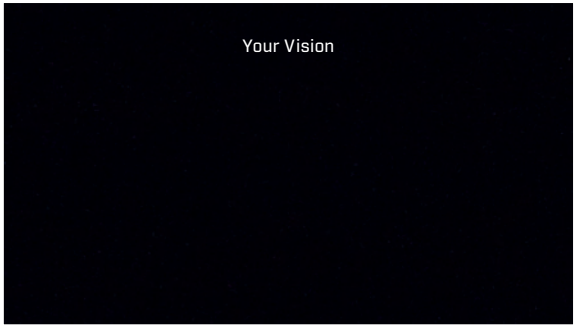
FLIR M400™/M400XR™

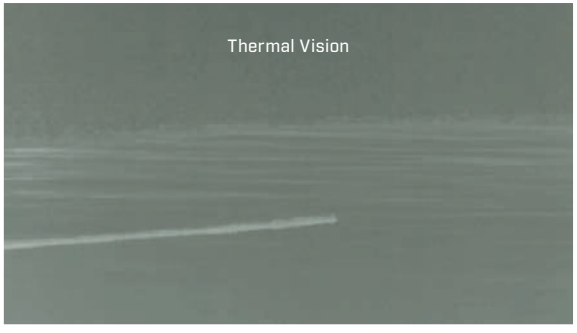
ADVANCED INTEGRATION

The M400 and M400XR offer multiple integration options. View and control them from leading marine MFDs from Furuno, Garmin, Raymarine, and Simrad. The supplied JCU-3 joystick also offers primary control and access to all the M400 features. IP video allows the camera to network with onboard video surveillance systems and HD-SDI output provides broadcast quality video to compatible displays. Analog output is also available for most marine displays and monitors. NMEA 0183 integration allows the M400/M400XR to slew to radar cursor locations, ARPA targets, or the active waypoint location.

MARINE FIREFIGHTING MODE (M400XR MODEL ONLY)

The M400XR adds a marine firefighting mode engineered for fireboats and rescue craft. Survey the scene and immediately see hot spots with a firefighting-specific isothermic color palette. M400XR instantly shows you temperatures on-screen to help you visualize your plan of attack, locate hot spots, and save lives and property. M400XR sees through smoke, steam, and darkness and identifies targets in scenes with extreme temperature dynamics.





INTEGRATED LED SPOTLIGHT

Use the integrated spotlight on M400 to point out targets of interest, confirm navigational aids, light up the rescue zone, or just signal *I see you*. The narrow-beam LED spotlight is precisely aligned with the thermal and video camera payloads, making it easy to illuminate any target without embarrassing other vessels or spoiling the night vision of on-deck crew.

FLIR M500™

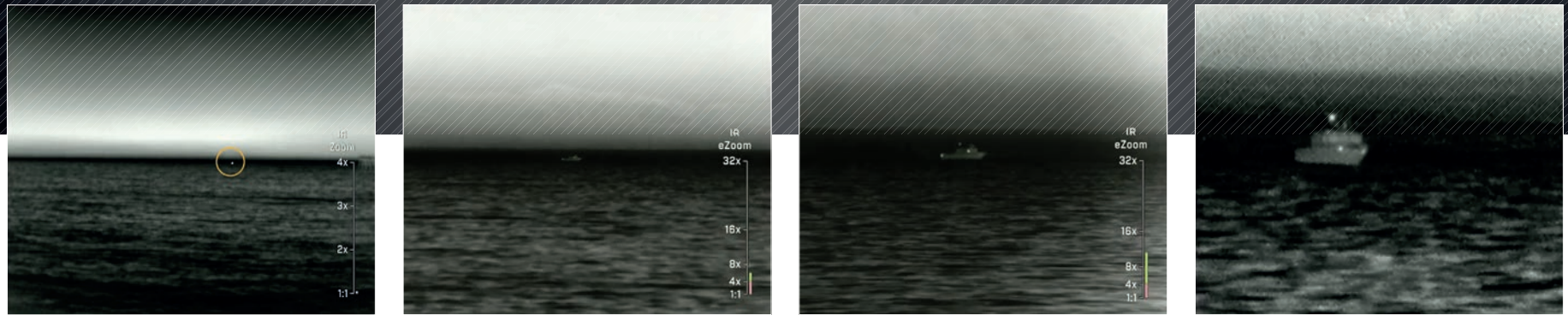
M500 FEATURES

- Cooled MWIR Thermal imager with 640 × 512 resolution and 14x Optical Zoom
- High-intensity LED spot-beam can highlight targets of interest while preserving the night vision of on-deck personnel
- HD color lowlight camera with 30x optical zoom
- Gyro-stabilized to ensure steady viewing in heavy sea conditions
- Rugged, waterproof gimbal enclosure with automatic window heaters for ice management
- 360° pan and +/-90° tilt capability
- Video tracking follows objects in the camera's view
- IP video, HD-SDI, and analog video outputs and integration with navigation displays

M500 ULTRA HIGH-PERFORMANCE MULTI-SENSOR CAMERA SYSTEM

CRYOGENICALLY COOLED FOR EXTREME LONG-RANGE DETECTION

A liquid helium cooling system in the M500 chills its internal sensor to a frigid -387°F (-233°C), making it super-sensitive, even at long range. M500 can detect a man-sized target at ranges approaching five nautical miles and small vessels at over eight nautical miles. M500 lets you detect vessels and classify onboard activities at extreme standoff ranges.



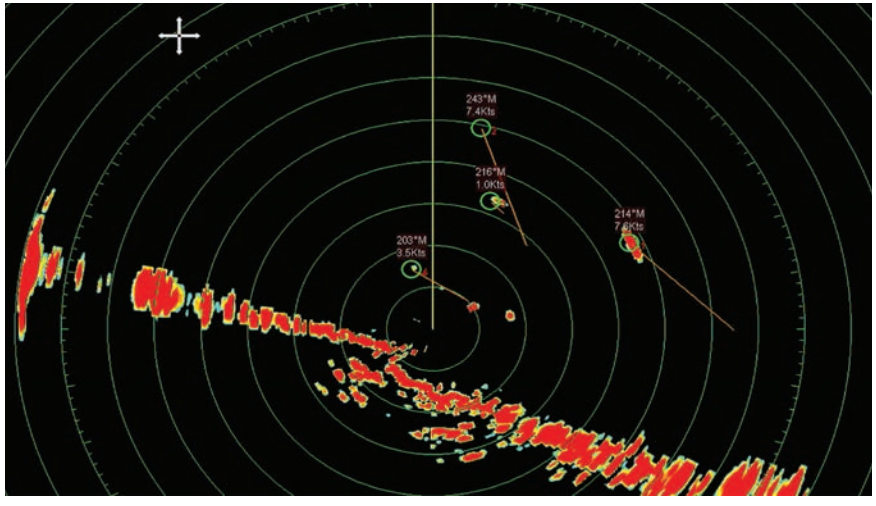
The M500 thermal camera has a 14x optical zoom, 4x E-Zoom, and gyro-stabilization for superior long-range detection. The small boat pictured here is over two nautical miles away.

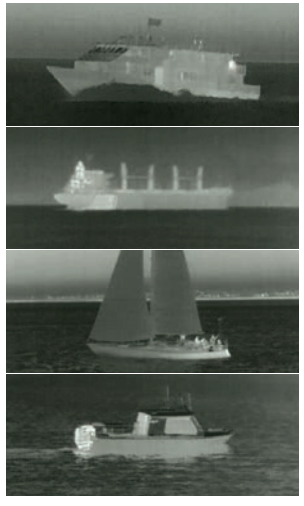
THERMAL VISION WITH CONTINUOUS OPTICAL ZOOM

The M500 thermal camera core features a 14x optical zoom lens plus an additional 4x digital zoom. See well beyond visual range to identify distant contacts or magnify small objects for easy identification. With continuous optical zoom, targets remain in clear, crisp focus right up to maximum magnification. Use the digital zoom to further expand the thermal image, making maximum usage of even the smallest pixels.

ADVANCED RADAR INTEGRATION

Link the M500 with your NMEA0183-compatible radar and enjoy an even higher level of integration. The M500 pan and tilt gimbal can receive coordinates from the radar system and slew to them automatically. Quickly identify tracked ARPA targets. Place the radar cursor on an unknown target and let the M500 show you what's there. M500 can even auto-slew to show you visually the bearing to your next GPS waypoint.





Advanced radar integration with M500 enables the camera auto-slew between multiple tracked ARPA targets.

SUPERIOR ALL-WEATHER THERMAL IMAGING

The M500 cooled thermal sensor has twice the sensitivity of uncooled systems. This gives enhanced contrast, clarity, and detail in every image. Plus, M500 sees in the mid-wave infrared (MWIR) spectrum. Light fog, smoke, haze, and offshore marine layer are nearly invisible in this spectral range.

Select any in-view object of interest with the joystick controller to enable video tracking.

VIDEO TRACKING

Video tracking keeps the M500 locked on any target using the visible or thermal cameras. Once engaged, the system will pan and tilt the camera automatically to keep that target in view until it drops over the horizon.

INTEGRATED LED SPOTLIGHT

Use the integrated spotlight on the M500 to point out targets of interest, confirm navigational aids, light up the rescue zone, or just signal *I see you*. The narrow-beam LED spotlight is precisely aligned with the thermal and video camera payloads, making it easy to illuminate any target without embarrassing other vessels or spoiling the night vision of on-deck crew.

DETECTION RANGES*

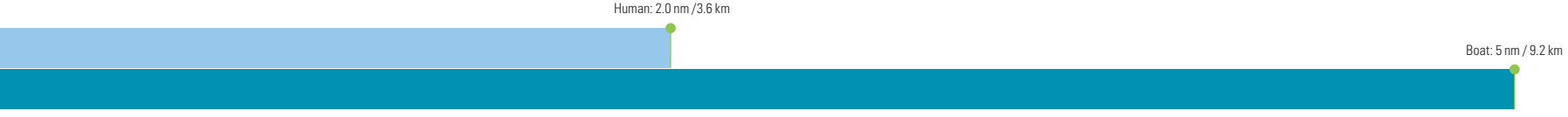
HD ZOOM VIDEO CAMERA

A low light, high definition visible imaging camera on the M500 helps identify other vessels and navigation aids better than conventional binoculars. With a 30x optical zoom lens and active stabilization, the HD zoom video camera captures key details and distant activity for safer decisions on the water. Visible and thermal camera controls can link for easy comparison and side-by-side viewing.

Integrated LED spotlight.

High-sensitivity mid-wave detector offers the best image quality and long-range object recognition.

M500 allows you to observe human activity at extremely long ranges.



*Actual range may vary depending on camera set-up, environmental conditions, and user experience.

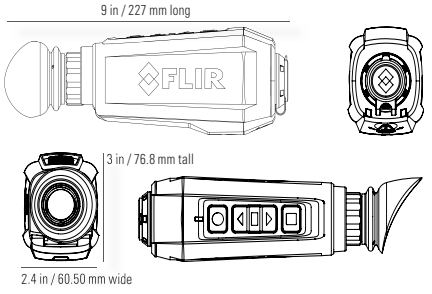
THERMAL CAMERA FEATURES COMPARISON CHART

Feature:
Thermal Night Vision: Day or night operation without any ambient light.
Digital Thermal Zoom: Thermal image is magnified by pixel stretching, making small or distant targets appear larger for easier viewing.
Color Thermal Vision and MSX™. Enhanced blending brings true color to thermal night vision images, or enhanced edge detail.
Analog Video Output: Connect the camera to monitors, televisions, and marine displays with standard composite analog video.
Gyro-stabilized: Sensors in the camera's gimbal system detect and counteract vessel motion for smooth viewing in rough seas.
Horizontal Stabilization: The camera can hold on a selected azimuth or bearing, regardless of vessel heading changes, to maintain visibility of a scene.
Multifunction Display Integration: Controllable from major brands of marine MFD's, such as Raymarine, Garmin, Furuno, and Simrad
Video Over IP Output: Streams network video over standard Ethernet networks to computers and compatible marine MFDs.
MFD Slew to Cue: The thermal camera can respond to queues from a networked marine multifunction display. Cues include dangerous ARPA or AIS contact alarms, the GPS position of a man overboard alarm, or locking onto a point designated from the electronic chart.
Pan and Tilt Control: Slew the camera +/- 360° horizontally and +/- 90° vertically for horizon-to-horizon viewing of targets.
HD Color Zoom Camera: Augments the thermal imager with color and lowlight video for positive target verification and enhanced surveillance.
Optical Thermal Zoom: Advanced lens system magnifies small objects or distant targets for easy identification. Targets remain in clear, sharp focus at maximum optical magnification.
Video Tracker: Lock the camera on a suspect, victim, or incident scene. The camera's pan and tilt system will automatically keep that object in-frame.
NMEA 0183 Integration: Send coordinates from your radar system to the camera's pan and tilt drive to keep selected radar targets in view, follow the radar cursor, or see upcoming GPS waypoints.
Thermal Vessel Detection: What is the typical range at which this camera can detect a small vessel using thermal?

	Scion Handhelds	MD-Series	M232	M300C	M332, M364	M364C, M364C LR	M400	M400XR	M500
	●	●	●		●	●	●	●	●
	●	●	●		●	●	●	●	●
						●	●		
		●		●	●	●	●	●	●
				●	●	●	●	●	●
				●	●	●	●	●	●
		●	●	●	●	●	●	●	●
			●	●	●	●	●	●	●
			●	●	●	●	●	●	●
			●	●	●	●	●	●	●
				●		●	●	●	●
							●	●	●
								●	●
				●	●	●	●	●	●
	.48 - 1.7 nm	1.0 to 1.7 nm	1.0 nm	N/A	1.0 to 1.7 nm	1.7 to 2.0 nm	3.7 nm	3.7 nm	5 nm
	0.9 - 3.2 km	1.8 to 3.1 km	1.8 km	N/A	1.8 to 3.1 km	3.1 to 3.7 km	6.8 km	6.8 km	9.26 km

SCION HANDHELD SPECIFICATIONS

Scion OTM



WHAT'S IN THE BOX:

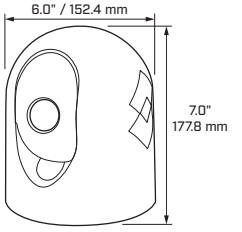
EVERY SCION OTM THERMAL HANDHELD MONOCULAR INCLUDES:

- USB charging cable with universal AC adapter
- Custom video-out cable
- Wrist strap
- Molle bag
- Quick start guide.

	SCION OTM130	SCION OTM260
MAIN THERMAL CAMERA		
Core Technology	BOSON 12 µm VOx Microbolometer	
Detector Resolution	320 × 256	640 × 512
Lens System	13.8 mm	18 mm
Field of View (H × W)	16° × 12°	24° × 18°
Optical Magnification	1.5x	1x
Digital Zoom	1X | 2X | 4X	1X | 2X | 4X | 8X
Refresh Rate	9 Hz	
Video Recording	Yes	
Image Capturing	Yes	
Internal Memory	2 GB Internal Storage / Optional microSD™ Card (up to 128 GB)	
Focusing Range	∞	
Eye Relief	16 mm	
Display	Quad-VGA (1280x960) High definition display	
Display Focus	Manual	
INTERFACING		
USB Type	USB-C; Power In; Video Out; Video and Image File Transfer	
POWER		
Battery Life	Up to 4.5 hours at 20°c	
Battery Type	6x CR123A 3V Lithium Battery	
COMMUNICATIONS		
NFC (Near-Field Communication)	Yes	
Bluetooth™	BLE 4.1+	
Wi-Fi	Video Streaming	
GPS	No	
PHYSICAL		
Weight	Without Batteries: 452 g; With Batteries 572 g	
Size	227 × 76.8 × 60.5 mm (9 × 3 × 2.4 in)	
Color (Housing)	Gray / Black	
Mounting	¼-20 Tripod Mount	

MD-SERIES SPECIFICATIONS

MD-SERIES



WHAT'S IN THE BOX:

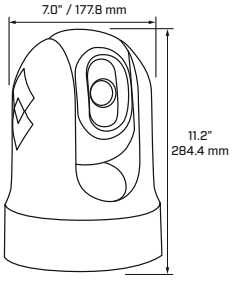
EVERY MD-SERIES THERMAL CAMERA SYSTEM INCLUDES:

- Camera unit
- Camera base O-ring
- RJ-45 Ethernet cable, double shielded, low smoke zero halogen (LSZH) rated, 25 feet (7.7 meters)
- Coaxial video output cable, 25 feet (7.7 meters)
- 12V DC Power Over Ethernet (PoE) injector
- RJ45 weatherproof coupler
- Female-to-female F-type video connectors
- Stainless steel mounting hardware kit

	MD-324		MD-625	
MAIN THERMAL CAMERA				
Field of View	24° × 18° (NTSC)		25° × 20° (NTSC)	
Video Refresh Rate	<9 Hz or 30 Hz (NTSC and PAL)			
Focal Length	19 mm		25 mm	
Focus	Fixed 12ft (3.6m) to infinity			
Optical Zoom	N/A			
Digital Zoom	2×		2×, 4×	
Detector Type	320 × 240 VOx Microbolometer		640 × 480 VOx Microbolometer	
SYSTEM SPECIFICATIONS				
Gyro Stabilized	No			
Video Tracking	No			
Firefighter Mode	No			
Pan/Tilt Adjustment Range	Pan: ±30° per key, Tilt: +34°, -27° (Locked in at Installation)			
Analog Video Output	NTSC or PAL, 30 Hz or <9 Hz			
Analog Video Connector Types	F-type BNC with BNC-to-RCA adapter included for video out			
Network Video Output	No			
HD-SDI Lossless Video Output	No			
Power Requirements	PoE injector required per IEEE 802.3af, 12-24 V DC			
Power Consumption	4.8 W nominal; 12.5 W max			
ENVIRONMENTAL				
Operating Temperature Range	-13°F to +131°F (-25°C to +55°C)			
Storage Temperature Range	-40°F to +185°F (-40°C to +85°C)			
Automatic Window Defrost	Standard at Power-Up			
Sand/Dust Ingress	Mil-Std-810E			
Water Ingress	IPX 6 (heavy seas, powerful jets of water)			
Shock	15 g vertical, 9 g horizontal			
Vibration	IEC 60945; MIL-STD-810E			
Lightning Protection	Standard			
Salt Mist	IEC60945			
Wind	100 knot (115.2 mph)			
EMI	IEC 60945			
PHYSICAL				
Weight	~ 3 lbs (1.36 kg)			
Size	6" (152.4 mm) dia. × 7" (177.8 mm) ht.			
RANGE PERFORMANCE				
Clear Weather Range Performance	**metres**	**nm**	**metres**	**nm**
Detect a 30-foot vessel	1850.0	1.0	3150.0	1.7
NATO Target 2.3m x 2.3m @50%	1285.0	0.7	1691.0	0.9
Detect Human Sized Target	559.0	0.3	735.0	0.4

M232 SPECIFICATIONS

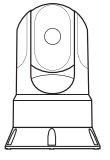
M132/M232 SERIES



WHAT'S IN THE BOX:

EVERY M232 THERMAL CAMERA INCLUDES:

- Camera unit
- Top down riser kit
- Thermal camera base-seal
- Right-angled RayNet to RayNet cable, 32 feet (10 meters)
- RayNet to RJ45 adapter cable, 4-inches (100mm)
- Right-angled 3-pin power cable, 32 feet (10 meters)
- Stainless steel mounting hardware kit

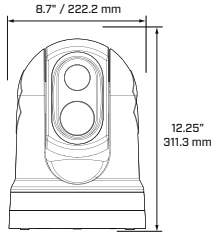


Thermal camera shown with optional riser

	M232	
MAIN THERMAL CAMERA		
Field of View	24° × 18°	
Video Refresh Rate	9 Hz	
Focal Length	19mm	
Focus	Fixed 12ft (3.6m) to infinity	
Optical Zoom	N/A	
Digital Zoom	4x Continuous	
Detector Type	320 × 240 VOx Microbolometer	
SYSTEM SPECIFICATIONS		
Gyro Stabilized	No	
ClearCruise Analytics	Yes, with Raymarine Axiom	
Video Tracking	No	
Firefighter Mode	No	
Pan/Tilt Adjustment Range	Pan: 360° (continuous), Tilt: +110°, -90°	
Analog Video Output	No	
Analog Video Connector Types	N/A	
Network Video Output	Single H.264 Network Video Stream	
HD-SDI Lossless Video Output	No	
Power Requirements	12 or 24 VDC	
Power Consumption	15 W (typical) 18 W (max)	
ENVIRONMENTAL		
Operating Temperature Range	-13°F to +131°F (-25°C to +55°C)	
Storage Temperature Range	-30°F to +158°F (-30°C to +70°C)	
Automatic Window Defrost	Standard at Power-Up	
Sand/Dust Ingress	Mil-Std-810E	
Water Ingress	IPX 6 (heavy seas, powerful jets of water)	
Shock	15 g vertical, 9 g horizontal	
Vibration	IEC 60945; MIL-STD-810E	
Lightning Protection	Standard	
Salt Mist	IEC60945	
Wind	100 knot (115.2 mph)	
EMI	IEC 60945	
PHYSICAL		
Weight	6.0 lb (2.7 kg) w/o top-down riser 6.6 lb (3.0 kg) w/ top-down riser	
Size	6.34" (dia. @ base) x 9.03" (ht.) 161.1 (dia.) x 229.3 (ht.) mm	
RANGE PERFORMANCE		
Clear Weather Range Performance	**metres**	**nm**
Detect a 30-foot vessel	1850.0	1.0
NATO Target 2.3m x 2.3m @50%	1285.0	0.7
Detect Human Sized Target	559.0	0.3

M300 SERIES SPECIFICATIONS

M300-SERIES



WHAT'S IN THE BOX:

EVERY M300 CAMERA SYSTEM INCLUDES:

- Camera unit
- Camera base-seal
- Camera gasket
- RayNet-to-RJ45 adaptor cable 120 mm (4.72 in.)
- Right-angled RayNet-to-RayNet cable 3 m (9.8 ft.)
- Right-angled BNC-to-BNC cable 3 m (9.8 ft.)
- Right-angled 3-pin power cable 3 m (9.8 ft.)
- Mounting riser
- 3 x camera fixings: nuts, dome nuts, spring and flat washers, threaded studs
- 2 x self-adhesive decals (for ball-down mounting only)
- Documentation pack

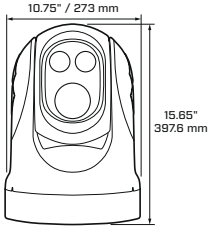
	M300C	M332	
MAIN THERMAL CAMERA			
Video Refresh Rate	N/A	30 Hz or <9 Hz	
Field of View	N/A	24 ° x 18 °	
Focal Length	N/A	9.1mm	
Focus	N/A	Fixed 12 ft (3m) to infinity	
Optical Zoom	N/A	N/A	
E-Zoom	N/A	4x Continuous	
Image Processing	N/A	FLIR Proprietary Digital Detail Enhancement	
Detector Type	N/A	320 x 256 VOx Microbolometer	
MAIN VISIBLE CAMERA			
Detector Type	1/2.8" Exmor R CMOS	N/A	
Resolution	High Definition up to 1080/30p	N/A	
Minimum Illumination	0.1 lux (50 IRE, 1/30s, ICR off, slow shutter off, high sensitivity off) / 0.0008 lux (30 IRE, ICR on, slow shutter 1/4s, high sensitivity on)	N/A	
Zoom	30× Optical Zoom	N/A	
E-Zoom	12x	N/A	
Focal Length	129 mm to 4.3 mm	N/A	
Field of View	Optical 63.7° x 35.8° WFOV to 2.3° x 1.29° NFOV	N/A	
SYSTEM SPECIFICATIONS			
Gyro Stabilized			
ClearCruise Analytics			
Color Thermal Vision (CTV)		No	
Multispectral Imaging (MSX)		No	
Video Tracking			
Firefighter Mode			
Pan/Tilt Adjustment Range			
Analog Video Output			
Analog Video Connector Types			
Network Video Output			
HD-SDI Lossless Video Output			
Power Requirements			
Power Consumption			
ENVIRONMENTAL			
Operating Temperature Range	-13°F to +131°F (-25°C to +55°C)	-13°F to +131°F (-25°C to +55°C)	
Storage Temperature Range	-30°F to +158°F (-30°C to +70°C)	-30°F to +158°F (-30°C to +70°C)	
Automatic Window Defrost	Standard at Power-Up	Standard at Power-Up	
Sand/Dust Ingress	Mil-Std-810E or IP6X	Mil-Std-810E or IP6X	
Water Ingress	IPX6 (heavy seas, power jets of water)	IPX6 (heavy seas, power jets of water)	
Shock	15g vertical, 9g horizontal	15g vertical, 9g horizontal	
Vibration	IEC60945	IEC60945	
Lightning Protection	Standard	Standard	
Salt Mist	IEC60945	IEC60945	
Wind	100 knots (115.2 MPH)	100 knots (115.2 MPH)	
EMI	IEC60945	IEC60945	
PHYSICAL			
Weight	6.3 kg (13.9 lb) without mounting riser; 6.75 kg (14.9 lb) with mounting riser.	6.3 kg (13.9 lb) without mounting riser; 6.75 kg (14.9 lb) with mounting riser.	
Size	Camera: Base diameter: 222.2 mm (8.7 in.) Height: 328.3 mm (12.9 in.) Camera attached to mounting riser: Base diameter (with seal): 254.0 mm (10.0 in.) Height: 365.5 mm (14.4 in.)	Camera: Base diameter: 222.2 mm (8.7 in.) Height: 328.3 mm (12.9 in.) Camera attached to mounting riser: Base diameter (with seal): 254.0 mm (10.0 in.) Height: 365.5 mm (14.4 in.)	
RANGE PERFORMANCE			
Clear Weather Range Performance		**metres**	**nm**
Detect a 30-foot vessel	N/A	1850.0	1.0
NATO Target 2.3m x 2.3m @50%	N/A	1285.0	0.7
Detect Human Sized Target	N/A	559.0	0.3

	M364	M364C	M364C LR
	30 Hz or <9 Hz		
	24 ° x 18 °	24 ° x 18 °	18 ° x 13.5 °
	18 mm	18 mm	25 mm
	Fixed 12 ft (3m) to infinity	Fixed 12 ft (3m) to infinity	Fixed 12 ft (3m) to infinity
	N/A	N/A	N/A
	8x Continuous	8x Continuous	8x Continuous
	FLIR Proprietary Digital Detail Enhancement	FLIR Proprietary Digital Detail Enhancement	FLIR Proprietary Digital Detail Enhancement
	640 x 512 VOx Microbolometer	640 x 512 VOx Microbolometer	640 x 512 VOx Microbolometer
	N/A	1/2.8" Exmor R CMOS	1/2.8" Exmor R CMOS
	N/A	High Definition up to 1080/30p	High Definition up to 1080/30p
	N/A	0.1 lux (50 IRE, 1/30s, ICR off, slow shutter off, high sensitivity off) / 0.0008 lux (30 IRE, ICR on, slow shutter 1/4s, high sensitivity on)	0.1 lux (50 IRE, 1/30s, ICR off, slow shutter off, high sensitivity off) / 0.0008 lux (30 IRE, ICR on, slow shutter 1/4s, high sensitivity on)
	N/A	30× Optical Zoom	30× Optical Zoom
	N/A	12x	12x
	N/A	129 mm to 4.3 mm	
	N/A	Optical 63.7° x 35.8° WFOV to 2.3° x 1.29° NFOV	
	Yes		
	Yes		
		Yes	
		Yes	
	No		
	No		
	360° Continuous Pan, +/- 90° Tilt		
	NTSC/PAL User Settable		
	BNC		
	Single H.264 Network Video Stream		
	Yes		
	12 to 24vDC (24vDC recommended)		
	41 W typical, 56 W typical (with heaters on.) Note: FLIR recommends using a 75 W power supply		
	-13°F to +131°F (-25°C to +55°C)	-13°F to +131°F (-25°C to +55°C)	-13°F to +131°F (-25°C to +55°C)
	-30°F to +158°F (-30°C to +70°C)	-30°F to +158°F (-30°C to +70°C)	-30°F to +158°F (-30°C to +70°C)
	Standard at Power-Up	Standard at Power-Up	Standard at Power-Up
	Mil-Std-810E or IP6X	Mil-Std-810E or IP6X	Mil-Std-810E or IP6X
	IPX6 (heavy seas, power jets of water)	IPX6 (heavy seas, power jets of water)	IPX6 (heavy seas, power jets of water)
	15g vertical, 9g horizontal	15g vertical, 9g horizontal	15g vertical, 9g horizontal
	IEC60945	IEC60945	IEC60945
	Standard	Standard	Standard
	IEC60945	IEC60945	IEC60945
	100 knots (115.2 MPH)	100 knots (115.2 MPH)	100 knots (115.2 MPH)
	IEC60945	IEC60945	IEC60945
	6.3 kg (13.9 lb) without mounting riser; 6.75 kg (14.9 lb) with mounting riser.	6.3 kg (13.9 lb) without mounting riser; 6.75 kg (14.9 lb) with mounting riser.	6.3 kg (13.9 lb) without mounting riser; 6.75 kg (14.9 lb) with mounting riser.
	Camera: Base diameter: 222.2 mm (8.7 in.) Height: 328.3 mm (12.9 in.) Camera attached to mounting riser: Base diameter (with seal): 254.0 mm (10.0 in.) Height: 365.5 mm (14.4 in.)	Camera: Base diameter: 222.2 mm (8.7 in.) Height: 328.3 mm (12.9 in.) Camera attached to mounting riser: Base diameter (with seal): 254.0 mm (10.0 in.) Height: 365.5 mm (14.4 in.)	Camera: Base diameter: 222.2 mm (8.7 in.) Height: 328.3 mm (12.9 in.) Camera attached to mounting riser: Base diameter (with seal): 254.0 mm (10.0 in.) Height: 365.5 mm (14.4 in.)

	metres	nm	metres	nm	metres	nm
	3150.0	1.7	3150.0	1.7	3704.0	2.0
	1691.0	0.9	1691.0	0.9	2368.0	1.3
	926.0	0.5	926.0	0.5	1029.0	0.6

M400 SPECIFICATIONS

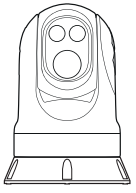
M400



WHAT'S IN THE BOX:

EVERY M400 AND M400XR THERMAL CAMERA SYSTEM INCLUDES:

- Camera unit
- FLIR Joystick Control Unit (JCU2) kit
- 5-Port PoE+ Ethernet Switch
- Power cable, right angle, 12 AWG, 3 meters
- Ethernet cable, right angle to RJ45, 1 meter
- RJ45 waterproof Ethernet coupler
- AV and serial cable, right angle, 1 meter
- HD-SDI cable, 1 meter
- HD-SDI Isolation Transformer
- Camera base O-ring and stainless steel mounting hardware kit

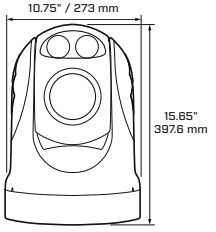


Thermal camera shown with optional riser

	M400		M400XR	
MAIN THERMAL CAMERA				
Field of View	24° to 6° HFOV / 1.5° HFOV with e-zoom		24° to 6° HFOV / 1.5° HFOV with e-zoom	
Video Refresh Rate	<9 Hz or 30 Hz (NTSC and PAL)		<9 Hz or 30 Hz (NTSC and PAL)	
Focal Length	26 mm (Wide) to 105 mm (Narrow)		26 mm (Wide) to 105 mm (Narrow)	
Focus	Controlled by JCU		Controlled by JCU	
Optical Zoom	4×		4×	
Digital Zoom	4x Continuous		4x Continuous	
Detector Type	640 × 512 VOx Microbolometer		640 × 512 VOx Microbolometer	
MAIN VISIBLE CAMERA				
Detector Type	1/2.8" CMOS		1/2.8" CMOS	
Lines of Resolution	1920 x 1080		1920 x 1080	
Minimum Illumination	0.35 lux at F1.6, AGC On, 1/30s High Sensitivity Mode / 1.4 lux Normal Mode			
Zoom	30× Optical Zoom		30× Optical Zoom	
E-Zoom	12x (360x total digital and optical zoom)		12x (360x total digital and optical zoom)	
Focal Length	129 mm to 4.3 mm		129 mm to 4.3 mm	
Field of View	Optical 63.7° x 35.8° WFOV to 2.3° x 1.29° NFOV		Optical 63.7° x 35.8° WFOV to 2.3° x 1.29° NFOV	
SPOTLIGHT SPECIFICATIONS				
Type, Lumens, Beam°	LED, 580 Lumens, 5° Divergence Angle		LED, 580 Lumens, 5° Divergence Angle	
SYSTEM SPECIFICATIONS				
Gyro Stabilized	Yes		Yes	
Video Tracking	No		Yes	
Firefighter Mode	No		Yes	
Pan/Tilt Adjustment Range	360° Continuous Pan, ± 90° Tilt		360° Continuous Pan, ± 90° Tilt	
Analogue Video Output	NTSC or PAL, 30 Hz or <9 Hz		NTSC or PAL, 30 Hz or <9 Hz	
Analogue Video Connector Types	F-type BNC with BNC-to-RCA adapter included for video out		F-type BNC with BNC-to-RCA adapter included for video out	
Network Video Output	Dual, Independent H.264 Network Video Streams		Dual, Independent H.264 Network Video Streams	
HD-SDI Lossless Video Output	Yes		Yes	
Power Requirements	12-24V DC		12-24V DC	
Power Consumption	<50 W nominal; 130 W peak, 270 W 2/heaters		<50 W nominal; 130 W peak, 270 W 2/heaters	
ENVIRONMENTAL				
Operating Temperature Range	-13°F to +131°F (-25°C to +55°C)		-13°F to +131°F (-25°C to +55°C)	
Storage Temperature Range	-56° F to + 176°F (-50°C to +80°C)		-56° F to + 176°F (-50°C to +80°C)	
Automatic Window Defrost	Standard at Power-Up		Standard at Power-Up	
Sand/Dust Ingress	Mil-Std-810E		Mil-Std-810E	
Water Ingress	IPX 6 (heavy seas, powerful jets of water)		IPX 6 (heavy seas, powerful jets of water)	
Shock	15 g vertical, 9 g horizontal		15 g vertical, 9 g horizontal	
Vibration	IEC 60945; MIL-STD-810E		IEC 60945; MIL-STD-810E	
Lightning Protection	Standard		Standard	
Salt Mist	IEC60945		IEC60945	
Wind	100 knot (115.2 mph)		100 knot (115.2 mph)	
EMI	IEC 60945		IEC 60945	
PHYSICAL				
Weight	28 lbs (12.7 kg)		28 lbs (12.7 kg)	
Size	10.75" (273.1 mm) x 15.65" (397.6 mm) – 18.05" (458.7mm) high with top down riser			
RANGE PERFORMANCE				
Clear Weather Range Performance	**metres**	**nm**	**metres**	**nm**
Detect a 30-foot vessel	6853.0	3.7	6853.0	3.7
NATO Target 2.3m x 2.3m @50%	4722.0	2.5	4722.0	2.5
Detect Human Sized Target	1796.0	1.0	1796.0	1.0

M500 SPECIFICATIONS

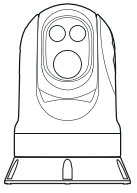
M500



WHAT'S IN THE BOX:

EVERY M500 THERMAL CAMERA SYSTEM INCLUDES:

- Camera unit
- FLIR Joystick Control Unit (JCU2) kit
- 5-Port PoE+ Ethernet Switch
- Power cable, right angle, 12 AWG, 3 meters
- Ethernet cable, right angle to RJ45, 1 meter
- RJ45 waterproof Ethernet coupler
- AV and serial cable, right angle, 1 meter
- HD-SDI cable, 1 meter
- HD-SDI Isolation Transformer
- Camera base O-ring and stainless steel mounting hardware kit



Thermal camera shown with optional riser

	M500	
MAIN THERMAL CAMERA		
Field of View	Optical 28° x 21° WFOV to 2° x 1.5° NFOV	
Video Refresh Rate	25 Hz (PAL) / 30 Hz (NTSC)	
Focal Length	19mm (Wide) to 275mm (Narrow)	
Focus	Controlled by JCU	
Optical Zoom	1x to 14x (continuous)	
Digital Zoom	4x Continuous	
Detector Type	Cooled MWIR InSb 640x512 Focal Plane Array	
MAIN VISIBLE CAMERA		
Detector Type	1/2.8" CMOS	
Lines of Resolution	1920 x 1080	
Minimum Illumination	0.35 lux at F1.6, AGC On, 1/30s High Sensitivity Mode / 1.4 lux Normal Mode	
Zoom	30× Optical Zoom	
E-Zoom	12x (360x total digital and optical zoom)	
Focal Length	129 mm to 4.3 mm	
Field of View	Optical 63.7° x 35.8° WFOV to 2.3° x 1.29° NFOV	
SPOTLIGHT SPECIFICATIONS		
Type, Lumens, Beam°	LED, 580 Lumens, 5° Divergence Angle	
SYSTEM SPECIFICATIONS		
Gyro Stabilized	Yes	
Video Tracking	Yes	
Firefighter Mode	No	
Pan/Tilt Adjustment Range	360° Continuous Pan,± 90° Tilt	
Analogue Video Output	NTSC or PAL, 30 Hz or <9 Hz	
Analogue Video Connector Types	F-type BNC with BNC-to-RCA adapter included for video out	
Network Video Output	Dual, Independent H.264 Network Video Streams	
HD-SDI Lossless Video Output	Yes	
Power Requirements	12-24V DC	
Power Consumption	250 W (max w/heaters)	
ENVIRONMENTAL		
Operating Temperature Range	-13°F to +131°F (-25°C to +55°C)	
Storage Temperature Range	-56° F to + 176°F (-50°C to +80°C)	
Automatic Window Defrost	Standard at Power-Up	
Sand/Dust Ingress	Mil-Std-810E	
Water Ingress	IPX 6 (heavy seas, powerful jets of water)	
Shock	15 g vertical, 9 g horizontal	
Vibration	IEC 60945; MIL-STD-810E	
Lightning Protection	Standard	
Salt Mist	IEC60945	
Wind	100 knot (115.2 mph)	
EMI	IEC 60945	
PHYSICAL		
Weight	32 lb (14.5 kg)	
Size	10.75" (273 mm) dia. x 15.65" (397.5 mm) ht	
RANGE PERFORMANCE		
Clear Weather Range Performance	**metres**	**nm**
Detect a 30-foot vessel	9260.0	5.0
NATO Target 2.3m x 2.3m @50%	6482.0	3.5
Detect Human Sized Target	3625.0	2.0

US EXPORT REGULATIONS

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WARRANTY

Select FLIR maritime cameras are backed by a 2-year standard warranty and our commitment to world-class service and support. By registering your system at flir.com/support, the 2-year standard limited warranty is upgraded to a 3-year extended limited warranty for free.

FLIR M500 cameras are backed by a 2-year/10,000 hour limited warranty.

Visit flir.com/marine for complete warranty details

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