HRC-Series

Long-range thermal imaging cameras for
border and coastal surveillance applications

FLIR Systems, Stockholm, Sweden

FLIR Systems, Boston

FLIR Systems, Santa Barbara

FLIR Systems, Portland

FLIR Systems: the world leader in thermal imaging cameras

FLIR Systems is the world leader in the design, manufacturing and marketing of thermal imaging systems for a wide variety of commercial, industrial and government applications.

FLIR Systems' thermal imaging systems use state-of-the-art infrared imaging technology that detects infrared radiation - or heat - enabling the user to see in total darkness, in practically all weather conditions. We design and manufacture all of the critical technologies inside our products, including detectors, electronics, and special lenses ourselves.

Rapidly emerging markets and organization

Interest in thermal imaging has grown considerably over the last few years in a large variety of markets. To face this increased demand FLIR Systems expanded its organization drastically. Today we employ more than 2,700 people. Together, these infrared specialists realize a consolidated annual turnover of more than 1 billion US dollars. This makes FLIR Systems the largest manufacturer of commercial thermal imaging cameras in the world.

Manufacturing capabilities

FLIR Systems currently operates 6 production facilities: three in the USA (Portland, Boston and Santa Barbara, California) one in Stockholm, Sweden, one in Paris, France and one in Tallinn, Estonia.

Thermal imaging: more than building a camera

There is more to the world of thermal imaging than building a camera. FLIR Systems is not only committed to providing you with the best camera, we are also able to offer you the best software, service and training to suit your thermal imaging needs.

Thermal imaging cameras:

Thermal imaging cameras like the FLIR HRC-Series create a virtual security fence and are finding their way into many security and surveillance applications.

Thanks to their ability to detect man-sized targets several kilometers away, they are extremely suited for border surveillance and coastal protection. Protecting a country's borders is vital to its national security. It is however very challenging to detect potential intruders or smugglers in total darkness, in the most diverse weather conditions. Thermal imaging cameras can help border control professionals to meet the demands they face at night and in other low-light situations.

Also ports and airports, nuclear plants, petrochemical installations,... are vulnerable to theft, or even worse terrorist attacks, and can be protected by using thermal imaging cameras like the FLIR HRC-Series.

Terrorism, vandalism, and random violence threaten the safety of personnel and the integrity of public and private facilities. A comprehensive security program utilizing thermal imaging cameras like the FLIR HRC-Series is the key to asset protection and risk mitigation. Thermal imaging cameras expose threats hidden in the darkness, concealed by adverse weather, and veiled by obscurants like dust, fog, and smoke.
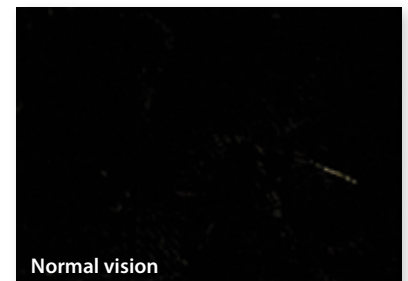
The HRC-Series thermal imaging cameras detect intruders sooner, provide more time to react and protect people, assets, and infrastructures. They are operational 24 hours a day even in the darkest of nights, dense fog, snow, smoke,...

See in total darkness

Thermal image

Because everything generates heat, thermal imaging cameras can see as well at night as they can during the day. Cameras dependent on visible light are useless at night or in poor visibility without supplementary illumination from lamps, LED's or lasers.
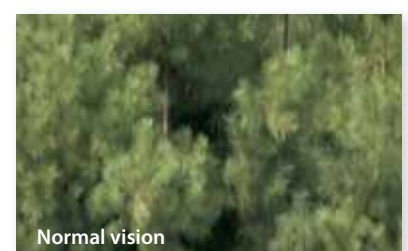

Normal vision

Protect your borders and assets also in broad daylight

Thermal image

The HRC-Series will not only protect borders and assets against intruders during the darkest of nights. The cameras are also perfectly suited for daytime surveillance. The FLIR HRC-Series will detect objects that remain invisible to the naked eye. For example people hiding in the shadows or in bushes, will be seamlessly detected. The HRC-Series are also not blinded by glare from the sun.

Normal vision

Border security

Thermal image

Normal vision

The FLIR HRC-Series cover more territory with greater detail than any other sensor suite available. Networkable video and control make the HRC-Series the perfect border security imaging solution. The HRC Multi-Sensor, or HRC MS-Series can be connected to a radar in a so called "slew to cue" configuration. If the radar detects an object the camera turns in the correct direction so that you get a visual image from that blip on your radar screen.

Coastal surveillance

Thermal image

Normal vision

Some countries are bordered by thousands of kilometers of coastline. The FLIR HRC-Series are the perfect tools to monitor what is happening along the coastline. They can be used to intercept illegal immigrants or to detect other threats coming from the sea. They are perfect for Vessel Traffic Monitoring and can work together with Automatic Identification Systems (AIS) and radars.

Perimeter Security

Thermal image

Normal vision

Airports, hydropower generation, refineries, oil and gas pipelines and any other large infrastructures have perimeters that can be kilometers long. The FLIR HRC-Series provide the ultimate security solution.

FLIR HRC-Series

Thermal imaging cameras for ultra long range surveillance applications with cooled detector

The HRC-Series are equipped with a highly reliable, mid-wave, cooled detector which offers extremely long range detection in all weather conditions. The cameras offer a continuous optical and electronic zoom. This offers excellent situational awareness while also giving the possibility to zoom in at suspect activities, and have a closer look, once they are detected. The HRC-Series can be integrated into existing networks or used as a stand alone unit.

The HRC-Series offer extreme long range detection and excellent image quality, in the darkest of nights, through smoke and dust. You can detect a man-size target several kilometers away. All thermal imaging cameras are extremely suited for border and coastal surveillance but also for mid-range threat detection.

Cooled detector

The HRC-Series are equipped with a mid-wave, cooled detector. A thermal imaging camera with a cooled detector gives you the advantage that you can see and detect potential threats much farther away than with an uncooled detector. But there is more. Objects which are at a close distance can be seen with much more detail. You can see what people are carrying. There is no need anymore to send someone out in the field to take a closer look since small details can clearly be seen on the thermal image.

According to his needs and preferences, the user can choose a FLIR HRC-Series that is either equipped with a cooled Indium Antimonide (InSb) or a cooled Mercury Cadmium Telluride (MCT) detector.

Crisp, high resolution thermal images: 640 x 480 pixels

All thermal imaging cameras are equipped with a cooled Mid-Wave InfraRed (MWIR) detector (InSb or MCT) that produces ultra-sharp thermal images of 640 x 480 pixels. This will satisfy users that want to see the smallest of detail and demand the best possible image quality.

It allows the user to see more detail and detect more and smaller objects from a farther distance. Coupled with high sensitivity, the HRC-Series offer extremely long range performance and excellent image quality.

Four different versions available
- HRC-E: Equipped with a 22 x 275 mm lens. It zooms between a 24° field of view and a 2° field of view.
- HRC-S: Equipped with a 39 x 490 mm lens. It zooms between a 14.1° field of view and a 1.1° field of view.
- HRC-U: Equipped with a 59 x 735 mm lens. It zooms between a 9.4° field of view and a 0.75° field of view.
- HRC-X: Equipped with a 88 x 1100 mm lens. It zooms between a 6.3° field of view and a 0.5° field of view.

Continuous optical and digital zoom on the thermal image

The HRC-Series thermal imaging cameras are equipped with powerful continuous optical zoom capability on the thermal image. It offers excellent situational awareness but also the possibility to zoom-in, and see more detail, once a target has been detected. This way operators can see farther recognize more detail and react more quickly to security threats. The advantage of continuously zooming compared to other systems that are using a rotating lens system is that there is no switch or swapping between the different images. You can gradually zoom in while keeping your focus all the time.

All systems are also equipped with an up to 16x continuous digital zoom.

HRC-X 1100 mm lens
Horizontal Field of View: 0.5°to 6.3°

HRC-U 735 mm lens
Horizontal Field of View: 0.75°to 9.4°

HRC-S 490 mm lens
Horizontal Field of View: 1.1°to 14.1°

HRC-E 275mm lens
Horizontal Field of View: 2°to 24°

Advanced image processing

FLIR Systems has developed a powerful algorithm that helps to overcome the problem of finding low contrast targets in high dynamic range scenes. Advanced Digital Detail Enhancement (DDE) assures clear, properly contrasted thermal images. DDE delivers a high contrast image even in extremely dynamic thermal scenes. It provides high quality thermal imaging in any night- or daytime environmental conditions.

Auto focus

The HRC-Series contain an exclusive auto focus feature which delivers crisp, clear images at the press of a button. Focus is kept while zooming in or out. The system allows you to experience better situational awareness in the wide field of view, while maintaining detailed recognition capabilities in the narrow field of view.

Easy and fast to install

All cameras incorporate easily with common power and video interfaces found in existing and new security systems. They can be easily integrated into any existing infrastructure providing early detection and visibility 24/7 all the year round. The images from the 640 x 480 pixels detector can be displayed on virtually any existing display that accepts standard composite video.

Portability

All systems are configured to be either fixed mounted or field transportable for fast deployment. They can be mounted on a standard tripod. A single operator can set up the system in minutes, making it ideal for mobile operations and quick deployments.

Continuous optical zoom on the thermal image

Designed for use in harsh environments

All systems are extremely rugged. Their vital core is well protected against humidity and water. They all operate between -32°C and +55°C. All HRC-Series are Commercially Developed, Military Qualified (CDMQ). They comply with various Mil-Std standards.

Multiple installation options

Various options exist to connect the HRC-Series and integrate them in your existing systems. All cameras can be configured for stand alone use, as part of a network or in a hybrid configuration with local and network based control:
- Serial Configuration: Simply connect the HRC-Series over serial to your remote control panel or use the Joystick Control Unit.
- TCP/IP configuration: all HRC MS cameras can be integrated in any existing TCP/IP network and controlled over a PC. No need to put extra cables. Using this configuration, you can monitor all activity in a protected area over the internet. Even when you are thousands of kilometers away.

High contrast scene with standard AGC algorithm applied

DDE applied - all targets can be observed simultaneously

HRC-Series Multi-Sensor

The HRC-Series Multi-Sensor systems integrate the long range, mid-wave thermal imaging camera found in the HRC-Series with a variety of powerful daylight sensors, and optionally a Laser Range Finder, GPS, Digital Magnetic Compass and Automatic Video Tracker. An array of advanced functions and options are available to meet the most demanding needs. All sensors on the HRC MS-Series units are mounted on an accurate Pan & Tilt unit.

Powerful daylight imaging camera
The Multi-Sensor systems feature different powerful and sensitive daylight cameras with excellent zoom and color quality for additional target identification when conditions permit. Displaying both the thermal image and the daylight image at the same time is also possible.

Pan & Tilt
All sensors on the HRC MS unit are mounted on an accurate Pan & Tilt unit. They can be connected to a RADAR in a "slew to cue" configuration.

Programmable search
The Multi-Sensor systems can be programmed to scan an entire area automatically. Different spots that need to be monitored periodically can be preset. This not only ensures that the entire area is being monitored but also reduces operator workload.

Tailored to all needs
Different thermal and daylight cameras can be installed in the HRC MS-Series System. The GPS and Digital Magnetic Compass are optional. They can also be equipped with an Automatic Video Tracker.

Thermal imaging camera: HRC-S

Global Positioning System (GPS)
Laser Range Finder
Digital Magnetic Compass

Long range daylight camera (LR-TV)

TCP/IP compatible electronics

Pan & Tilt providing continuous rotation

Optionally available

Advanced Global Positioning System (GPS)
The Multi-Sensor systems can be equipped with an advanced GPS. This way the systems will know where they are located. This can be extremely important when the Multi-Sensor systems are installed on moving equipment or when they are used as portable systems.

Digital Magnetic compass
Optionally, a built-in digital magnetic compass allows to determine in which direction the HRC MS-Series are pointing.

Laser Range Finder
The Multi-Sensor systems can be equipped with an eye safe Laser Range Finder. Combined with the GPS system and the electromagnetic compass, it will allow you to exactly determine where a suspected object is located and how far it is away.

Automatic Video Tracker
When equipped with an Automatic Video Tracker, the user can select a given target. Selecting and engaging in tracking mode is easily done by the touch of a button. Once the tracker is engaged, the Multi-Sensor systems will follow the object as long as it can be seen.

The video tracker also provides electronic stabilization. A useful features when the Multi-Sensor is installed on a mast where it is susceptible to movement by the wind.

Junction Protocol Converter (JPC3-G)

The optional JPC3-G box is converting the various low level communication protocols and electrical interfaces of all installed sensors and cameras into a single and common TCP/IP middleware protocol accessible via a standard Ethernet interface. The JPC3-G uses electronic boards in PC104 format. The server is running on an embedded solid state hard disk. Dual channel MPEG-4 encoders and, as an option, an automatic video tracker can be integrated as well.
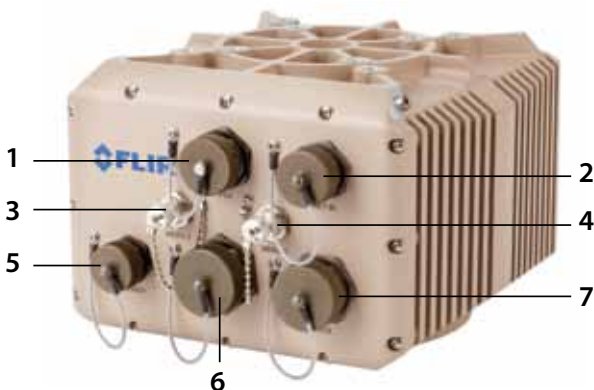
1. 26-pin System Connector (System Interface to Pan & Tilt Head)
2. Net/USB port Connector (Net In / expansion port for future options)
3. Video Loopback 1 Connector (Analog Video Output)
4. Video Loopback 2 Connector (Analog Video Output)
5. Power Input Connector
6. Ethernet Connector (C2 System Interface)
7. JCU Connector (JCU / Serial Remote Interface)

HRC Multi-Sensor systems:
Different configurations possible

FLIR Systems offers the Multi-Sensors in different configurations. The user can choose either an HRC-E, HRC-S, HRC-U, or HRC-X thermal camera. Multiple options exists for the daylight camera as well. Depending on the needs of the user, the HRC Multi-Sensor systems can be equipped with a Short Range (SR-TV) or Long Range (LR-TV or UR-TV) daylight camera.

The following are just three possible configurations for the HRC Multi-Sensor systems

Multi-Sensor configuration:
• Thermal imaging camera HRC-X
• Long range daylight camera (LR-TV)
• Robust Pan & Tilt
• TCP/IP electronics
• Digital magnetic compass
• GPS
• Laser range finder

Multi-Sensor configuration:
• Thermal imaging camera HRC-S
• Short range daylight camera (SR-TV)
• Robust Pan & Tilt
• Laser range finder

Multi-Sensor configuration:
• Thermal imaging camera HRC-U
• Long range daylight camera (UR-TV)
• Robust Pan & Tilt
• TCP/IP electronics
• Digital magnetic compass
• GPS
• Laser range finder
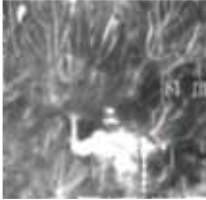
See more, see farther than ever before

HRC's high resolution imaging capability lets operators see more detail from farther away

Maximum detail, maximum Range

With FLIR's HRC-Series thermal security cameras you'll see more detail from greater distances than ever before. HRC's 640x480 detector creates crisp, high-resolution thermal video, putting more pixels on target for extreme image detail at unbelievably long ranges.

Optimized for long-range performance

The HRC's optics strike the perfect balance required for long-range imaging in challenging atmospheric conditions. The HRC-X, equipped with a 1100 mm lens, lets operators see small, distant targets clearly and reliably. Longer focal length lenses produce greater magnification, but just having a long telescope isn't enough – the lens and detector package must be designed and optimized to work together. FLIR Systems is uniquely capable of these complex tasks, as we design and manufacture all of the critical components in the imaging system: detector – cooler – video processing – lenses.

Seeing more than ever before - Tunable Digital Detail Enhancement (DDE)

Beyond the capabilities of linear auto gain/level controls and even non-linear histogram equalization, Tunable DDE automatically provides system operators with buried image details without sacrificing image quality. Precision lens design allows for low-distortion across the entire image while maintaining optimized focus quality across the entire zoom range. High-durability anti-reflection coatings ensure long life and consistent performance of the optical lens.

High contrast scene with standard AGC algorithm applied.

DDE applied - all targets can be observed simultaneously.

Continuous optical and digital zoom

Continuous zoom allows operators to customize their active field of view, observing from extreme ranges without ever losing sight of potential threats – night and day, in all weather conditions.

HRC-Series equipped with an optical and digital zoom on the thermal image allowing to have a closer look at objects which are far.

FLIR Networked Systems

Your partner for intelligent TCP/IP sensor networks

Modern security systems are becoming more and more complex. A security network consists of various types of sensors that need to work together in order to offer maximum performance. Radar, perimeter and ground sensors, CCTV cameras, thermal imaging cameras and other sensors need to be geo-referenced and interconnected in "slew to cue" configurations.

FLIR Systems thermal imaging cameras can be configured for standalone use. But they are also "intelligent sensors". They can be easily deployed as plug & play elements in a TCP/IP network.

FLIR Networked Systems
The mission of FLIR Networked Systems is to support system integrators that want to include FLIR Systems thermal imaging cameras and third party sensors in modern security networks.

FLIR Networked Systems is a group of highly skilled professionals that can help system integrators, product manufacturers, government agencies and commercial end users to focus on their core business activities and quickly respond to changing market conditions.

Your experienced partner
FLIR Networked Systems delivers components and services for critical security and surveillance applications to companies around the world. We have built stable relationships with commercial and technological partners and work closely together with the engineering teams of many systems integrators and product manufacturers.

Basing their solutions on our tools, solution providers can reduce software development costs and integration risks.

FLIR Networked Systems offers a wide variety of products to help integrators set up a professional security network:

Software
Nexus Middleware Technology
Our software agents or servers turn each sensor into a plug & play manageable network object in TCP/IP networks. The Nexus server resides in each of the sensors in the network making it a network manageable node. The server can run in rugged servers, embedded electronics or rack-mount industrial PCs. Drivers are available for devices such as: Thermal imaging and CCTV Cameras, Radars, Alarm Contacts, Fence & Ground Sensors, Vehicles, UAV or Meteo Stations.

Client Applications
FLIR Systems also offers client applications that make Nexus servers become visible and easy-to-use by operators. Our FLIR Sensors Manager GUI is entirely based on FLIR Systems Developers Tools.

Hardware
FLIR Systems offers specific hardware appliances such as Desktop Computers, Storage Servers (nDVR), or Industrial PC based Servers.

Developers Tools
These allow developers to build their own Command and Control applications to manage and control sensors. Our toolkits include libraries for communications, image processing and video display or moving maps...

SDK - "easy-to-integrate"
SW developers can use our SDK and technical support to easily develop their own command & control or sensor and video management applications.
FLIR Maps - This control offers a moving map display to be integrated in high level graphical user interface software applications.
FLIR Video Player - The FLIR Video Player is an embedded ActiveX control that provides a set of functions to display and process video from different sources. The FLIR Video Player provides video functions to be integrated in high level software applications.
OEM Licenses - nDVR and Video Analysis Tools are available for OEM customers. Yearly subscriptions for technical support including generation of licenses and updates are available.

Professional Services
Our past experience as systems integrators and with the devices allows us to help you minimize your network challenges and reduce your operating costs. We offer consulting, training and support services based on this know-how in the following fields:
- System Architecture Design and Networking
- Training & On Site Support and New Products

## FLIR Networked Systems: serving different types of customers

End Users:
They demand open, flexible and scalable architectures that allow them to manage their security network and use multiple vendors.

Systems Integrators:
Want to integrate and deploy complex systems and need "easy-to-integrate" sensors and low-level tools (SDK) that can make their job easier, reducing risks, schedules and software development costs.

Sensors/Device Manufacturers:
FLIR Networked Systems can help them with the adoption of evolving standards and some of the other market challenges they face in bringing competitive devices to market.
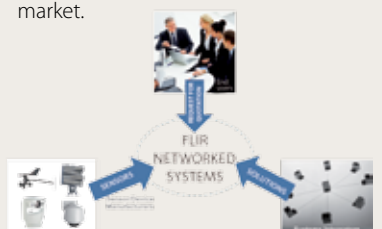
Software

Turning tools into solutions

At FLIR Systems, we recognize that our job is to go beyond just producing the best possible thermal imaging cameras. We are committed to enabling all users of our thermal imaging camera systems to work more efficiently and productively by providing them with the most professional camera-software combination.

Our team of committed specialists are constantly developing new, better and more user-friendly software packages to satisfy the most demanding security professionals.

FLIR Sensors Manager 2010

Software to manage and control FLIR Systems Thermal imaging cameras for security and surveillance applications.

FLIR Sensors Manager offers powerful and efficient management capabilities for any security installation with FLIR Systems thermal imaging cameras. FLIR Sensors Manager allows to automatically locate FLIR Systems thermal imaging cameras in the network and to easily control them. Just connect the thermal imaging camera to the network, install FLIR Sensors Manager and hit the "discover" button and you will be able to manage and control the camera. Thanks to FLIR Sensors Manager, the management of FLIR Systems thermal imaging cameras over a network will become extremely easy. The 2010 version adds new features and usability.

Easy to use
FLIR Sensors Manager is a commercial "Out of the Box" software. Fully designed and supported by FLIR Systems, this application guaranties an intuitive and simple user experience. Just install the software and you will be ready to use it immediately. You can even tailor the layout to your own needs.

Connect a large number of sensors
Both the Basic Video Security and the Pro versions of FLIR Sensors Manager allow multiple users to share monitoring and control of up to four FLIR Systems thermal imaging cameras.

Different license packages to manage more than one camera are available. Additional sensor licenses can be added to manage up to 100 sensors from a single workstation.

Support for multiple languages
FLIR Sensors Manager can be configured to work in different languages, including English, French, German, Italian, Spanish, Chinese, Japanese, Russian, Arabic, Portuguese and Polish.

Different versions available
FLIR Sensors Manager is available in two different versions: Basic Video Security and Pro. Depending on your exact needs and your security network, you can choose the version that best fits your system's requirements. A free demo version is available and can be downloaded from our website.
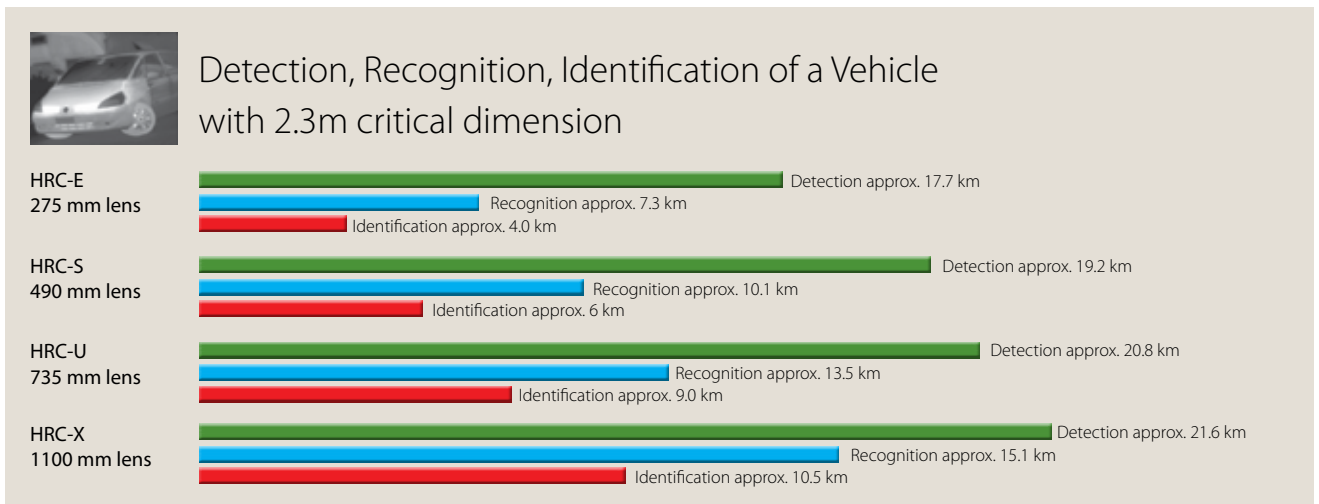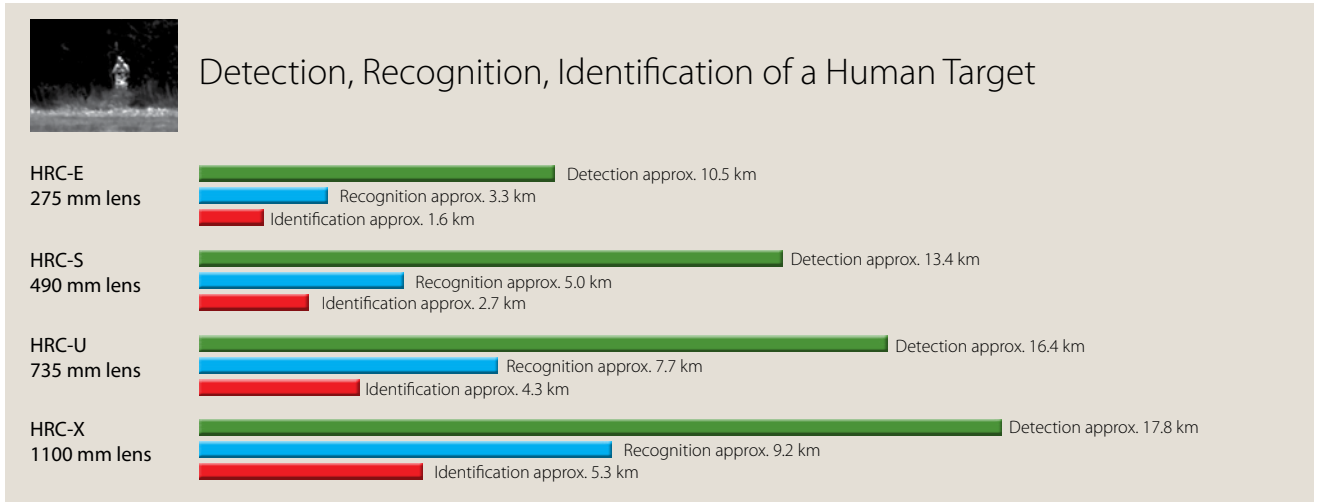
- Basic Video Security:
The Basic Video Security version of FLIR Sensors Manager allows to discover sensors in the network, display network video, define presets, manage scan lists, create panoramas, show thermal images on multiple monitors, capture images and configure user profiles. The Basic Video Security version also includes frequently used video management features like video walls, carousel, schedulers and more.

- Pro:
The Pro version of FLIR Sensors Manager contains all the features that are incorporated in the Basic Video Security version, plus a number of useful modes that will help you make the most out of your security network: display of FLIR thermal imaging cameras and other Nexus enabled sensors on a geo-referenced map; video analytics functions like Video Motion Detection, Target Detection or Software based tracking of moving objects; electronic stabilization; radar cueing and radar tracks display; video wall display with support for multiple monitors…

Range Performances

Range performances for HRC-E, HRC-S, HRC-U, HRC-X

Detection, Recognition, Identification of a Human Target

HRC-E
275 mm lens
- Detection approx. 10.5 km
- Recognition approx. 3.3 km
- Identification approx. 1.6 km

HRC-S
490 mm lens
- Detection approx. 13.4 km
- Recognition approx. 5.0 km
- Identification approx. 2.7 km

HRC-U
735 mm lens
- Detection approx. 16.4 km
- Recognition approx. 7.7 km
- Identification approx. 4.3 km

HRC-X
1100 mm lens
- Detection approx. 17.8 km
- Recognition approx. 9.2 km
- Identification approx. 5.3 km

Detection, Recognition, Identification of a Vehicle with 2.3m critical dimension

HRC-E
275 mm lens
- Detection approx. 17.7 km
- Recognition approx. 7.3 km
- Identification approx. 4.0 km

HRC-S
490 mm lens
- Detection approx. 19.2 km
- Recognition approx. 10.1 km
- Identification approx. 6 km

HRC-U
735 mm lens
- Detection approx. 20.8 km
- Recognition approx. 13.5 km
- Identification approx. 9.0 km

HRC-X
1100 mm lens
- Detection approx. 21.6 km
- Recognition approx. 15.1 km
- Identification approx. 10.5 km

Actual range may vary depending on camera set-up, environmental conditions, user experience and type of monitor or display used.
Assumptions: 50 % probability of achieving objective at specified distance given 2°C temperature difference and 0.82 / km atmospheric attenuation factor.
DRI according to Johnson Criteria.
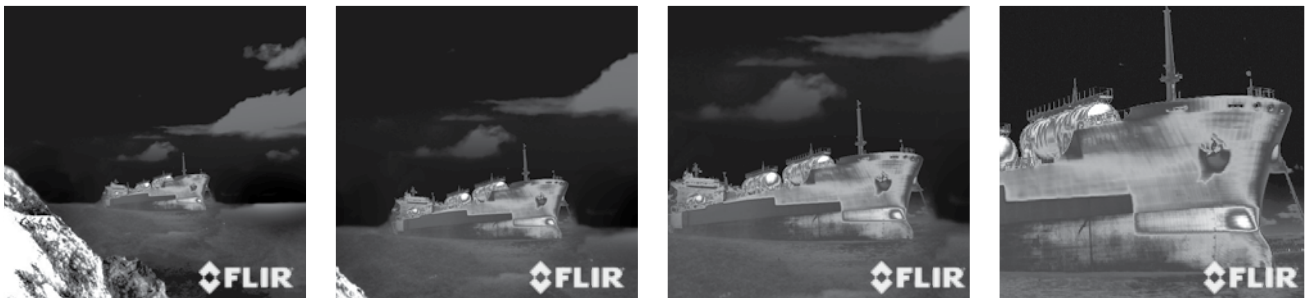
HRC-Series equipped with a continuous optical and continuous digital zoom on the thermal image allowing to have a closer look at objects which are far.

HRC-Series
Thermal imaging camera only

Technical specifications

IMAGING PERFORMANCE

Detector type	MWIR: Indium Antimonide (InSb) or Mercury Cadmium Telluride (MCT): 640 x 480 pixels
Spectral range	3 to 5 µm
Field of View	12.5x continuous zoom and four preset positions
Image frequency	50 Hz (PAL), 60 Hz (NTSC)
Focus	Automatic or Manual
Continuous Digital Zoom	Yes, up to 16x
Selectable preset focus distance	Yes: Allows to command the lens to a given focus position
Focus athermalisation	Yes
Image processing	Tunable Digital Detail Enhancement (DDE), Histogram Equilazition

SYSTEM FEATURES

Remote Control	RS-232, RS-485 and Ethernet
Palettes	black hot / white hot; different color palettes
Still image capture	JPEG and FFF 14bit
Built-in Test (BIT)	Yes

IMAGE PRESENTATION

Video	PAL / NTSC selectable

POWER

Input Voltage	28 V +/- 4V
Consumption	35 W typical (running after cooldown), < 125 W maximum with heaters

ENVIRONMENTAL SPECIFICATIONS

Operating temperature range	-32°C to +55°C
Storage temperature range	-45°C to +70°C
Automatic Window defrost	Yes
EMC / EMD	CE tested which requires compliance with the following procedures:
	Emission: EN61000-6-4:2007
	Immunity: EN61000-6-2:2005
	FCC 47 CFR part 15 Class B
Rain	Mil-Std-810F, 506.4 - procedure II
Humidity	Mil-Std-810F, 507.4
Sand/dust	Mil-Std-810F, 510.4 - procedure II
Ice/ freezing rain	Mil-Std-810F, 521.2 - procedure I
Shock	Mil-Std-810F - procedure I
Vibration	Mil-Std-810C, 514.5 - procedure VIII
Solar radiation	Mil-Std-810F, 505.4 - procedure I, cycle A1
Emission	EN61000-6-4:2007
Immunity	EN61000-6-2:2005
IP rating	IP66

INTERFACES

Ethernet	Command and control all functions and still images
RS-232	Command and control all functions
RS-485	Command and control all functions

STANDARD PACKAGE:
Thermal imaging camera, power supply, hand control, junction box, set of cables (standard camera cable length 7.5 m), operator manual, shipping case.

Camera specific

	HRC-E	HRC-S	HRC-U	HRC-X
IMAGING PERFORMANCE				
Field of View: continuous optical zoom	2° (H) x 1.5° (V) to 24° (H) x 18.8° (V) with 22 x 275 mm lens.	1.1° (H) x 0.84° (V) to 14.1° (H) x 10.50° (V) with 39 x 490 mm lens	0.75° (H) x 0.56° (V) to 9.4° (H) x 7.0° (V) with 59 x 735 mm lens	0.5° (H) x 0.38° (V) to 6.3° (H) x 4.7° (V) with 88 x 1100 mm lens
Spatial resolution (IFOV)	0.67 mrad for 22 mm lens - 0.055 mrad for 275 mm lens	0.383 mrad for 39 mm lens - 0.031 mrad for 490 mm lens	0.256 mrad for 59 mm lens - 0.020 mrad for 735 mm lens	0.17 mrad for 88 mm lens - 0.014 mrad for 1100 mm lens
Thermal Sensitivity	25 mK	25 mK	25 mK	35 mK
SYSTEM FEATURES				
Auto front lens cover when parked	no	yes	yes	yes
PHYSICAL CHARACTERISTICS				
Camera Weight	7.5 kg	9.5 kg	12 kg	12 kg
Camera Size (L x W x H)	475 x 235 x 194 mm	475 x 235 x 194 mm	564 X 264 X 303 mm	564 X 264 X 303 mm

Daylight camera specific

Daylight CCD:	SR-TV	LR-TV	UR-TV
CCD-Format	1/4"	1/2"	1/2"
Focal Length (Wide to Tele)	3.5mm to 91mm	12.5mm to 750mm 25mm to 1500mm (with 2x Extender)	31.5mm to 750mm
F# (Wide to Tele)	1.6 to 3.8	3.8 to 7.1 7.6 to 14.2 (with 2x Extender)	4.3 to 7
Field Of View (H)	1.6° to 42°	0.48° to 28.7° 0.24° to 14.4° (with 2x Extender)	0.5° to 11.8°
Optical Zoom	26x	60x 120x (with 2x Extender)	23.6x
Digital zoom	12x	10x	-
Min. Illumination	2 lux (1/50 sec) B&W Mode: 0.7 lux (1/50sec)	0.6 lux (1/50sec)* 0.02 lux (32/50sec)*	0. 08 lux (1/50sec)
Focus	Continuous AF/Manual	One shot AF/Manual	One shot AF/Manual

Thermal image

Thermal energy passes through many obscurants including smoke, dust, modest foliage and light fog. The thermal camera can see this person clearly through the fog, but the standard visible light color camera cannot.

Normal vision

The Multi-Sensor systems can be ordered in different configurations. This version contains an HRC-U combined with a long range daylight camera (UR-TV), TCP/IP compatible electronics, a laser range finder, a digital magnetic compass and a GPS.

Technical specifications

IMAGING PERFORMANCE	
Thermal:	Please see page 15 for detailed technical specifications of the HRC-E, HRC-S, HRC-U and HRC-X
Daylight sensors	Please see page 16 for detailed technical specifications of the daylight cameras

PAN & TILT:	
Az Range; Az velocity	n x 360°; 0.03° - 65° /sec continuous
El Range; El velocity	+/- 35°; 0.03° - 30° / sec
Accuracy	1 mrad
Resolution	0.1 mrad
Parking Position	Yes
Programmable Search	Program multiple preset scene locations

IMAGE PRESENTATION	
Video output	NTSC or PAL composite video
Connector types	BNC (2) provides thermal and daylight videos simultaneously
Video Over IP	Optional embedded encoders provide simultaneous MPEG-4, IR + TV digital videos

POWER	
Input Voltage	28V +/- 4V
Consumption	55 W typical (running after cooldown) - 140 W with heaters - 250 W Max (configuration dependent)

ENVIRONMENTAL SPECIFICATIONS	
Operating temperature range	-32°C to +55°C
Storage temperature range	-45°C to +70°c
Automatic Window defrost	Yes
EMC / EMD	CE tested which requires compliance with the following procedures: Emission: EN61000-6-4:2007 Immunity: EN61000-6-2:2005 FCC 47 CFR part 15 Class B
Rain	Mil-Std-810F, 506.4 - procedure II
Humidity	Mil-Std-810F, 507.4
Sand/dust	Mil-Std-810F, 510.4 - procedure II
Ice/ freezing rain	Mil-Std-810F, 521.2 - procedure I
Shock	Mil-Std-810F - procedure I
Vibration	Mil-Std-810C, 514.5 - procedure VIII
Solar radiation	Mil-Std-810F, 505.4 - procedure I, cycle A1
Emission	EN61000-6-4:2007
Immunity	EN61000-6-2:2005
IP rating	IP66

PHYSICAL CHARACTERISTICS	
HRC-E MS / HRC-U MS / HRC-S MS / HRC-X MS	
Weight	Configuration dependent - 65 kg max.
Size	Configuration dependent

INTERFACES	
Ethernet	Optional: command and control all functions and MPEG video
RS-485	Command and control all functions

OPTIONALLY AVAILABLE	
Laser Range Finder	Erbium glass, eye safe / 80 m - 20 km
Geo Positioning	GPS optionally available
Digital Magnetic Compass	Optionally available
Automatic Video Tracker including e-stab	Optionally available

TYPICAL CONFIGURATION PACKAGE
HRC-E MS / HRC-S MS / HRC–U MS / HRC-X MS
Thermal imaging camera, daylight camera, Pan & Tilt, power supply with cables, operator manual, shipping cases.

Notes

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