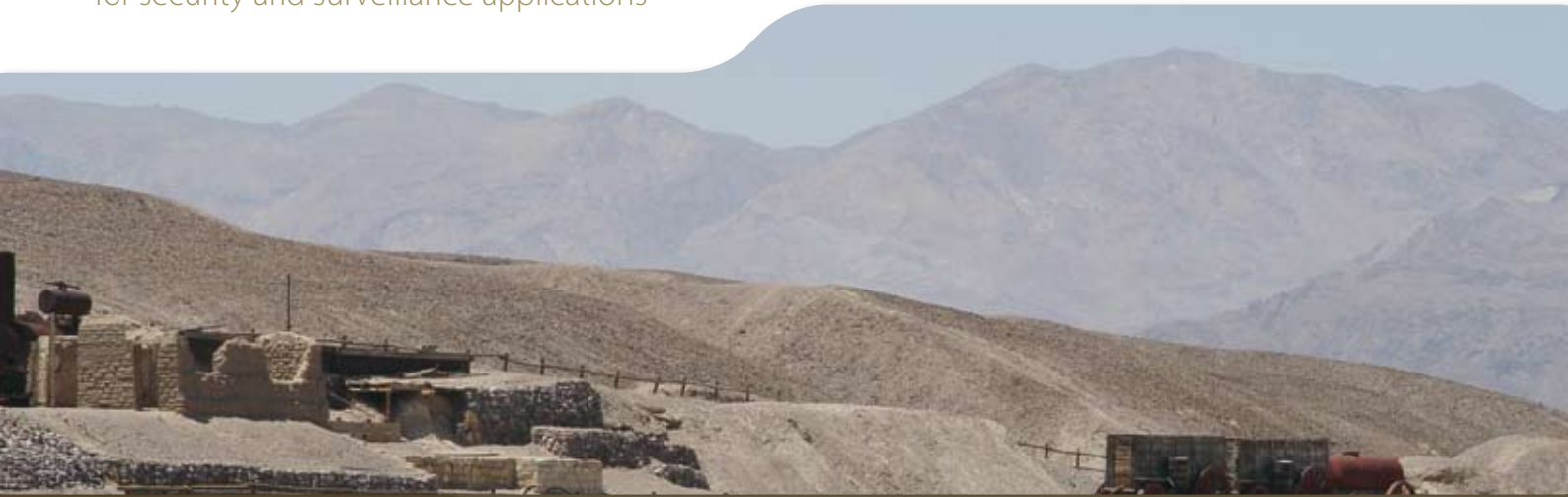


Thermal imaging cameras
for security and surveillance applications



HRC-U / HRC-S

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

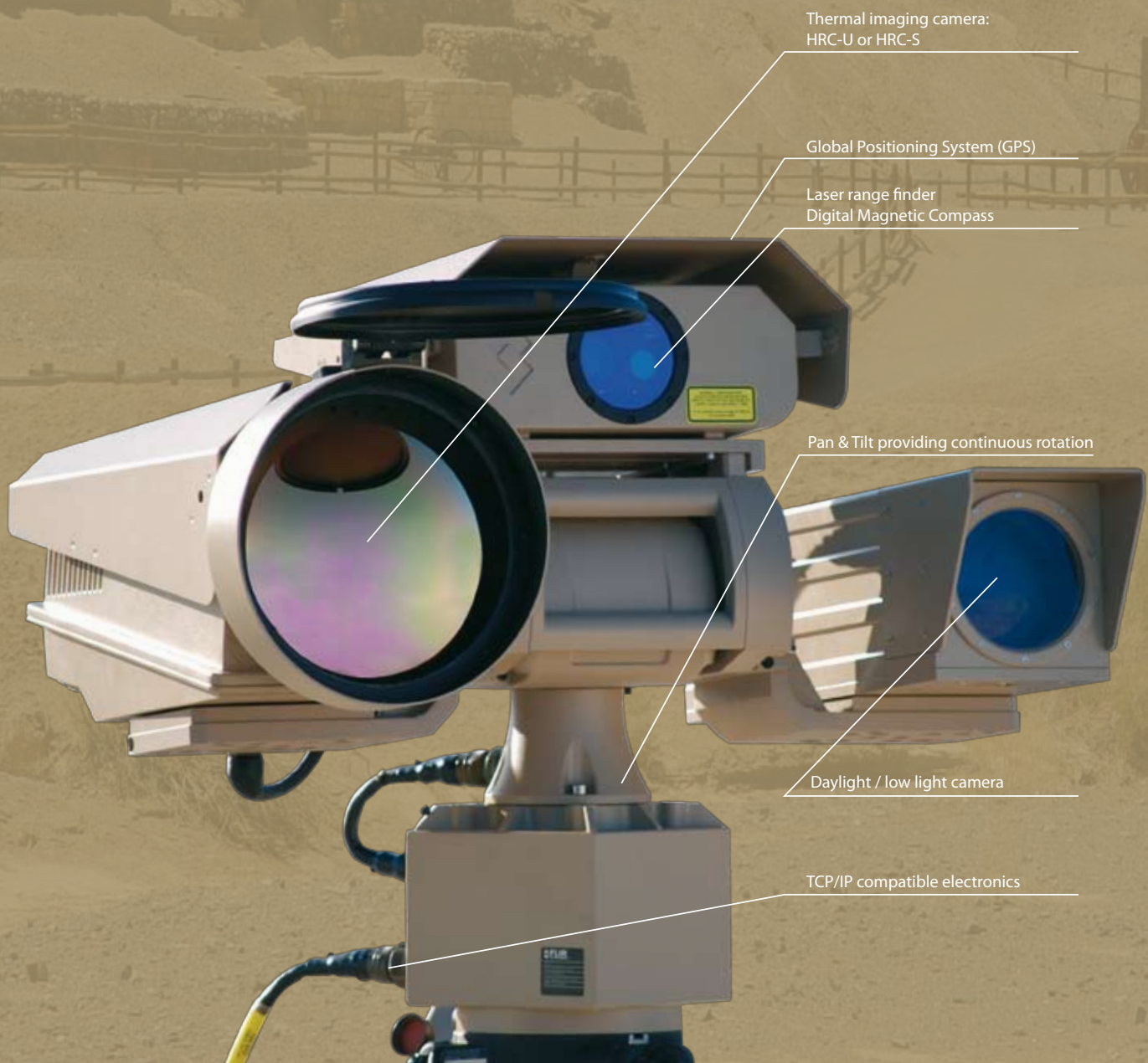


Thermal imaging camera only



Multi-Sensor

HRC-U MS / HRC-S MS Multi-Sensor systems



Thermal imaging camera:
HRC-U or HRC-S

Global Positioning System (GPS)

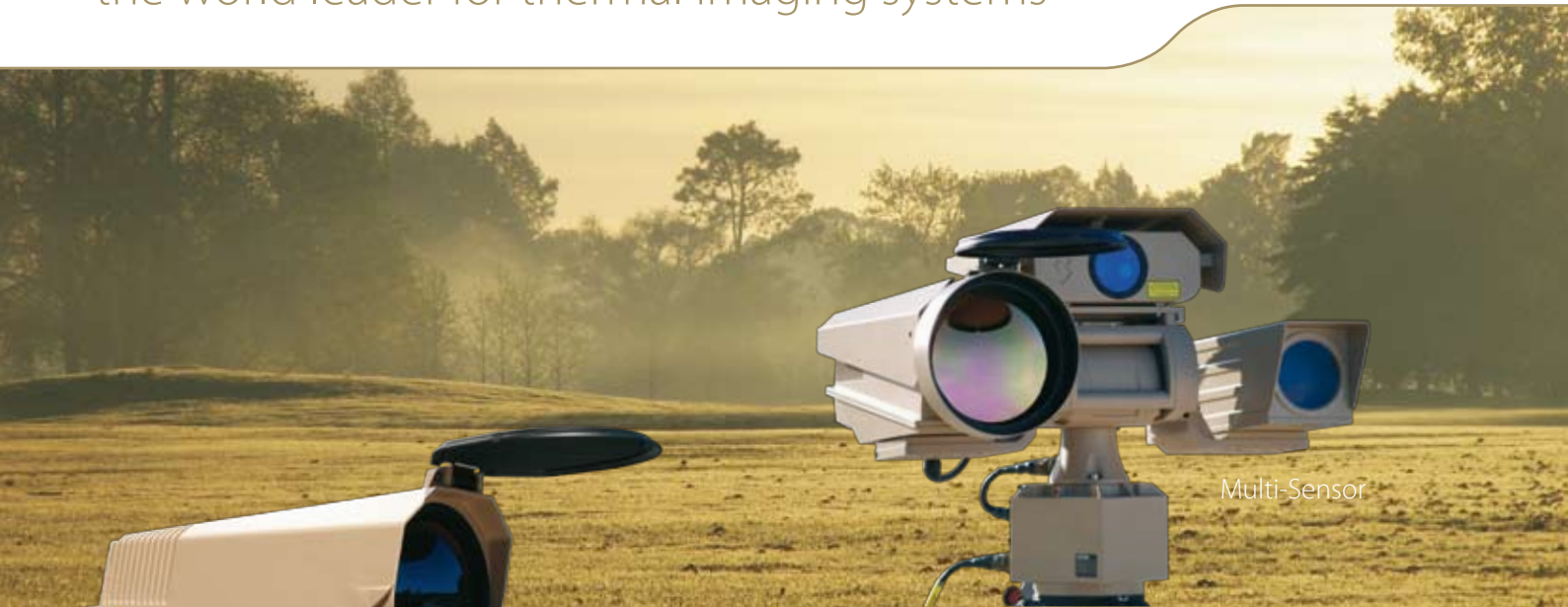
Laser range finder
Digital Magnetic Compass

Pan & Tilt providing continuous rotation

Daylight / low light camera

TCP/IP compatible electronics

HRC-U / HRC-S from FLIR Systems, the world leader for thermal imaging systems



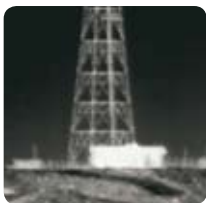
Multi-Sensor

Thermal imaging camera only

The HRC-U and HRC-S are equipped with a highly reliable, mid-wave, cooled Indium Antimonide (InSb) detector which offers extremely long range detection in all weather conditions. The cameras offer a continuous 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-U and HRC-S can be integrated into existing networks or used portably.

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

Both versions are also available as a Multi-Sensor systems. They can be equipped with a daylight camera, a GPS unit, a Digital Magnetic Compass and optionally a laser rangefinder.



Cooled InSb detector

Both the HRC-U and HRC-S are equipped with a mid-wave, cooled Indium Antimonide (InSb) detector. A thermal imaging camera with a cooled detector gives you the advantage that you can see and detect potential threats much further 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 check things out since small details can clearly be seen on the thermal image.

Crisp, high resolution thermal images: 640 x 480 pixels

Both thermal imaging cameras are equipped with an InSb detector that produces ultra-sharp thermal images of 640 x 480 pixels. This will satisfy users that want to see the smallest of detail and are demanding the best possible image quality. It allows the user to see more detail and detect

more and smaller objects from a further distance. Coupled with high sensitivity, the HRC-U and HRC-S offer extremely long range performance and excellent image quality.

Two different versions available

The HRC-S is equipped with a 40 x 490 mm lens. It zooms between a 14.06° field of view and a 1.13° field of view.

For even longer range performance, the user can choose for the HRC-U, equipped with a 59 x 735 mm lens. It zooms between a 9.38° field of view and a 0.75° field of view.



Optical and digital zoom on the thermal image

The HRC-U and HRC-S are both equipped with powerful 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 further recognize more detail and react more quickly to security threats.

The advantage of 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.

Both systems are also equipped with an up to 4x digital zoom.

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



High contrast scene with standard AGC algorithm applied



DDE applied - all targets can be observed simultaneously

Both the HRC-S and HRC-U 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

Both 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

Both 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.

Designed for use in harsh environments

Both systems are extremely rugged. Their vital core is well protected against humidity and water. They both operate between -32°C and +55°C.

Easy-to-use, fast, accurate "Pan & Tilt"

The thermal imaging cameras can optionally be mounted on a rugged Pan & Tilt system. Intuitive joystick operation allows the operator to see 360° horizontal and +/- 35° vertically, offering superb situational awareness.

Radar Connection – "Slew to cue"

If installed on a Pan & Tilt mechanism, the thermal imaging cameras can be connected to a radar system. If the radar detects an object, the camera will automatically turn in the right direction and give you a visual image so that you can instantly see what the blip on the radar screen really means. The accurate, fast, Pan & Tilt system, allows for easy tracking and following of fast moving objects.

Multiple installation options



Continuous optical zoom on the thermal image

Various options exist to connect the HRC-U and HRC-S and integrate them in your existing systems. Both cameras can be configured for stand alone use, as part of a network or in a hybrid configuration with local and network based control:

- Analog configuration: Simply connect the HRC-U or HRC-S over RS-232 or RS-422 to the remote control panel. A video cable can be connected to any existing display that accepts composite video.
- TCP/IP configuration: both 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.



HRC-U MS / HRC-S MS Multi-Sensor

The HRC-U MS and HRC-S MS are Multi-Sensor systems that integrate the long range, short wave thermal imaging camera found in the HRC-U and HRC-S with a variety of powerful daylight sensors, GPS and optionally a laser range finder. An array of advanced functions and options are available to meet the most demanding needs. The Multi-Sensor systems are installed on a Pan & Tilt system to increase situational awareness.

Powerful daylight imaging camera

The Multi-Sensor systems feature a powerful, sensitive daylight camera 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.

Advanced Global Positioning System (GPS)

The Multi-Sensor systems are equipped with 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-U MS or HRC-S MS are pointing.

Laser range finder

Optionally, the Multi-Sensor systems can be equipped with an eye safe laser range finder. Combined with the GPS systems and the electromagnetic compass, it will allow you to exactly determine where a suspected object is located and how far it is away.

Pan & Tilt

The Multi-Sensor systems can be mounted on a rugged Pan & Tilt mechanism. They can be connected to a RADAR in a "slew to cue" configuration.

Programmable search

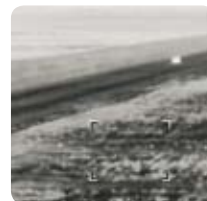
The Multi-Sensor systems can be programmed to scan an entire area automatically. Different spots that need to be monitored periodically can be preset. The system will scan the predefined areas automatically. This not only ensures that the entire area is being monitored but also reduces operator workload.

Tailored to all needs

Although the Multi-Sensor systems are available with a standard daylight imaging camera, GPS, compass and eventually a laser range finder, the user has the possibility to define his preferred equipment to be included in the system.



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





HRC-U and HRC-S: the perfect tools for border security and other surveillance applications..

In complete darkness, in the most diverse weather conditions

The HRC-U and HRC-S 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 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.



But also ports and airports, nuclear plants, petrochemical installations, warehouses... are vulnerable to theft, or even worse terrorist attacks, and can be protected by using thermal imaging cameras like the HRC-U and HRC-S.



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 HRC-U and HRC-S is the key to asset protection and risk mitigation. The HRC-U and HRC-S expose threats hidden in the darkness, concealed by adverse weather, and veiled by obscurants like dust, fog, and smoke.

The HRC-U and HRC-S are new weapons for intrusion detection. They 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, fog, snow, smoke, ...

Protect your borders and assets also in broad daylight

The HRC-U and HRC-S will not only protect borders and assets against intruders during the darkest of nights. The cameras are also perfectly suited to complement existing surveillance cameras during daytime. The HRC-U and HRC-S will detect objects that remain invisible to the naked eye. For example people hiding in the shadows or in bushes, will be seamlessly detected.



HRC-U / HRC-S

Thermal imaging camera only

Technical specifications

IMAGING PERFORMANCE

Detector type	Indium Antimonide (InSb): 640 x 480 pixels
Spectral range	3.5 to 5.0µm
Field of view: continuous optical zoom	HRC-S: 1.13° (H) x 0.84 (V) to 14.06° (H) x 10.50° (V) with 40 x 490 mm lens HRC-U: 0.75° (H) x 0.56 (V) to 9.38° (H) x 7.00° (V) with 59 x 735 mm lens
Spatial resolution (IFOV)	HRC-S: 0.383 mrad for 40 mm lens - 0.031 mrad for 490 mm lens HRC-U: 0.256 mrad for 59 mm lens - 0.020 mrad for 735 mm lens
Thermal sensitivity	20 mK
Image frequency	50 Hz (PAL), 60 Hz (NTSC)
Focus	Automatic or Manual
Electronic zoom	2x, 4x
Image processing	Digital Detail Enhancement (DDE), Histogram Equalization

SYSTEM FEATURES

Remote Control	By serial link or over TCP/IP
Automatic heater	Yes
Built-in Test (BIT)	Yes
PelcoD compliance	Yes

IMAGE PRESENTATION

Video output	NTSC or PAL composite video, 16-bit digital image
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POWER

Requirements	18-35 V DC
Consumption	35 W typical - 140 W with heaters

ENVIRONMENTAL SPECIFICATIONS

Operating temperature range	-32°C to +55°C
Storage temperature range	-45°C to +70°C
Automatic Window defrost	Yes
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

PHYSICAL CHARACTERISTICS

Camera Weight	8.5 kg for HRC-S / 12 kg for HRC-U
Camera Size	HRC-S: 474 x 194 x 225 mm (L x H x W) HRC-U: 540 X 250 X 250 mm (L x H x W)
Shipping weight (camera + packaging)	25 kg

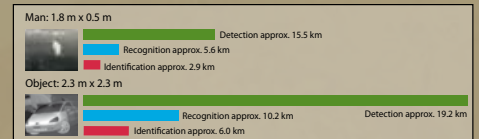
INTERFACES

TCP/IP	Command and control all functions and still images
RS-232	Command and control all functions
RS-485 Command and control	Command and control all functions

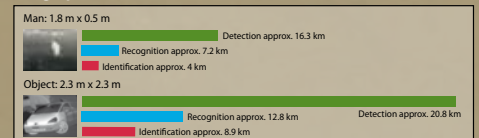
STANDARD PACKAGES

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

HRC-S: range performance 490 mm lens



HRC-U: range performance 735 mm lens



Actual range may vary depending on camera set-up, environmental conditions, user experience and type of monitor or display used.

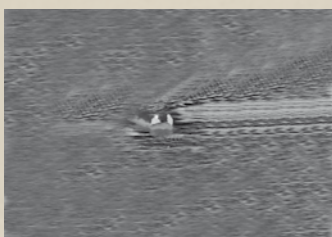
Assumptions:

50 % probability of achieving objective at specified distance given 2°C temperature difference and 0.85 / km atmospheric attenuation factor.



SPECIFICATIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE

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HRC-S / HRC-U equipped with a continuous optical zoom on the thermal image allow to have a closer look at objects which are far away.

HRC-U MS / HRC-S MS

Multi-Sensor systems



Technical specifications

IMAGING PERFORMANCE

Thermal:

Detector type	Indium Antimonide (InSb): 640 x 480 pixels
Spectral range	3.5 to 5.0 μ m
Field of view: continuous optical zoom	HRC-S MS: 1.13° (H) x 0.84° (V) to 14.06° (H) x 10.50° (V) with 40 x 490 mm lens HRC-U MS: 0.75° (H) x 0.56° (V) to 9.38° (H) x 7.00° (V) with 59 x 735 mm lens
Spatial resolution (IFOV)	HRC-S MS: 0.383 mrad for 40 mm lens - 0.031 mrad for 490 mm lens HRC-U MS: 0.256 mrad for 59 mm lens - 0.020 mrad for 735 mm lens
Thermal sensitivity	20 mK
Image frequency	50 Hz (PAL), 60 Hz (NTSC)
Focus	Automatic or Manual
Electronic zoom	2x, 4x
Image processing	Digital Detail Enhancement (DDE), Histogram Equalization
<u>Daylight CCD:</u>	
Type	Sony FCB-EX-980S Color block camera (NTSC) Sony FCB-EX-980SP Color block camera (PAL) Other types available on request
Effective pixels	Approx. 680,000 pixels NTSC - approx. 800,000 pixels PAL
Low light option	Yes
Image stabilization	Yes
Optical zoom	26x, 42° to 1.6° continuous
Electronic zoom	12x continuous

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

LASER RANGE FINDER (optional)

Type / range	Erbium glass, eye safe / 80 m - 20 km
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SYSTEM FEATURES

Geo Positioning	Internal GPS
Programmable Search	Program multiple preset scene locations
Remote Control	By serial link or over TCP/IP
Automatic heater	Yes
Built-in Test (BIT)	Yes
PelcoD compliance	Yes

IMAGE PRESENTATION

Video output	NTSC or PAL composite video, 16-bit digital image
Connector types	BNC (2) provides thermal and daylight video simultaneously
VOIP	Optional embedded server provides simultaneous IR + TV
MPEG video	MPEG-2 or MPEG-4

POWER

Requirements	18-35 V DC
Consumption	55 W typical - 140 W with heaters

ENVIRONMENTAL SPECIFICATIONS

Operating temperature range	-32°C to +55°C
Storage temperature range	-45°C to +70°C
Automatic Window defrost	Yes
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

PHYSICAL CHARACTERISTICS

HRC-U MS / HRC-S MS

Camera Weight	23 kg for HRC-S / 25 kg for HRC-U
Camera Size	HRC-S: 550 x 350 x 640 mm (L x H x W) HRC-U: 650 x 380 x 680 mm (L x H x W)

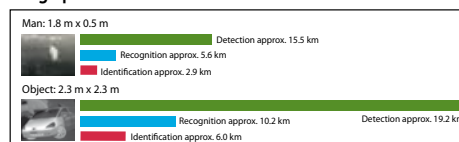
INTERFACES

TCP/IP	Optional: command and control all functions and MPEG video
RS-232	Command and control all functions
RS-485 Command and control	Command and control all functions

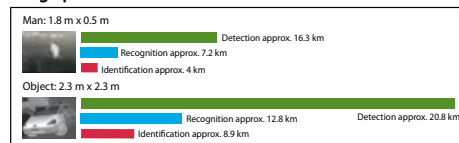
TYPICAL CONFIGURATION PACKAGE

HRC-U MS / HRC-S MS
Thermal imaging camera, daylight camera, Pan & Tilt, power supply with cables, operator manual, shipping cases (3).

HRC-S: range performance 490 mm lens



HRC-U: range performance 735 mm lens



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 0.85 / km atmospheric attenuation factor.

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