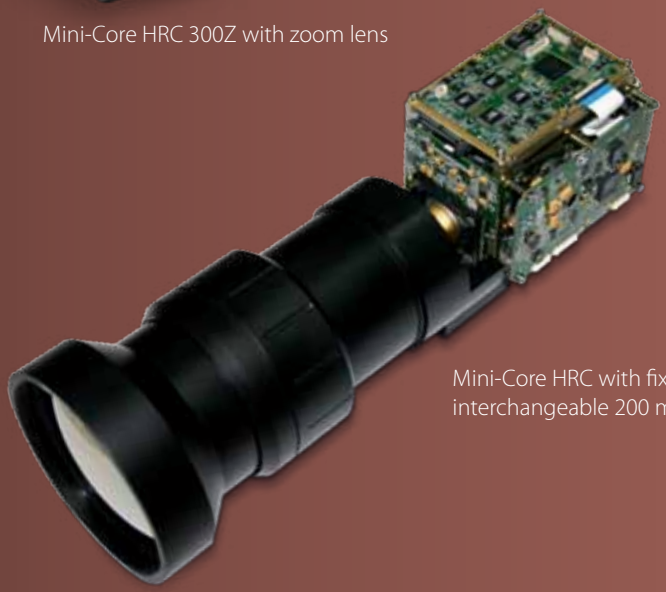
Cores and components
for thermal imaging applications

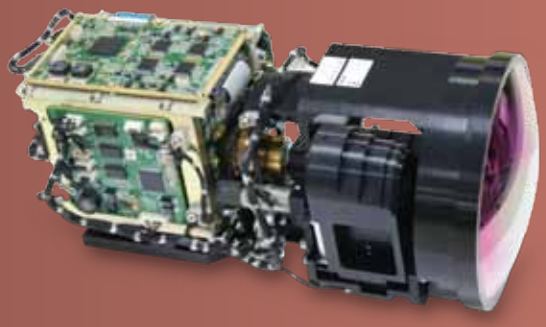
Mini-Core HRC 300Z with zoom lens

Mini-Core HRC

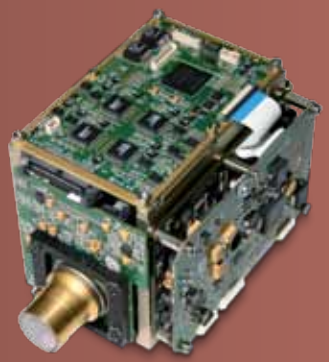
Thermal imaging core in a small, light and affordable package



Mini-Core HRC with fixed, interchangeable 200 mm lens



Mini-Core HRC 460T



Mini-Core HRC lens-less configuration

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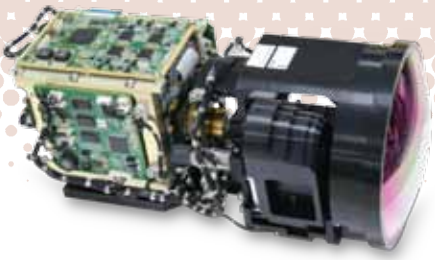
Mini-Core HRC

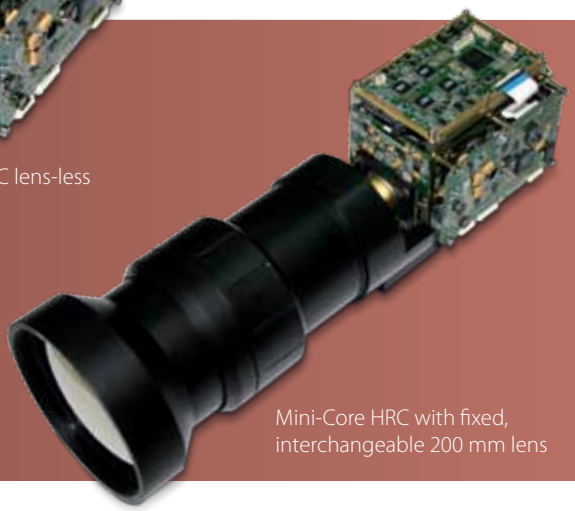
Thermal imaging core in a small, light and affordable package



Mini-Core HRC 460T

Mini-Core HRC 300Z with zoom lens

Mini-Core HRC lens-less configuration



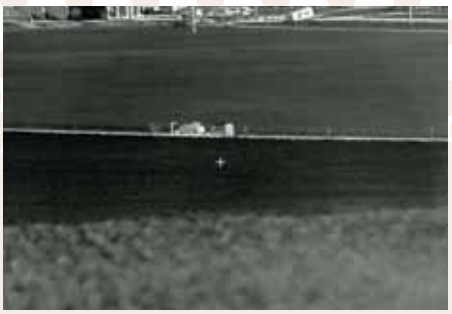
Mini-Core HRC with fixed, interchangeable 200 mm lens

The "Mini-Core HRC" has been especially designed for Original Equipment Manufacturers (OEM). It can easily be integrated into systems that require a small, compact and lightweight thermal imaging core with a cooled detector. The "Mini-Core HRC" can be easily integrated in small airborne gimbals or in any other application. Different version of the "Mini-Core HRC" are available.

Thermal imaging core

Thermal imaging camera cores are subsystems that provide similar features and functions to those found in some of FLIR Systems' standard camera products. However, cores are designed to allow integration into other systems. Camera cores can be used in whole or subsystem form by an OEM in many applications.

FLIR Systems provides different components and cores for a large number of advanced thermal imaging platforms. With FLIR's strength in focal plane array manufacturing, vacuum packaging, video processing electronics and system integration, along with high commercial product manufacturing rates, FLIR Systems is a powerful partner to many OEM customers.



The Vilga video processor offers video tracking from the "Mini-Core HRC" and multiple video sources installed in the optical payload.

Cooled MCT detector

The "Mini-Core HRC" is equipped with a cooled Mercury Cadmium Telluride (MCT) detector. This offers excellent range performance.

The MCT detector produces crisp thermal images of 640x512 pixels on which the smallest of details can be seen. It operates in the mid-wave infrared band (3 – 5 µm).

A thermal imaging core 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 any more to send someone out in the field to check things out since small details can clearly be seen on the thermal image.

Continuous optical zoom lens

The "Mini-Core HRC" is available with a zoom lens. The Mini-Core HRC 300Z is equipped with a 20 x, 15 – 300 mm zoom lens. It continuously zooms between a 1.8° narrow field of view and a 36° wide field of view. 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.

For OEMs that are looking for even longer range performance, the Mini-Core HRC 600Z is available. It can continuously zoom between a 0.9° narrow field of view and a 18.0° wide field of view.

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.

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.

Triple field-of view optics

The Mini-Core HRC is also available with triple filed of view optics: Mini-Core HRC 460T. It is equipped with a wide angle lens offering a wide field of view, a medium field of view lens and a narrow field of view lens.

It has the capability to switch from one lens to another within a fraction of a second. A wide angle lens will give you excellent situational awareness. When a potential threat is detected you can easily switch to the medium field of view lens to have a closer look at the situation or even to the extremely narrow field of view lens so that you can see the smallest

of details. This way operators can see further recognize more detail and react more quickly to security threats.

Fixed, interchangeable lenses
The "Mini-Core HRC" equipped with a MCT detector is also available with a fixed lens. It is available with a 25 mm, 50 mm, 100 mm or 200 mm lens. Lenses are interchangeable which means that OEMs can make one design and just change the lens according to their users needs.

Lens-less core
A version of the "Mini-Core HRC" without lens is also available. This means that the "Mini-Core HRC" can be used for any thermal imaging application that requires a special optical path.

Vilga Tracker and E-stab module available
Optionally, the "Mini-Core HRC" can host the Vilga video processor. The Vilga video processor offers video tracking from the "Mini-Core HRC" and multiple video sources installed in the optical payload.

Multiple algorithms are available and selectable by external commands amongst which, Centroid, Correlation and Scene. Tracking result is outputted at video rate from the Vilga board through a serial communication port at high speed rate using a proprietary documented software protocol. Through the software communication protocol the user can command all parameters from the Vilga tracker, select algorithms and obtain tracking results.

Vilga also offers electronic stabilization of images from external sensors. This can be useful when cameras are installed on high poles or in other environments susceptible to movement caused by wind or other factors. Electronic stabilization can be enabled whether the video tracking is activated or not.

Extremely compact - Easy to integrate
All modules are extremely compact and lightweight. They provide a turnkey thermal imager with advanced image processing features built-in and ready for system integration. They incorporate easily with common power and video interfaces found in existing and new systems.

Based on proven design of Carthage DCL
The Carthage DCL is an advanced video processing module specifically developed for size-limited thermal imagers, such as small airborne gimbals or handheld IR binocular systems. It primarily addresses new state-of-the-art digital IRFPAs, and is also adapted to other standard cooled sensors. The Carthage DCL includes standard IR processing such as Non Uniformity Correction and Bad Pixel Replacement, as well as the DDE (Digital Detail Enhancement) advanced video enhancement processing. Since the "Mini-Core HRC" is based on the Carthage DCL, it includes all these features as well.

Advanced image processing
All versions of the "Mini-Core HRC" contain powerful image processing algorithms which are embedded in the module's hardware and software. Automatic Gain Control (AGC), histogram equalization and other functions are guaranteeing high quality thermal imaging in any night or daytime environmental conditions.

Digital Detail Enhancement (DDE)
FLIR Systems has developed a powerful, FLIR Systems patented, algorithm that helps to overcome the problem of finding low contrast targets in high dynamic range scenes: Digital Detail Enhancement (DDE). It assures clear, properly contrasted thermal images and delivers a high contrast image even in extremely dynamic thermal scenes.

Proven technology with a wide range of possibilities
All cores are designed for easy integration in airborne, land or maritime systems. The modules have been integrated into many of FLIR Systems' successful thermal imaging cameras. Numerous systems, used for a wide variety of applications, are out in the field with a proven track record. Applications include security and surveillance, thermal sights, airborne gimbals for e.g. powerline inspections, research and development and numerous others.

Continuous optical zoom on the thermal image

Mini-Core HRC
Technical specifications

IMAGING PERFORMANCE

Detector type	Cooled Mercury Cadmium Telluride 640 x 512 pixels
Spectral range	3 – 5 µm
NETD without lens	< 18 mk typical
Image processing	AGC, Manual Gain & Control, Tunable Digital Detail Enhancement (DDE), Non-Uniformity Correction, Tunable frame rate (1 Hz step) up to 100 Hz
Digital zoom	Continuous

LENSES

Field of View:	
Continuous optical zoom	Mini-Core HRC 300Z: 1.8° (H) x 1.4 (V) to 36° (H) x 29°(V) with 15 x 300 mm lens Mini-Core HRC 600Z: 0.9° (H) x 0.7 (V) to 18.0° (H) x 14.5°(V) with 30 x 600 mm lens
Triple Field of View Lens	Mini-Core HRC: 460T: 1.2° (H) x 0.9° (V) for 460 mm lens - 5° (H) x 4° (V) for 110 mm lens 17° (H) x 13.6° (V) for 32 mm lens
Fixed lenses	21° (H) x 17° (V) with 25 mm lens 11° (H) x 8.8° (V) with 50 mm lens 5.5° (H) x 4.4° (V) with 100 mm lens 2.7° (H) x 2.2° (V) with 200 mm lens
Spatial resolution (IFOV)	1 mrad for 15 mm zoom lens – 50 mrad for 300 mm zoom lens 0.5 mrad for 30 mm zoom lens – 25 mrad for 600 mm zoom lens 0.6 mrad for 25 mm lens - 0.3 mrad for 50 mm lens 150 mrad for 100 mm lens - 75 mrad for 200 mm lens 0.460 mrad for 32 mm lens - 0.136 mrad for 110 mm lens 0.032 mrad for 460 mm lens

INTERFACES

Digital Video Output	Option for GigE or CamLink (additional separate miniboard)
Analogue Video Output	PAL/NTSC, W/H and B/H palettes
Communication	RS232/422 or optional GigE or CamLink + spare RS232 for external device control

POWER

Requirements	24 VDC
Consumption	< 30 W
Ext Sync In	LVTTL

ENVIRONMENTAL

Operating temperature range	-30°C to +55°C
Storage temperature range	-40°C to +70°C
Humidity	95% relative
Random vibration	MIL STD 810F Method 516.5 procedure I
Sine vibration	10g peak from 15 Hz to 500 Hz
Shock	MIL STD 810F Method 514.5

VILGA TRACKER BOARD (OPTIONALLY AVAILABLE)

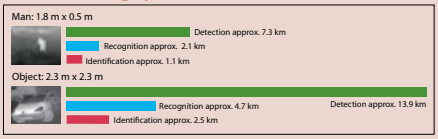
Video autotracker (correlation, scene, centroid modes)	Yes
Electronic Stabilisation	Yes
Picture in Picture	Yes
Graphical Overlay	Yes

PHYSICAL CHARACTERISTICS

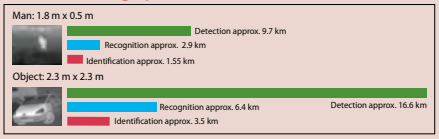
	Lens less configuration		Mini-Core HRC 300Z		Mini-Core HRC 600Z		Mini-Core HRC 460T	
	Core only	With Vilga tracker	Core only	With Vilga tracker	Core only	With Vilga tracker	Core only	With Vilga tracker
Size (in mm)	161x100x93	161x100x116	282x118x106	282x118x116	372x190x190	372x190x190	283x181x140	283x181x144
Weight	1.4 kg	1.55 kg	2.8 kg	2.95 kg	5 kg	5.2 kg	4 kg	4,15 kg
Shipping size	276x200x120	276x200x120	360x304x194	360x304x194	700x 500x 300	700x 500x 300	700x500x300	700x500x300
Shipping weight	3.2 kg	3.35 kg	5.3 kg	5.45 kg	10 kg	10.2 kg	9 kg	9.15 kg

	25 mm lens		50 mm lens		100 mm lens		200 mm lens	
	Core only	With Vilga tracker	Core only	With Vilga tracker	Core only	With Vilga tracker	Core only	With Vilga tracker
Size (in mm)	243x100x99	244x100x116	235x100x99	236x100x116	290x130x120	291x130x123	423x144x144	424x144x144
Weight	2.3 kg	2.4 kg	2.3 kg	2.4 kg	3.2 kg	3.3 kg	4.5 kg	4.6 kg
Shipping size	360x304x194	360x304x194	360x304x194	360x304x194	360x304x194	360x304x194	747x415x190	474x415x190
Shipping weight	4.8 kg	4.9 kg	4.8 kg	4.9 kg	5.7 kg	5.8 kg	9.2 kg	9.3 kg

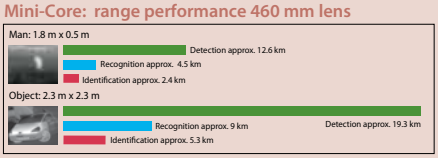
Mini-Core: range performance 200 mm lens



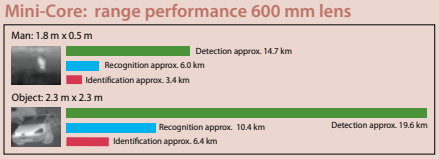
Mini-Core: range performance 300 mm lens



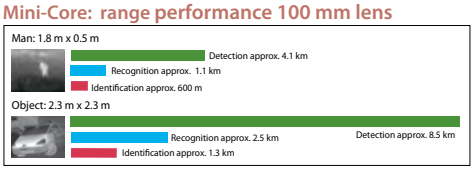
Mini-Core: range performance 460 mm lens



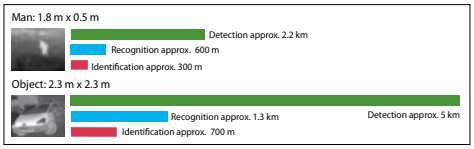
Mini-Core: range performance 600 mm lens



Mini-Core: range performance 100 mm lens



Mini-Core: range performance 50 mm lens



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FLIR Commercial Vision Systems B.V.
Charles Petitweg 21
4847 NW Breda
The Netherlands
Phone : +31 (0) 765 79 41 94
Fax : +31 (0) 765 79 41 99
e-mail : flir@flir.com

FLIR Systems, Inc
CVS World Headquarters
70 Castilian Drive
Santa Barbara, CA 93117
USA
Phone : +1 805 964 9797
Fax : +1 805 685 2711
e-mail : sales@flir.com

FLIR Systems Ltd.
United Kingdom
Phone : +44 (0) 1732 220 011
Fax : +44 (0) 1732 220 014
e-mail : flir@flir.com

FLIR Systems
Advanced Thermal Solutions
France
Phone : +33 (0)1 60 37 01 00
Fax : +33 (0)1 64 11 37 55
e-mail: flir@flir.com

FLIR Systems AB
Spain
Phone : +34 915 73 48 27
Fax : +34 915 73 58 24
e-mail : flir@flir.com

FLIR Systems AB
Sweden
Phone : +46 (0) 8 753 25 00
Fax : +46 (0) 8 753 23 64
e-mail : flir@flir.com

FLIR Commercial Vision Systems
China
Phone : +86 10 5869 9786/8762
Fax : +86 10 5869 8763
e-mail : flir@flir.com

FLIR Commercial Vision Systems B.V.
Dubai - United Arab Emirates
Phone : +971 4 299 6898
Fax : +971 4 299 6895
e-mail : flir@flir.com

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