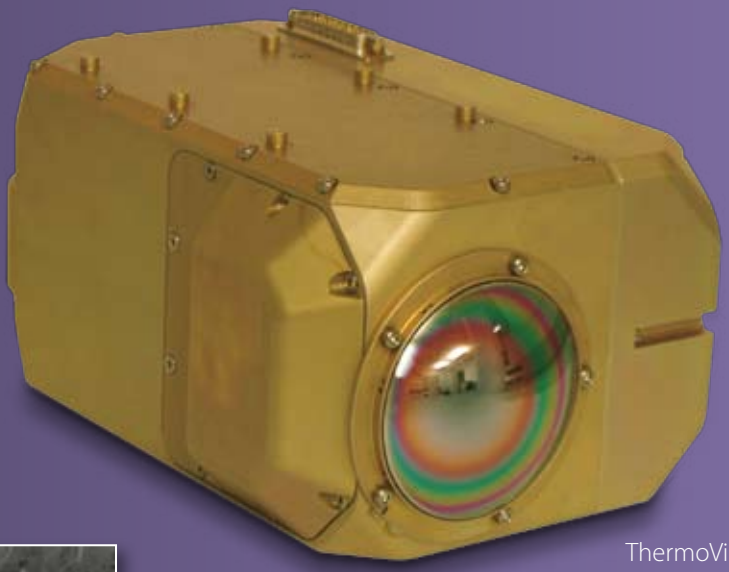
Cores and components
for thermal imaging applications

ThermoVision 2000 / 3000 module

ThermoVision™
1500 / 2000 / 3000 modules

Cooled thermal imaging cores



ThermoVision 1500 module

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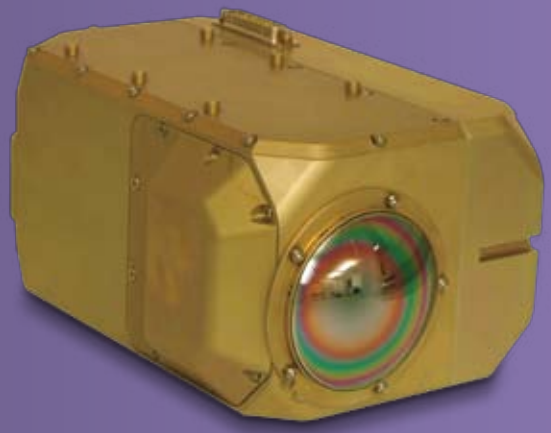
ThermoVision™ 1500 / 2000 / 3000 modules

Cooled thermal imaging cores

ThermoVision 2000 / 3000 module



ThermoVision 1500 module

The ThermoVision 1500 / 2000 / 3000 cores have been especially designed for Original Equipment Manufacturers (OEM). They can be easily integrated into infrared systems that require an advanced, cooled thermal imaging solution. The ThermoVision1500 / 2000 / 3000 modules are equipped with a long-wave, cooled Quantum Well Infrared Photodetector (QWIP) operating in the 8 – 9 µm waveband, which offers extremely long range detection in practically all weather conditions.

The ThermoVision 1500 has two different fields of view. The ThermoVision 2000 / 3000 are equipped with three different fields of view. This offers excellent situational awareness while also giving the possibility to have a closer look at things once they are detected.

The ThermoVision 1500 and ThermoVision 2000 modules offer crisp thermal images of 320 x 240 pixels. For seeing even smaller details, the user can choose for the ThermoVision 3000 which produces thermal images of 640 x 480 pixels.

All cores offer extreme long range detection and excellent image quality. They produce a clear image in total darkness, through smoke, dust and light fog.

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 permit 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.

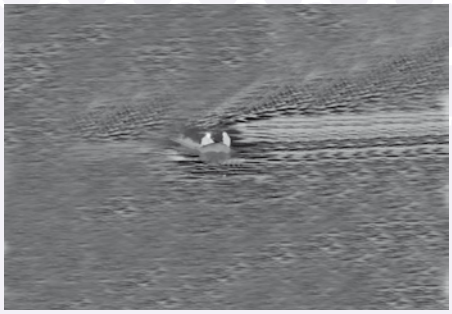
With FLIR's strength in focal plane array manufacturing, vacuum packaging, video processing electronics and system integration, along with high commercial product manufacturing rates, FLIR Systems is a powerful partner to many OEM customers.

Cooled QWIP detector

The ThermoVision 1500 / 2000 / 3000 modules are all equipped with a cooled Quantum Well Infrared Photodetector (QWIP). A thermal imaging core with a cooled detector gives you the advantage that you can see 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.

Choice of image quality – 320 x 240 pixels or 640 x 480 pixels

The ThermoVision 1500 / 2000 modules are equipped with a QWIP detector offering crisp thermal images of 320 x 240 pixels. For seeing the smallest of detail and the best possible image quality you can choose for the ThermoVision 3000 module. This thermal imaging module is also equipped with a QWIP detector but delivers images of 640 x 480 pixels. This is a four times better image quality than a 320 x 240 detector. It allows the user to see more detail and detect more and smaller objects from a further distance.



The ThermoVision 2000/3000 switches between 3 fields of view within a fraction of a second.

Multiple field of view optics
The ThermoVision 1500 module comes with dual field of view optics. Both the ThermoVision 2000 module and ThermoVision 3000 module are equipped with triple field of view optics. A wide angle lens offering a wide field of view, a medium field of view lens and a narrow field of view lens.

All systems have 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 something is detected you can easily switch to the medium field of view lens to have a closer look at the situation. The ThermoVision 2000 / 3000 modules can even switch to the extremely narrow field of view lens so that you can see the smallest of details.

Advanced image processing
The ThermoVision 3000 is equipped with Advanced Digital Detail Enhancement (DDE). This FLIR Systems patented feature assures clear, properly contrasted thermal images. It provides high quality thermal imaging in any night- or daytime environmental conditions.

Auto focus
All three modules contain an exclusive auto focus feature which delivers crisp, clear images at the press of a button or whenever fields of view are changed. 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.

User interface
A customizable graphical overlay allows integrators to create their own look and feel to the final system.

Easy to integrate
All modules 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. The images from the 320 x 240 pixel or 640 x 480 pixel detectors can be displayed on virtually any existing display that accepts composite video.

Military qualified and tested
All three ThermoVision thermal imaging cores have gone through the most stringent tests and quality procedures. They comply with Mil-Std-810E standards and are ready to be used in the harshest environments. Their QWIP detector is extremely well protected against humidity, water, dust, shocks and vibrations.

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 weapon sights, airborne gimbals for e.g. powerline inspections, research and development and numerous others.

Overview of FLIR Systems thermal imaging cores with cooled QWIP detector:

	320 x 240 pixels detector	640 x 480 pixels detector
Dual field of view	ThermoVision 1500	-
Triple field of view	ThermoVision 2000	ThermoVision 3000

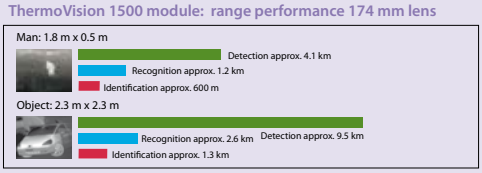
ThermoVision™ 1500 / 2000 / 3000 modules

Technical specifications

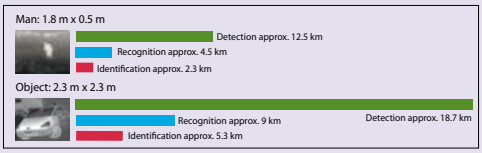
IMAGING PERFORMANCE	
Detector type	ThermoVison 1500 / 2000: Quantum Well Infrared Photodetector (QWIP): 320 x 240 pixels ThermoVison 3000: Quantum Well Infrared Photodetector (QWIP): 640 x 480 pixels
Spectral range	8.0 to 9.2µm
Number of fields of view	ThermoVision 1500: 2 ThermoVision 2000 / 3000: 3
Field of view lens 1	ThermoVision 1500: 18° (H) x 13.5° (V) with 39 mm lens ThermoVision 2000: 25° (H) x 19° (V) with 28 mm lens ThermoVision 3000: 25° (H) x 19° (V) with 37 mm lens
Field of view lens 2	ThermoVision 1500: 4° (H) x 3° (V) with 174 mm lens ThermoVision 2000: 6° (H) x 4.5° (V) with 116 mm lens ThermoVision 3000: 7.8° (H) x 5.8° (V) with 116 mm lens
Field of view lens 3	ThermoVision 1500: NA ThermoVision 2000: 0.99° (H) x 0.74° (V) with 704 mm lens ThermoVision 3000: 1.3° (H) x 0.96° (V) with 704 mm lens
Spatial resolution (IFOV)	ThermoVision 1500: 0.98 mrad for 39 mm lens 0.22 mrad for174mm lens ThermoVision 2000: 1.36 mrad for 28 mm lens - 0.33 mrad for 116 mm lens - 0.054 for 704 mm lens ThermoVision 3000: 0.68 mrad for 37 mm lens - 0.22 mrad for 116 mm lens - 0.036 mrad for 704 mm lens
Thermal sensitivity	30 mK max
Image frequency	ThermoVision 1500 / 2000: 50 Hz PAL or 60 Hz NTSC ThermoVision 3000: 25 Hz PAL or 30 Hz NTSC
Focus	Automatic or Manual
Electronic zoom	2x, 4x
Image processing	Histogram equalization, Digital Detail Enhancement (DDE): ThermoVision 3000 only
IMAGE PRESENTATION	
Video output	NTSC or PAL composite video, 14-bit digital image data
Connector types	DSUB
IMAGE STORAGE	
Type	JPEG and .FFF (14 bit)
POWER	
Requirements	18-35 V DC
Consumption	35 W typical
ENVIRONMENTAL SPECIFICATIONS	
Operating temperature range	-32°C to +55°C
Storage temperature range	-40°C to +70°C
Humidity	Mil-Std-810F, 506.4
Sand/dust	Mil-Std-810F, 510.4
Icing/freezing rain	Mil-Std-810F, 521.2
Shock	Mil-Std-810F, 516.5
Vibration	Mil-Std-810F, 514.4
INTERFACES	
TCP/IP	Command and control: all functions
RS-232	Command and control: all functions
PHYSICAL CHARACTERISTICS	
Core Size	ThermoVision 1500: 236 mm x 150 mm x 115 mm ThermoVision 2000/3000: 303 x 240 x 188 mm
Core weight	ThermoVision 1500: 3 kg ThermoVision 2000/3000: 7.1 kg
Shipping size / weight	Approx 350 x 450 x550 mm - 15 kg
STANDARD PACKAGES	Thermal imaging core, power supply, operator manual, shipping case

** 30 Hz NTSC or 25 Hz PAL available. Subject to approval of the US Department of Commerce for use outside the USA.*

ThermoVision 1500 module: range performance 174 mm lens



ThermoVision 2000/3000 modules: range performance 704 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.

ThermoVision 1500 /2000 / 3000 modules: from FLIR Systems, the world leader for thermal imaging systems

FLIR Systems offers a full range of thermal imaging cores which can be used for a wide variety of applications. Whatever your application, FLIR Systems offers a solution.

FLIR Systems has more than 50 years of experience in the development and production of infrared cameras and cores for night a wide range of applications. Recent technological developments have made it possible that know-how, which was reserved for military and high-end scientific users only, has made its way to many more applications.

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