

FLIR K-SERIES

Handheld thermal imaging
cameras for firefighting



The World's Sixth Sense™



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Introduction



FLIR Systems: the world leader in thermal imaging cameras

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

Rapidly emerging markets and organization

Interest for thermal imaging has grown considerably over the last few years in a large variety of markets. To face this increased demand, FLIR Systems has expanded its organization drastically. With more than 3,000 employees and annual revenues of nearly \$1.5 billion, FLIR the largest manufacturer of commercial thermal imaging cameras in the world.

Manufacturing capabilities

FLIR currently operates five manufacturing plants: three in the USA (Portland, Boston and Santa Barbara, California) one in Stockholm, Sweden, and one in Estonia.



FLIR, Sweden



FLIR, Boston, USA



FLIR Santa Barbara, USA

All markets and all applications

FLIR Systems' primary focus is the design and manufacture of thermal imaging cameras and technologies. No other manufacturer produces more thermal imaging cameras than FLIR.

Wherever thermal cameras are being used – in applications as diverse as predictive maintenance, building diagnostics, R&D, automation or for night vision applications in maritime safety, security, or the military – FLIR is there.



The thermal imaging camera and how it works

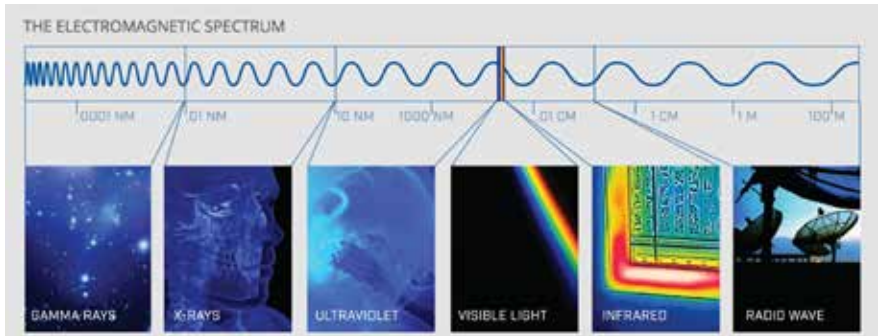
A thermal imaging camera records the intensity of radiation in the infrared part of the electromagnetic spectrum and converts it to a visible image.

What is infrared?

Our eyes are detectors that are designed to detect electromagnetic radiation in the visible light spectrum. All other forms of electromagnetic radiation, such as infrared, are invisible to the human eye.

Infrared energy was discovered in 1800 by astronomer Sir Frederick William Herschel. In an effort to learn more about why different colors of light had different temperatures, he directed sunlight through a glass prism to create a spectrum and then measured the temperature of each color. He found that the temperatures of the colors increased from violet to red.

After noticing this pattern Herschel decided to measure the temperature just beyond the red portion of the spectrum in a region where no color was visible. To his surprise, he found that this region had the highest temperature of all.

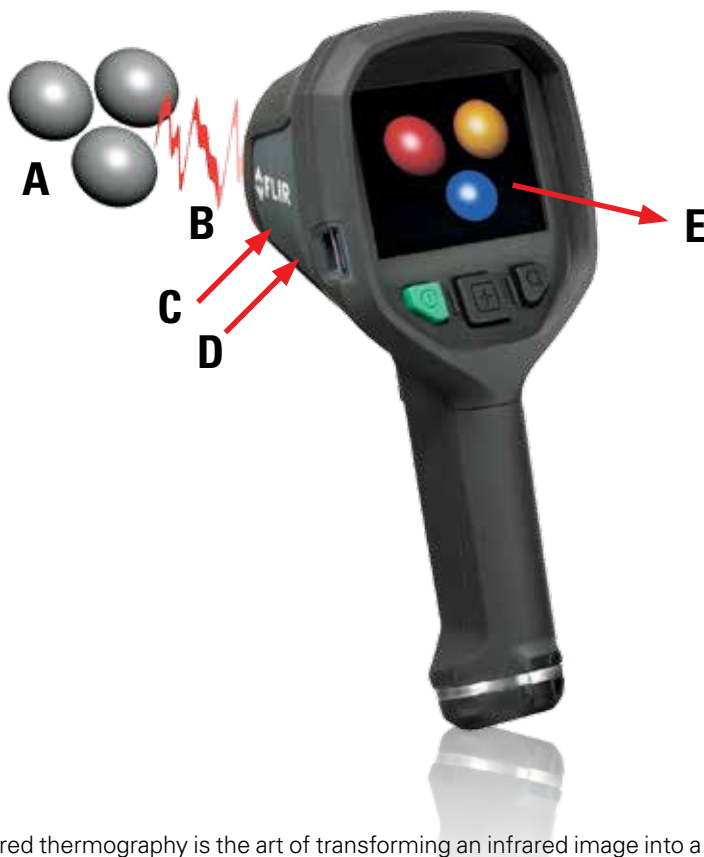


Infrared radiation lies between the visible and microwave portions of the electromagnetic spectrum. The primary source of infrared radiation is heat or thermal radiation. Any object that has a temperature above absolute zero (-273.15 degrees Celsius or 0 Kelvin) emits radiation in the infrared region, even objects that we think of as being very cold, such as ice cubes, emit infrared radiation.

We experience infrared radiation every day. The heat that we feel from sunlight, a fire or a radiator is all infrared. Although our eyes cannot see it, the nerves in our skin can feel it as heat. The warmer the object, the more infrared radiation it emits.

The thermal imaging camera

Infrared energy (A) coming from an object is focused by the optics (B) onto an infrared detector (C). The detector sends the information to sensor electronics (D) for image processing. The electronics translate the data coming from the detector into an image (E) that can be viewed in the viewfinder or on a standard video monitor or LCD screen.



Infrared thermography is the art of transforming an infrared image into a radiometric one; every pixel in a radiometric image is actually a temperature measurement, so temperature values to be read from the image. This makes the thermal imaging camera a perfect tool for firefighting applications.



FLIR K-Series: High quality thermal imaging cameras at an extremely affordable price

Although still “exotic” technology in many markets, thermal cameras are well-known tools in the firefighting community, and their life-saving qualities are firmly established.

However, all thermal cameras are not equal. Each model has its pros and cons, so it is important to make a well-informed buying decision. This is especially true given the critical, life saving role thermal cameras can play.

Developed for demanding firefighting applications

All FLIR's K-Series models have been developed specifically to meet the demanding requirements of firefighting use. During the development of these products, FLIR worked directly with firefighters around the world to make sure their unique needs were addressed met in every phase of the design process.



FLIR K-SERIES

Your Sixth Sense

Developed in collaboration with fire departments around the world, K-Series thermal cameras include a number of features defined for firefighters by firefighters.

Light weight:

Firefighters already need to carry a lot of heavy equipment, so the K65/K55/K45 only weighs 1,037 grams, including the battery. K2 weighs only 700 grams.

Large display:

The 4" LCD display (3" for K2) makes it easy to see thermal images under difficult conditions. This is not only useful for the firefighter holding the camera, but also for the firefighters around him.

Easy to use:

K-Series cameras have only three large buttons, so its operation is very straightforward and the buttons are easy to manipulate, even when you're wearing gloves.



Multiple image modes:

K-Series cameras have five color modes that are optimized for various firefighting situations. Change from one mode to another with the touch of a button. Color modes of the FLIR K2 need to be changed in FLIRTools on a PC.

TI Basic mode



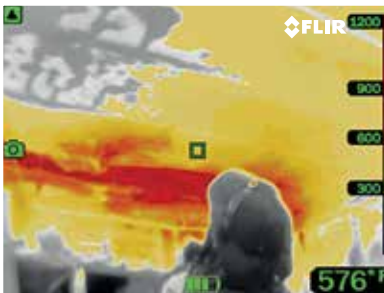
For initial fire attack and life-saving operations.

B/W fire fighting mode



Same as the TI Basic mode, but with a grey scale image.

Fire mode



For use in conditions with higher background temperatures, like structure fires, where there is already a lot of open flames.

Search & rescue mode



For use in conditions with lower temperatures, like outdoor search and rescue operations.

Heat detection mode



*Used for finding and highlighting hot spots.
The hottest 20% of the scene is colored in red.*

Ergonomics:

The K-Series' "pistol grip" design is easy to hold onto, and simplifies operation for left- and right-handed users.



FLIR K-Series with "pistol grip" design and easy accessible buttons

Customization (K65/K55/K45):

Users can easily customize K-Series cameras to meet the needs of their most common missions. You can even create your own start-up screen in the FLIR Tools software that comes with every K-Series.



Create your own start-up screen in FLIR Tools software.

In-Camera video storage (FLIR K65/K55):

Being able to store video clips on an internal memory is important during firefighting training. Also real interventions can be recorded. Video clips can be evaluated afterwards for training purposes. FLIR K55 can store 200 files (images or video clips). It records up to 600 minutes in video in clips of maximum 5 minutes each.

Flexible Scene Enhancement (FLIR K65/K55/K45):

Details in the thermal image are enhanced through digital image processing inside the camera. The result is an ultra-sharp thermal image that shows more detail. FSX makes it easier for firefighters to find their way in smoke filled rooms. Even in scenes with extreme temperature dynamics that are typical for a firefighting environment.



Thermal image without FSX



Thermal image with FSX

Multi-spectral dynamic imaging (MSX) (K2)

The K2 uses FLIR's patented MSX technology that etches key details from the built-in visible light camera onto the thermal image, helping firefighters identify structures and surroundings without compromising temperature data.

Easy to upgrade:

K-Series cameras can be upgraded over the internet by downloading the latest firmware updates, so users will never have to send their cameras back for routine upgrades.

Complete package:

The FLIR K-Series thermal camera comes with everything you need to start using it immediately: two batteries, battery charger, a hard case, strap lanyard, USB cable, FLIR Tools software. The K45/K55/K65 are also standard supplied with a hard case, retractable lanyard, neck strap, and a tripod adapter.

**K-Series batteries:**

Quality lithium-ion batteries used in K-Series cameras

You may think there is only one kind of lithium-ion battery, but there are actually many types of materials used, each of which impacts the battery's performance.

K-Series batteries use Lithium-Ion cells with the very latest NMC technology (Lithium Nickel Manganese Cobalt Oxide) for higher capacity than other Lithium-Ion batteries, and are produced with the greatest quality control by one of the world's foremost battery manufacturers.

All cells are extensively tested to the UL1642 standard to verify their safety, including high-temperature testing, so you can rely on them to power your camera when you need it most.

More than a product

When you select a FLIR camera you get more than a piece of hardware – you get the largest commercial infrared company in the world watching your back.

Warranty:

After online free online registration, every K-series camera comes with 5 years of warranty, but that's only the start: the heart of the camera, the infrared detector, is covered by a full 10-year warranty. The battery comes with 2 full years of warranty.

Only FLIR can cover the detector for 10 years because we design and manufacture the detectors ourselves so we have full control over the quality of these vital components.



Support:

Should you ever have a problem with your K-Series camera, just contact our dedicated Customer Support Department or any of our local service centers around the world to get the support you need.

Truck charger:

This optional accessory is conveniently mounted inside a fire truck to charge the camera, along with a spare battery, so you'll know your K-Series is always ready for action.

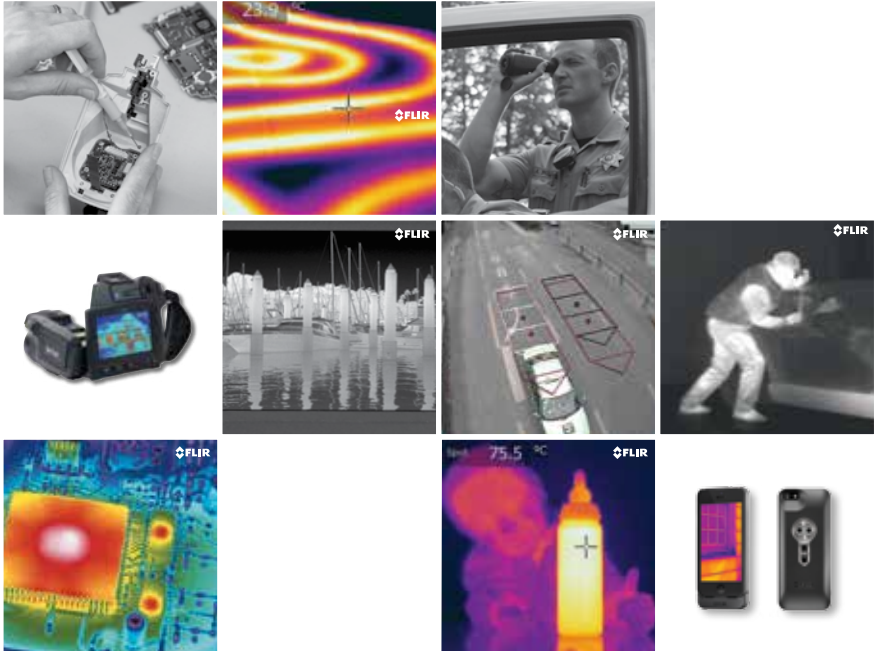
FLIR K2 can be charged in your truck with an optional cigarette lighter plug.



4

What about the price of the FLIR K-Series? How can it be so low?

That's easy. FLIR Systems makes more thermal imaging cameras in a year than every other manufacturer on the planet. Combined.



Wherever thermal cameras are being used – in applications as diverse as predictive maintenance, building diagnostics, R&D, automation or for night vision applications in maritime safety, security, or the military – FLIR is there.

This incredible volume of cameras lets us produce them more affordably and pass that savings on to you.





Was the K-Series developed for firefighters, or is it just a modified industrial camera?

The K-Series was developed from the ground up for firefighters, and in partnership with firefighters, around the world.

FLIR designed the K-Series from scratch; it is not an existing camera with a couple of new bits here and there that we're calling a firefighting camera, because firefighters have specific demands and operate in conditions that are unique from any industrial environment.

A firefighting camera needs to be resistant to high temperatures, water resistant, light weight, and easy to control with gloves on.

With our 50 years of experience, and partnerships with firefighters around the world, we're able to bring you K-Series cameras with all of these useful features.



IP-67 rating? What does this mean?

The IP code is a standardized two-digit rating that tells you how a product is protected against the intrusion of solids and liquids: the first number tells you how it's protected against solids, and the second against liquids. The higher the number, the better the protection.

The K-Series' IP-67 rating tells you that it will stand up to the harsh environments it needs to operate in.

IP 67.

Dust Protected;

Totally protected against dust ingress

Immersion Protected;

Protected against short periods of immersion in water up to 1 meter deep.

Flame test:

We tortured the K-Series in flames, but it was worth it. The result is a camera that operates continually at temperatures between -20°C and 85°C (-2°F to 185°F) and can withstand exposure to as much as +260°C (500°F) for up to five minutes.



Drop test:

You shouldn't have to worry about not dropping your thermal camera when you're surrounded by fire. That's why K-Series cameras are built to take a 2-meter drop (IEC 60068-2-31). Even onto concrete.



NFPA-Compliant (K65):

The National Fire Protection Association is the world's leading advocate of fire prevention and an authoritative source on public safety.

The [NFPA 1801:2013](#) standard for firefighting thermal imaging cameras focuses on three main areas: interoperability/usability, image quality, and durability. The new K65 complies fully with this important standard.

Conclusion

Purpose-designed by FLIR, in partnership with firefighters around the world and for firefighters around the world, K-Series delivers the performance, features, and toughness you can take with you into harm's way every day.

Thanks to FLIR's leadership in all aspects of thermal imaging and our 50 years of experience, we're able to make K-Series cameras affordable enough to equip more firefighters with this life-saving technology than ever before.



With the FLIR K-Series you can see clearly through smoke



With the FLIR K-Series you can protect your own life while saving others.



The FLIR K-Series is a must-have tool for every firefighter. The optional truck charger assures that it is always ready for action.

Firefighting applications for thermal imaging cameras

Many firefighters know about thermal cameras. They know that thermal cameras help protect them when they have to enter a raging fire, and that it can help them to save the lives of others. Here are a few ways thermal imaging helps make these things happen.

Seeing through smoke

Thermal cameras can see through smoke, giving firefighters better situational awareness, both of where they are in the building, and where they are in relation to their team members. It also helps them find people trapped in the fire.

Thermal cameras are also vital tools when helping firefighters attack the fire. Obviously, the fire itself is easy to see in a thermal imager, but the relatively cold water being sprayed from the hoses also shows up clearly on a thermal image, so firefighters can make sure they get water on the fire as effectively and efficiently as possible.



Measuring temperatures

K-Series thermal cameras can measure temperature from a distance, helping protect firefighters against a dangerous phenomenon called rollover – the stage of a fire in which unburned, superheated gases gathered at the ceiling in an enclosed area ignite.

By monitoring the temperature of the ceiling with the thermal camera while trying to cool down the smoke, they can know that if the temperature exceeds a certain value a rollover may be imminent and react appropriately.



Search and Rescue

Firefighters do more than fight fires – often they're called on to find missing or injured people. A thermal camera's ability to see in the dark makes it an invaluable tool in SAR missions.



Wildfires

Thermal imaging cameras show clearly the hot spots where “underground fire” is still burning. By further extinguishing and cooling down the area spontaneous combustion can be prevented.



Overhaul

During Overhaul the burned area is carefully examined for hot spots that can cause the fire to reignite. These “hot spots” will clearly show up on a thermal image so that they can be further cooled down or extinguished.

FLIR helps Beveren fire department locate hotspots and missing subjects more easily.

Having the right equipment is critical for a firefighter. Both for his own survival, and for saving the lives of others. To ensure the safety of its crew and to deliver even better firefighting services, the firefighting department of Beveren, Belgium, recently purchased a FLIR K50 thermal camera.



With the FLIR K50 you can see temperature changes resulting from all kinds of chemical reactions in containers, something that is very useful to the Beveren fire department because of the many chemical industry companies in the Waasland port.



FLIR K-Series in SAR display mode

"The FLIR K-Series helps you to see dangerous situations without the need to enter a specific area," says Corporal Stefaan Terryn.

Thermal imaging helps Kalmthout fire department during wildland fires and other interventions

Kalmthout is located about 20 kilometers north of Antwerp, Belgium. Despite being a small village of approximately 20,000 inhabitants, the local firefighters are well equipped. Apart from their normal firefighting duties they also need to protect the natural reserve "Kalmthout Heath" against fire. Thermal imaging cameras have long been part of their equipment.



Lieutenant Ronny van Riel, commanding officer at the Kalmthout fire department.



FLIR K50 in the hands of one of the 40 volunteer firefighters of the Kalmthout fire department.



FLIR K50 next to the FireFLIR. Although the FLIR K50 is the preferred tool due to its small size and light weight, the FireFLIR is still proving its worth after 10 years of hard use. It was extensively used during a fire at the Kalmthout Heath in 2011.

"Thermal imaging cameras are great tools for every firefighter for multiple applications. With the FLIR K50 in our primary vehicle and the FireFLIR in our secondary, we are well equipped. The cameras help to protect the lives of our firefighters and helps them to save the lives of others," said Lieutenant van Riel.

Thermal imaging: easy to use and hard to live without

Clackamas Fire District #1 provides fire, rescue, and emergency medical services to five cities in the state of Oregon, USA. With 17 fire stations strategically located throughout Clackamas County and a workforce of more than 200 employees & 100 volunteers, it's the second largest fire protection district in the state, serving over 179,000 citizens in an area covering nearly 200 square miles.

Like many fire departments in the USA, Clackamas Fire has depended on thermal imaging cameras (TICs) for well over a dozen years as a critical tool in helping protect lives and save property.

"Thermal imagers have allowed us to see in situations where it's nearly impossible to with the naked eye. Obviously inside a fire environment it's incredibly smoky and dark, and we don't know the layout of the building. TICs show us the way through so we can move swiftly, look for the seat of the fire, look for victims; basically they help provide a very effective roadmap." says Captain Jason Ellison.



The lifesaving FLIR K-Series lets firefighters see through smoke, find their way in smoke-filled building and to locate fire victims.



Captain Jason Ellison: "Thermal imagers have allowed us to see in situations where it's nearly impossible to with the naked eye."

FLIR thermal imaging cameras help Mühldorf county fire departments deliver first-class firefighting services

Thermal imaging cameras (TIC) for firefighters used to be bulky, expensive and generally unreachable for small voluntary fire departments, of which the German state of Bavaria has so many. TICs like FLIR's K50 camera, have become extremely attractive and affordable, even for small fire brigades.



"The total package of the camera is just right for a fire department like ours. I would not change a thing about it. Even in highly elevated temperatures of more than 250°C, the camera keeps on working perfectly. We currently make use of twelve thermal imaging cameras from FLIR in our county. Whenever we need to do an intervention, we give priority to the closest available team that has a FLIR camera. This way, we are sure that our people get the best firefighting services possible." says District Fire Inspector Harald Lechertshuber.

The camera has several different imaging modes that help speed up tactical decisions and the search for survivors.



Thermal imaging: a wide variety of applications

As prices for thermal cameras continue to fall, more and more people are discovering the power of thermal imaging, while simultaneously devising new and interesting uses for the technology. One thing remains the same: FLIR has the right camera for every application.



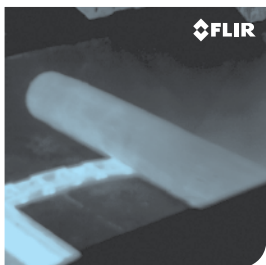
Electrical / Mechanical Predictive Maintenance

In industrial environments thermal imaging provides the accurate non-contact temperature measurement used to find hot spots that can lead to failures in electrical and mechanical equipment. Early detection of problems can avoid unplanned shutdowns and the lost revenue they cause.



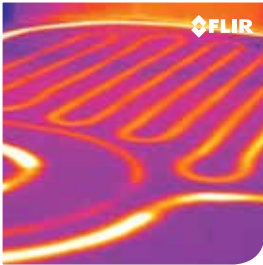
Security

Thermal security cameras and optimized thermal analytics provide automated perimeter intrusion detection for facilities like ports, airports, nuclear facilities, warehouses, high value residences, small businesses, and anything else that needs automated intrusion detection and threat assessment.



OEM Components

FLIR supplies its thermal imaging camera cores and electronic components as OEM parts to a wide variety of manufacturers around the world.



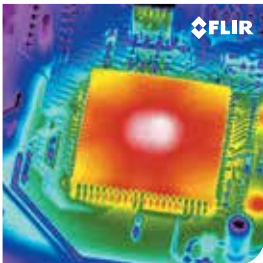
Building Diagnostics

Building professionals look for insulation losses and other building related defects with a thermal imaging camera. Finding insulation losses and repairing them can mean huge energy savings.



Border Security

Border security specialists protect their country's border against smugglers, terrorists, and other intruders. With a thermal imaging camera they are able to see people at distances of up to 20 kilometers away in total darkness.



Science / R&D

Thermal imaging also plays a pivotal role in both scientific research and product development. For these demanding applications FLIR Systems markets extremely high performance thermal imaging cameras.



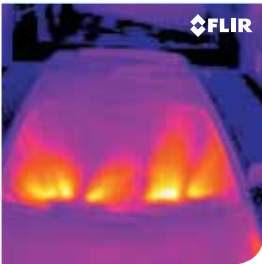
Maritime

FLIR's thermal cameras give mariners the power to see clearly in total darkness, and ability to navigate with confidence regardless of the conditions, regardless of the size or type of vessel they're in.



Driver's Vision Enhancement

FLIR cameras help drivers to see up to 4 times further than with their headlights in total darkness, virtually eliminate the glare of oncoming headlights, and automatically alert the driver to pedestrians, cyclists, and animals approaching the vehicle's path.



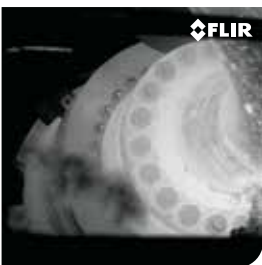
Automation and Process Control

Thermal imaging cameras are used to continuously monitor production processes, maintain product quality, and alert to potential fire hazards.



Law enforcement

Police officers use the power of thermal imaging to see without being seen and find suspects in total darkness without giving away their position.



Optical Gas Imaging

Specialized thermal cameras help work crews detect dozens of different volatile organic compounds (VOCs) and other greenhouse gasses so that leaks can be found and stopped before environmental damage is done or fines incurred.



Personal Vision Systems

Hikers, campers, hunters, and outdoor enthusiasts of every kind use FLIR's handheld thermal cameras to see clearly in total darkness, stay safe on the trails, see animals at night, and enhance their nighttime experience.



Firefighting

Firefighters are able to see through smoke. It helps them to find victims in a smoke filled room and also to see if fires are well extinguished. It helps them to save lives.



Military

FLIR's combat-proven sensor packages deliver the performance and reliability today's warfighter demands. Our Commercially Developed, Military Qualified systems provide the intelligence and insight needed to get the mission done.



Test & Measurement

FLIR's complete line of test and measurement instruments is built upon our 50 years of leadership in the thermal camera industry, as well as our commitment to innovation, quality, and reliability.

Selecting the correct thermal imaging camera manufacturer

As thermal imaging technology has become increasingly well known in recent years, it seems like everyone thinks they can build a thermal camera. But regardless of what you're using the camera for, there are some important things to consider about the company you're buying from when investing in a thermal camera.

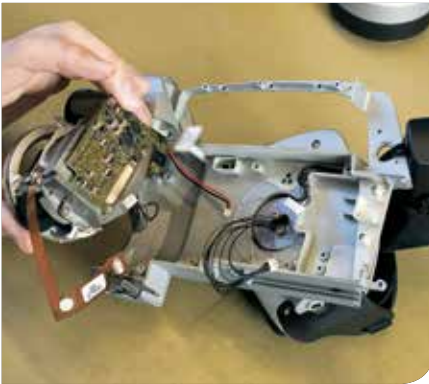
The right tool for the job

Different applications require cameras with different capabilities, so choose the manufacturer that has a broad enough camera selection to make sure you're getting the features and performance that are the best fit for the way you'll use the camera.



Software

Many applications require a software package that will allow you to view, manipulate, and analyze the temperature data in your images, and report what you've found. Make sure the camera's manufacturer also supplies the software you need.



Service

Once you start using your thermal camera you won't be able to live without it, so make sure the manufacturer can service your camera quickly and conveniently should a problem occur.

Training

Today's thermal cameras should be point-and-shoot easy for their basic functions. But to get the most out of your camera some training is often beneficial. A reputable camera manufacturer will have these training resources close at hand.



NOTES



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