

# VEHICLE VISION SYSTEMS

IMAGING SOLUTIONS FOR DRIVER VISION  
& SITUATIONAL AWARENESS

# THE WORLD LEADER IN THERMAL IMAGING

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

Interest in thermal imaging has grown considerably over the last few years in a large variety of markets. To face this increased demand FLIR expanded its organization drastically. Today we employ more than 3,250 people. Together, these infrared specialists realize a consolidated annual turnover of more than 1 billion US dollars. This makes FLIR the largest manufacturer of commercial thermal imaging cameras in the world.

FLIR 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. We are 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.



# THE THERMAL ADVANTAGE

See without being seen is critical on the battle field. A few years ago thermal imaging systems on vehicles were rare and mainly sighting systems. The desire to keep soldiers protected inside the vehicle as well as the need to drive without lights has led to that today's vehicles often are equipped with multiple thermal cameras and sensors.

FLIR has a wide range of vehicle cameras, many of them combat proven. Driver Vision cameras (DV) are helping the drivers to navigate, drive the vehicle safely and to see threats ahead in different light conditions from broad daylight to complete darkness. Situational Awareness cameras (SA) are helping the soldiers inside the vehicle to assess the situation outside the vehicle without exposing themselves. A rear looking Situational Awareness camera helps the driver to see that the area behind the vehicle is clear before he reverses the vehicle and the same camera can serve the soldiers inside the vehicle with information about the scene before they open the hatch or doors and exit.

Engineering vehicles are using different tools for digging, rescue towing and lifting – missions they may need to carry out not only in broad daylight but also in complete darkness, poor weather and obscured conditions. FLIR Systems has thermal cameras that can be mounted on the tools or nearby that helps the operator to maneuver the tools. There are Engineering Vehicles that are using as many as six thermal cameras for Driver Vision, Situational Awareness and to operate their tools in darkness.

## DRIVE SAFELY IN TOTAL DARKNESS

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

## SEE THE UNSEEN

The FLIR thermal imaging cameras detect objects that remain invisible to the naked eye. For example, people hiding in the shadows or in the bushes can be seen. The cameras are also not blinded by glare from the sun.

## SITUATIONAL AWARENESS

Situational Awareness cameras assist in seeing and assessing the surroundings without the need to open a hatch and exposing persons.

It is often difficult for a driver to see behind the vehicle but yet very important for safety reasons. Thermal cameras are excellent tools for this when mounted on the back of the vehicle.



Normal vision



FLIR thermal imaging

# IMAGERS TO MATCH THE MISSION

## PERFORMANCE

FLIR Systems' vehicle imagers deliver precision and repeatable accuracy. Main gun weapon sights are enhanced with US and NATO targeting reticles with drop-in accuracy and long term boresight retention. For vehicle commanders, we offer long range eye-safe laser range finders with pinpoint accuracy to provide fast readouts for ballistic calculation. Stabilized TACFLIR gimbals can be added to non-stabilized turrets to improve firing accuracy and "shoot on the move" capability. FLIR Vehicle imagers share hardened mechanical designs qualified to survive shocks from weapons firing and overland terrain, are designed to keep operating in high heat conditions above 65°C, and do not require periodic maintenance. FLIR's driving imagers provide increased safety for the entire vehicle crew by giving the driver superior 3D terrain depth perception over legacy Image Intensified sights. The range performance of FLIR's 640x480 resolution imagers provide more than double the range resolution (100% more).

## INTEGRATION

FLIR's vehicle imagers are designed for integration and "Drop-In" upgrades in the field. We provide common cables with Mil-Std connectors and EMI shielding per our MIL-STD 461 design adherence. FLIR's embeds resettable power filtering to guard against expected spikes and surges. All FLIR imagers are modular and interchangeable to outfit multi-generations of the same vehicle type. For maintainers, FLIR offers on-call tech support and local resupply through Government supply systems.

## PROCURE

Low risk (pre-qualified, tested or installed on vehicles). Affordability (low life cycle and procurement cost with volume discounts). COTS (no government funding required — built to forecast and short production lead time).

## COMMANDER'S PANORAMIC IMAGERS

Support "hunter-killer" handoffs with 360 degree long range scanning. Automate to provide constant security surveillance during silent watch or convoy operations. Long range stabilized imagers offer laser target designation capability for combined arms or air to ground targeting.

## PRIMARY GUNNER IMAGERS

Deliver long range, high resolution target tracking, even under low light desert conditions or under the glare of urban missions. Already installed with targeting reticles and on-board laser boresighting tools making precision accuracy easy.

## DRIVER VISION ENHANCEMENT IMAGERS

Enhance vehicle safety and speed, and provide a wider FOV and longer range than legacy Image Intensified drivers viewers to expand the reach and capability of the driver during all operations.

## SITUATIONAL AWARENESS IMAGERS

Provide the vehicle crew with early warning of threats and security when exiting the vehicle with this durable, affordable series of imagers designed for easy, non-penetrating installation and maintenance-free operation.

## SITUATIONAL AWARENESS IMAGERS



### THERMOVISION® SA180

The SA180 offers a 180-degree field of view for unmatched situational awareness. Two SA180 units can be coupled together to continuously monitor a 360-degree scene.



### THERMOVISION® SA40, SA63, SA90

The SA40, SA63 and SA90 imagers can be mounted virtually anywhere on any vehicle, providing visual confirmation of the area immediately surrounding the vehicle. Multiple SA40 and SA63 units can be cluster mounted to provide wider angles of coverage from a single mounting point.



### THERMOVISION® SA90SS

SA90SS is a Single Sensor (thermal imaging) which adds the ability to see in darkness. This little 90° thermal camera can be mounted on horizontal surfaces as well as on vertical surfaces and is excellent for situational awareness and for accurate tool control where ability to see in darkness is important.



### THERMOVISION® SA90DS

SA90DS is a system composed by both a thermal camera and a color TV camera, both with a 90° field of view that is perfect for situational awareness and with possibility to fuse/blend the two images.



### THERMOVISION® SA90DSL

SA90DSL is a Situational Awareness system composed of a thermal camera, a color TV camera and a protective lid with integrated lens cleaning mechanism. Also this system provides the possibility to blend/fuse the color image into the thermal image.



### THERMOVISION® SA90L

SA90L is a thermal imaging camera for situational awareness with a protective lid that incorporates a lens cleaning brush.



### THERMOVISION® DV55SS

DV55SS is a Single Sensor (thermal imaging) which adds the ability to see in darkness for driving, navigation and forward threat detection.



### THERMOVISION® DV55DS

DV55DS is a system composed by both a thermal camera and a color TV camera, both with a 55° field of view that is perfect for driving. The color TV image can be fused/ blended with the IR picture which is very useful for driving.



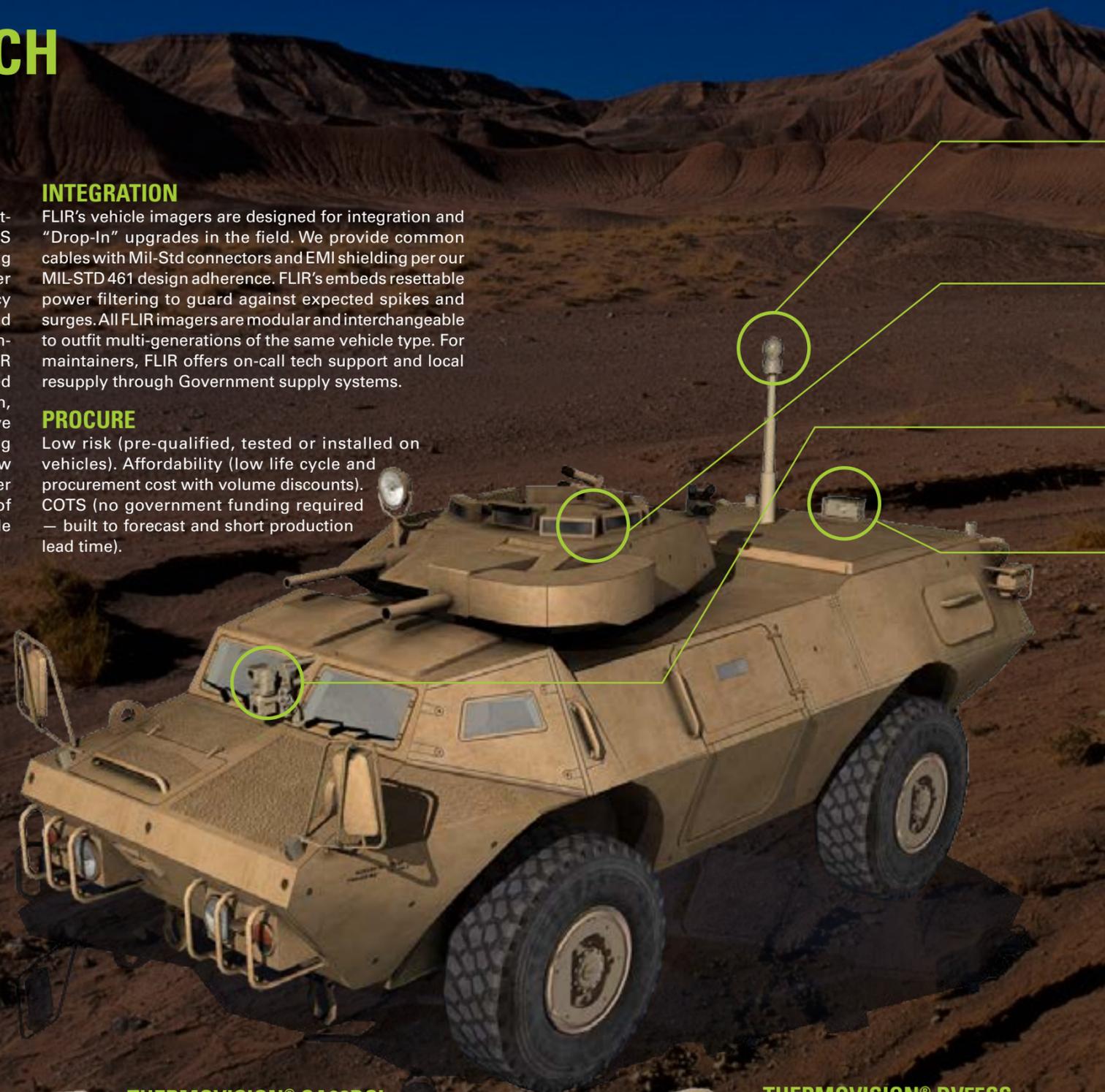
### THERMOVISION® DV55DSL

DV55DSL is a Driver Vision system composed of a thermal camera, a color TV camera and a protective lid with integrated lens cleaning mechanism. The color TV image can be fused/ blended with the IR picture which is very useful for driving.



### THERMOVISION® DV55L

DV55L is a thermal imaging camera for driving with a protective lid that incorporates a lens cleaning brush.



# FEATURES

## FUSION BLENDING

Just a color TV or a thermal camera alone can be a bit limited under some conditions. With FLIR's blended video, the driver has truly a multi spectral view of what is going on. It becomes possible to drive without using headlights and still see whether other vehicles' lights are white or red which in fact is quite important information.



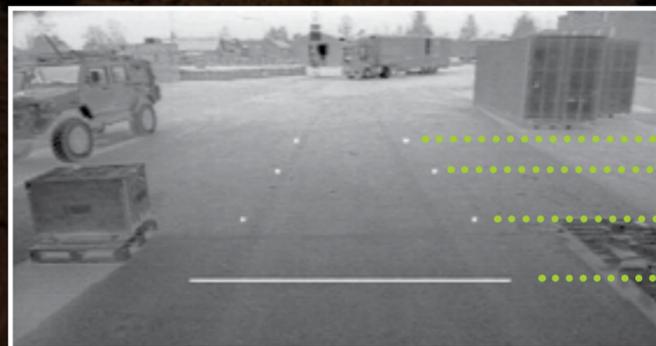
Color TV image



Color TV fused/blended with IR

## OVERLAYS: SIMPLIFYING THE MISSION

FLIR's Vehicle Systems have optional overlays that help the driver to estimate how well the terrain ahead of him is suited for driving with the actual vehicle. FLIR has standard overlays and can add overlay information if required for a specific vehicle model.



## DIGITAL DETAIL ENHANCEMENT

FLIR's proprietary DDE, Digital Detail Enhancement, brings out the best of the thermal image. The image provides unmatched clarity and even very small details with low contrast becomes visible. If the thermal image isn't good and adding relevant information to the operator then it becomes useless. FLIR's thermal cameras provide the detailed view of the scene that the mission require and this is automatically and doesn't require the operator to be an IR expert.



## COMMERCIALLY DEVELOPED, MILITARY QUALIFIED

FLIR is developing these systems following our CDMQ method which creates very affordable high performance systems. The products are commercially developed for high volumes and then going through a very thorough military qualification program. The result is very reliable products suitable for the tough vehicle environment. Some of the vehicle products are already combat-proven.



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