FORWARD LOOKING INFRARED (FLIR)

Forward Looking Infrared (FLIR) is a night vision enhancement system with many potential applications in law enforcement agencies. FLIR systems offer vision enhancement superior to that available through conventional night vision systems. Originally developed for military operations, FLIR systems have a wide variety of applications for law enforcement, fire fighting, governmental and commercial/industrial operations. Recent technological enhancements have made FLIR systems more accessible (and affordable) as a tool to support street-level law enforcement operations.

WHAT IS FLIR?

FLIR was originally developed by the United States Navy to assist in the identification and targeting of opposition forces. FLIR units measure the amount of infrared energy emitted by various objects and life forms. In other words, it allows the user to “see” the amount of heat (or thermal energy) an object emits. Infrared energy is normally invisible to the human eye, but FLIR systems are able to detect and interpret emissions and provide the user with an image, even in complete darkness. Like conventional night vision enhancement systems, FLIR does not provide a perfect picture of what is in its field of view. What it does provide is an image with sufficient clarity to allow users to distinguish between cars, trees, and people.

Conventional night vision systems improve the user’s ability to “see” objects by enhancing visible light. These systems only work if there is at least a minimal amount of available light and if there is nothing obscuring visibility (such as dust, haze, fog, or smoke). FLIR systems are still highly effective under conditions of low-visibility or complete darkness. By providing an image of the infrared energy being emitted by objects, the system can still “see” in complete darkness or obscured visibility. While the effectiveness of the system may be diminished when viewing distant objects under obscured conditions, FLIR still provide better visibility than other night vision enhancement systems. Because it measures thermal energy, FLIR can be used to conduct surveillance without relying on search lights or special lighting, improving the user’s ability to remain undetected.

The military advantages of these early systems were significant. Naval vessels could still detect and target enemy ships, even on the darkest nights or under foggy conditions. As one might imagine, these early systems were large, heavy, and expensive. During the past decades, however, FLIR systems have been adapted for use aboard all types of aircraft, naval vessels, and ground vehicles; in recent years some
manufacturers have even developed handheld units. Technological advances have significantly lowered the size, weight, and cost of FLIR systems. These new systems may offer reliable service without requiring extensive or costly upkeep. Handheld FLIR systems weigh less than five pounds and may be within the price range of many law enforcement agencies.

**Law Enforcement Applications**

FLIR systems have been successfully used by a number of major law enforcement agencies in recent years. Until recently, FLIR has generally been a tool for aviation units. Mounted on a helicopter, a FLIR system could assist in pursuits and Search and Rescue missions. The systems were still expensive and somewhat cumbersome. Because aviation units were most likely to respond to situations where FLIR could be of use, this was a logical use of this resource.

More recently, law enforcement agencies have begun experimenting with FLIR systems mounted on ground vehicles or as independent, handheld units. Lubbock, Texas, has FLIR systems integrated into their canine vehicles. A canine vehicle is likely to become involved in search or pursuit operations, so deploying ground vehicle systems with these units makes sense. As technologies improve and costs continue to decrease, it may be more common to see ground vehicle mounted or handheld FLIR systems being used to support a wide variety of law enforcement applications.

As a tool to assist in either pursuits or Search and Rescue missions, FLIR offers several advantages to police organizations. While it was designed for use during operations taking place at night or under obscured visibility conditions, FLIR can also be used during day light hours. For example, a search for a missing child or a fleeing suspect might lead to a farm field. Depending on the nature and density of the foliage, an aviation unit equipped with FLIR might be able to locate a child or suspect who might otherwise be hidden from plain view, even during daylight hours.

Many FLIR systems are designed to videotape what the operator sees. In addition, units may also serve as daylight video recording systems. These features allow officers to generate evidence which might be very helpful in prosecution. For example, a helicopter equipped with FLIR could assist ground vehicles in a high-speed pursuit of a stolen automobile. As soon as the helicopter arrived in the area of the pursuit, it could begin to record the events occurring on the ground. The system could videotape the infrared image of the driver “bailing” from the vehicle and fleeing into a residential neighborhood. The system could continue to videotape the suspect as he fled through backyards and assist aviation personnel in directing officers on the ground in order to make an apprehension.

Having the chase on tape would provide incontrovertible proof that the suspect taken into custody was indeed the driver of the stolen vehicle (and not an innocent citizen “looking for a runaway cat”). Because the system is not dependent on the use of a search light (which might produce shadows and distortions on a videotape), it might also show that officers used appropriate force in taking a suspect into custody, thus limiting potential liability.

FLIR may be one of the best options for vision enhancement under conditions of obscured visibility. Some jurisdictions frequently encounter problems due to fog or haze. Vision systems which amplify available light may be less effective under such conditions. While FLIR does have a limited ability to penetrate smoke, dust, haze, or fog, it is generally more effective than the naked eye or conventional night vision enhancement systems under such conditions. Police marine units may find it easier to engage in routine patrol or search and rescue operations with a FLIR system, even under conditions of heavy fog (and even during daylight hours).

Fire departments have been using helmet-mounted FLIR systems for several
years to aid personnel in searching for victims in fires. Although FLIR cannot penetrate all of the smoke generated by a burning building, it can improve a fire fighter’s ability to “see.” These systems not only allow fire fighters to conduct a more thorough search in less time, but a search could be done with fewer personnel, placing fewer lives at risk in the performance of dangerous operations.

FLIR can also be a valuable tool for police personnel conducting surveillance or security operations. Because the system works without relying on light sources, it can be operated in a covert manner. Personnel surveilling a dark parking lot could observe potential victims or suspects without alerting these party’s to their presence. Individuals can be clearly seen, even under conditions of complete darkness. These applications might enhance to covert nature of surveillance operations and decrease the number of personnel required to conduct such an operation.

FLIR systems may also be used to take a thermal image of a person, luggage, buildings, automobiles, trucks, or boats (generally in an effort to search for drugs). While FLIR systems can not see through walls or doors, they can detect temperature differences which might indicate the presence of hidden compartments or contraband. A thermal scan may indicate if a person has something secreted beneath their clothing, or if the hold of a ship contains ice-cold fish or something with an even greater street value. Growing marijuana indoors requires the use of high-temperature artificial lighting; a thermal scan of a neighborhood might indicate if a specific house has an unusual hot spot which might indicate that such indoor gardening is taking place.

It must be noted that the courts have not fully resolved how police officers can use thermal images in carrying out drug or contraband detection. Some federal circuit courts have viewed thermal imaging as equivalent to any other search. As such, police officers in these circuits may need either explicit probably cause or a search warrant in order to use thermal imaging. Other circuits have taken a more liberal stance, allowing law enforcement personnel to engage in random thermal imaging. Readers would be well advised to check the status of FLIR imaging as a search within their state and federal district courts before undertaking such operations.

**INCREASED EFFICIENCY WITH FLIR**

FLIR offers a clear way for law enforcement agencies to operate in a more efficient and effective manner. As a tool for an aviation unit, FLIR can significantly reduce the time needed to conduct a search. Agencies using FLIR might also have an easier time tracking and apprehending fleeing suspects. FLIR systems make pursuit and search operations more efficient and also safer. Suspects or victims can be quickly located. Officers on the ground can be directed to these locations without conducting prolonged, and potentially dangerous, searches.

As a surveillance tool, FLIR may allow agencies to carry out some operations with fewer personnel and in a more covert manner. Officers can surveil areas, even under complete darkness. Under some conditions, FLIR may also allows users to detect well camouflaged individuals. Because many FLIR systems allow for the generation of video recordings, it is easy to produce evidence suitable for use in the courtroom. Such evidence may enhance the likelihood of prosecuting defendants in cases where the cover of night might have otherwise made suspect identification difficult.

The use of FLIR technology can allow for agencies to conduct certain operations with fewer personnel. In addition, those personnel involved in such missions might be able to perform their duties with an enhanced degree of safety and security. The current cost FLIR systems may preclude some law enforcement agencies from enjoying these benefits. Despite the current cost of FLIR systems, it is likely that purchasing and maintenance costs will continue to decline,
while performance improves in the years to come.

**VENDORS**

Agencies interested in FLIR technology may find out more from the following vendors. This list is not exhaustive and should not be viewed as constituting an endorsement of any specific products or producers.

Boeing Electronic Systems & Missile Defense
3370 Miraloma Avenue
P.O. Box 3105
Anaheim, CA 92803-3105
714/762-4195 (Voice)
http://www.boeing.com/

FLIR Systems, Inc.
16505 SW 72nd Avenue
Portland, OR 97224
503/684-3731 (Voice)/ 503/684-3207 (FAX)
http://www.flir.com

National Drug Strategy Network
(Information on legal implications of using FLIR as a tool in drug enforcement operations)
http://www.ndsn.org/topics.html

Sierra Pacific Innovations
1034 Emerald Bay Rd., Dept. 437
South Lake Tahoe, CA 96150
530/543-1186 (Voice)
530/543-1153 (FAX)
E-mail: sales@x20.org
http://www.x20.org/index.html