Thermal Weapon Sight

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Theory of Thermal Imagery

• Every object absorbs, transmits and reflects Infrared energy (heat).

• Thermal Imagers detect the heat difference down to less than one tenth of a degree.
Theory of Thermal Imagery

• Thermal Imagers do not “see through” objects they only detect heat from objects.

• Thermal Imagers are passive non-evasive instruments.

Law Enforcement Applications

• Officer Safety
• Search and Rescue
• Vehicle Pursuits
• Structure Profiles
• Crime Scene Applications
• Environmental Enforcement
• Disturbed Surfaces / Burials

Flight Safety
Fugitive Apprehension
Vehicle Profiles
Accident Investigations
Perimeter Surveillance
Marine Surveillance
Sight, Thermal AS/PAS-13D(V)2
Sight, Thermal AS/PAS-13D(V)3

- Manufactured for Military, Police and Fire operations. May 15 2009
- Easy to operate and maintain.
- Purpose: Thermal Weapon Sight (TWS)
- Self-contained Infrared (IR) imaging sensor used to target acquisition (sighting)
- The TWS is lightweight, compact, durable, battery powered thermal sight.
- TWS operates with low power consumption.
- TWS is capable of target acquisition under conditions of limited visibility such as darkness, smoke, fog, dust and haze. The TWS operates effectively during daylight.

Callouts

1. Objective Focus Ring
2. FOV (Field of View) / Mode Button
3. Gain (EL- Elevation) Button
4. BRT (AZ- Azimuth/ Horizon) Button
5. POL( Polarity)/ AGC (Auto Gain control) Button
6. Power Switch
7. Diopter Focus ring
8. Eye Cup
9. I/O (Input/ Output) Port
Objective Focus Ring

- Adjust the focus of the thermal scene from 10 meters to infinity.
FOV/Mode Button

• When MENU is OFF- Normal button press changes FOV (Field of View)
• When MENU is OFF- Push and hold activates MENU
• When MENU is ON- normal button press selects MENU item.

Gain (EL) Button

• When MENU is OFF- Adjusts GAIN of thermal scene.
• When MENU is ON- MENU navigation, Reticle AZ (Azimuth) adjustment.
BRT (AZ) Button

• When MENU is OFF - Adjusts BRT (Brightness) of thermal scene.
• When MENU is ON - MENU navigation; Reticle AZ (Azimuth/Horizon) adjustment.

POL/AGC Button

• Normal button press changes Image Polarity (POL).
• Push and hold selects AGC- ON or AGC- Off. (AGC= Automatic Gain Control)
Power Switch

- **OFF** - Sight is OFF
- **On** - Display on/off controlled by eye cup.
- **EMER (Emergency)** - Display always on.

Diopter Focus Ring

- Adjusts the focus of the display.
Eyecup

• When Pressed with the Power Switch in ON position, turns LCD Display ON

I/O Port

• Allows for power input and video input/ output
Battery

• Open battery closure by twisting retainer ring counter clockwise and then twist eye cup end clockwise to remove battery.

Picture Sight
Surveillance

Locating Evidence
Kyllo v. United States, 533 U.S. 27 (2001)

- held that the use of a thermal imaging device from a public vantage point to monitor the radiation of heat from a person's home was a "search" within the meaning of the Fourth Amendment, and thus required a warrant. Because the police in this case did not have a warrant, the Court reversed Kyllo's conviction for growing marijuana.
Facts

- A federal agent from the Department of the Interior used a thermal imaging device outside of Danny Lee Kyllo's home. According to the District Court that presided over Kyllo's evidentiary hearing, the device could not “penetrate walls or windows to reveal conversations or human activities. The device recorded only heat being emitted from the home.”

The device showed that there was an unusual amount of heat radiating from the roof and side walls of the garage compared with the rest of his house. (The assumption is to grow marijuana indoors, one needs to provide a lot of light so plants can photosynthesize.) This information was subsequently used to obtain a search warrant, where federal agents discovered over 100 marijuana plants growing in Kyllo's home. Kyllo was charged with growing marijuana in his Oregon home. Kyllo first tried to suppress the evidence obtained from the thermal imaging search, but then pled guilty. Kyllo appealed to the Ninth Circuit Court on the grounds that observations with a thermal-imaging device constituted a search under the Fourth Amendment. At the Court of Appeals, the conviction was upheld. Kyllo petitioned a writ of certiorari to the Supreme Court.
Opinion of the Supreme Court

The Supreme Court ruled 5-4 that the thermal imaging of Kyllo's home constituted a search. Since the police did not have a warrant when they used the device, which was not commonly available to the public, the search was presumptively unreasonable and therefore unconstitutional. The majority opinion argued that a person has an expected privacy in his or her home and therefore, the government cannot conduct unreasonable searches, even with technology that does not enter the home. Justice Scalia also discussed how future technology can invade on one's right of privacy and therefore authored the opinion so that it protected against more sophisticated surveillance equipment. As a result, Justice Scalia asserted that the difference between “off the wall” surveillance and “through the wall” surveillance was non-existent because both methods physically intruded upon the privacy of the home. Scalia created a “firm but also bright” line drawn by the Fourth Amendment at the “entrance to the house”[1]. This line is meant to protect the home from all types of warrantless surveillance and is an interpretation of what he called “the long view” of the Fourth Amendment. The dissent thought this line was “unnecessary, unwise, and inconsistent with the Fourth Amendment”[2] because according to Scalia’s previous logic, this firm but bright line would be defunct as soon as the surveillance technology used went into general public use, which was still undefined.

In the dissent Justice John Paul Stevens argued that the use of thermal imaging does not constitute a search, which requires a warrant, because any person could detect the heat emissions. He argued that this could be done by simply feeling that some areas in or around the house are warmer than others or observing that snow was melting more quickly on certain sections of the house. Since the public could gather this information, Stevens argued, there is no need for a warrant and the use of this technique is not unconstitutional. Moreover, Stevens asserted that the use of the thermal imaging device was merely “off the wall” surveillance because it did not detect any “intimate” details of Kyllo’s home. Finally, Stevens commented on the absurdity of Kyllo’s trying to incorporate something as intangible, fluid and public as heat into the private sphere. He explained, “Heat waves, like aromas that are generated in a kitchen, or in a laboratory or opium den, enter the public domain if and when they leave a building.”

The decision did not break along the traditional “conservative” and “liberal” wings of the court: the majority opinion was written by Scalia, joined by Souter, Thomas, Ginsburg and Breyer, while Rehnquist, O'Connor, Kennedy and Stevens dissented.
FAQ

1. Is there any place or thing I can not legally image?
   - Yes. The United States Supreme Court states that you are not allowed to image someone’s residence for the purpose of obtaining information about the residence or what is occurring inside the residence. Kyllo v. United States, 533 U.S. 27 (2001).
   - Kyllo held that you can not use the imager to attempt to find an indoor marijuana grow in someone’s home without obtaining a search warrant. This is because the use of the imager on a home was considered a search under the Fourth Amendment. Keep in mind that hotel rooms, dorm rooms and apartments are considered the same as homes, because they are someone’s residence.
   - However, if the building is not a home, you may take images of the building. Commercial buildings, barns, garages and the like may still be imaged without implicating the Fourth Amendment.

2. What if I’m not looking at a building at all? For example, let’s say I’m looking for a lost child in the woods, a fugitive in a park, or a perp on the street or in a car?
   - There are no Fourth Amendment problems with using your imager to take images of these areas.

3. Does using the imager allow me to go anywhere I could not otherwise go?
   - No. You still may not go on the curtilage of property without a warrant (or a warrant exception, such as consent or exigent circumstances). Curtilage is the area immediately surrounding a residence when the area’s use is related to the house. It is usually the same as a yard. Note that, if people other than the residents are using the area, it’s not likely to be considered curtilage (for example, a sidewalk in an apartment complex).

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5. Can I use an imager from an aircraft?
   - Yes. The general rule is that, as long as the aircraft is in navigable airspace, you may use the imager from the aircraft.

6. May I use an imager from an aircraft?
   - Yes, but that doesn’t mean a judge will let you testify about it. The interpretation of an image is somewhat akin to interpreting an x-ray. Testifying about an image is often considered opinion, and only an “expert” can give an opinion in court. Being certified helps you become an “expert” that can testify about what the images show.

7. What other kinds of things might a judge consider in deciding whether I am an “expert” on thermal imaging?
   - A judge will want to know about your training, your experience with the device and any instructing you have done. Make sure you keep track of all of your training, as well as the number of times you have used the device in investigations and what successes you have had.
7. How do I explain my imager to a new judge or prosecutor?

Tell the judge or prosecutor that the imager is a camera that detects heat, rather than visible light. Everything in the world gives off heat, even ice! The imager creates an image because different items within its view will emit or reflect or transmit different amounts of heat based upon what they are made of and what heat they have encountered.

The imager is passive; it does not emit any rays or beams of any kind. It is non-invasive; it does not obtain information from the other side of objects in its sight path. It does not see through walls. It is widely commercially available and used in many industries.

8. When I use the imager during an investigation, what should I put in my report?

In addition to what your images revealed, you should:
- Document WHY you were taking the images
- Document WHAT the exigent circumstances were, if any
- Document WHERE you were when you took the images and the WEATHER (especially precipitation)
- Document HOW you took the images (in other words, what device were you using with what settings)
- Document WHEN you took the images
- Document WHO took the images (preferably someone with training and experience)
- Document WHAT the imager showed
- Document COMPARISON images (normally structures similar to the target structure)
- Document that you CHECKED the device and it was working properly

9. How do I preserve image evidence for court?

Most imagers have the capability of recording images on video tape or digital media. If you anticipate that the images you are taking may be used as evidence in court, the best practice is to record the images. This will allow the court or jury to confirm your testimony and may save an enormous amount of explaining. Judges and juries are fascinated with the technology.