

## **THERMAL IMAGING**

by Dr. Richard A. Barker, Copyright 2009

Forward Looking Infrared (FLIR) technology is gaining popularity because of its successful use on Sci Fi's *The Ghost Hunters*. It is not a new technology. It has been used for decades for military applications, and for almost as long for industrial applications. It is prohibitively expensive, with the military versions ranging from tens of thousands to hundreds of thousands of dollars, and the industrial versions ranging from thousands to tens of thousands of dollars. The least expensive camera I have found is three thousand dollars just for the camera. It is for industrial applications (checking temps on machines and electrical panels and such) and takes only single shots. The model that does what TAPS is doing is nine thousand just for the camera, and a thousand more for the recorder.

“The infrared” was discovered by accident by George III’s astronomer, Sir William Herschel (1738-1822), who also discovered the planet Uranus. He was trying to find some kind of optical filter that would allow telescopes to look directly into the sun. What he discovered was that a thermometer passed through the visible spectrum reached its highest temperature in the black area well beyond the edge of the red portion of the spectrum. The first thermal image, or *thermograph* was developed by Sir William’s son, Sir John Herschel, around 1840. The first practical applications were developed for military use during WWI. “See in the dark” technologies were developed between the wars, but the need for an infrared search beam made its use risky and impractical on the battlefield. After WWII, development of passive (no search beam) infrared technology progressed, but secrecy prevented the technology from entering the commercial world until the 1950s.

Despite its cost, thermal imaging has a good deal of value, and is an excellent tool for paranormal investigations. Like all tools, thermal imaging devices must be used by someone with an understanding of the application of the tool—in this case, thermodynamics, emissivity, mechanics of solids, sources of heat and heat exchange, and a grasp of basic thermography. But the most important requirements for the operator are experience, insight, and analytical ability. I have seen the TAPS folks identify some images as potentially paranormal that to my eyes were probably explainable (one example below). I have a high regard for the TAPS organization, but in addition to learning a complicated technology, TAPS investigators must abide the TV producers who are biased in favor of sensationalism.

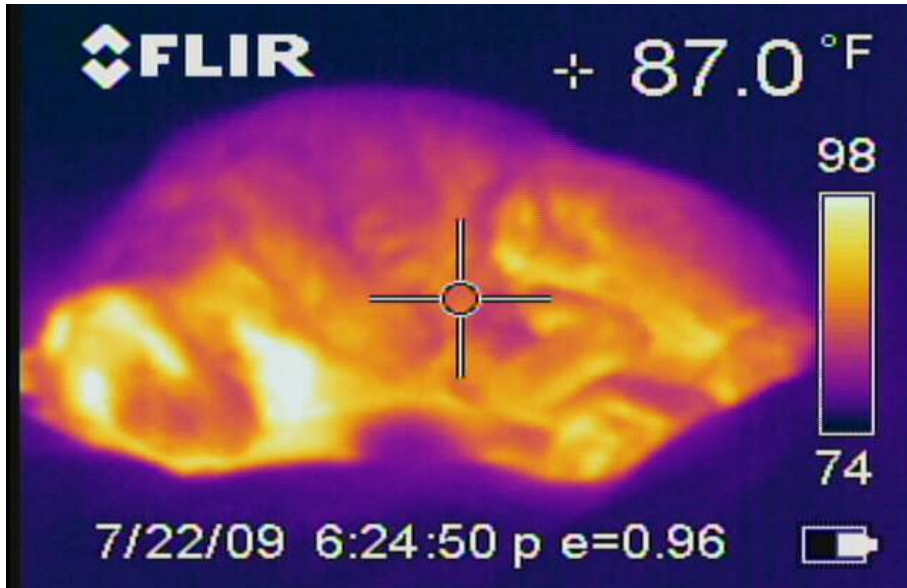
There are no developed theories that imply that ghosts generate heat. In fact, the theory behind thermography rather depends on the emissivity of a material body to which properties of blackbody radiation can be compared. On the other hand, infrared is an energy wavelength, and ghosts are thought to produce energy. I have addressed theories on the nature of ghosts elsewhere, and there is no need to rehearse that diatribe here. It is, of course, possible that ghosts do generate heat—no one knows either way. Paranormal activity is more likely to be associated with cold spots than with heat spots, but unexplained rises in temperature have been experienced during investigations.

The best use of thermography is to debunk claims of the paranormal. Specifically, thermography can be used to determine the presence of small animals that make certain kinds of noises, which are often interpreted to be paranormal. And, it can be used to identify poor insulation, drafty windows, unsealed doors, and holes in the wall that let in cold air, which could be mistaken for paranormal activity—I have detected significant streams of cold air coming in from outside or up from basements through electrical outlets. The TAPS folks and other high profile investigators must always worry about intruders interfering with investigations, and thermography can sometimes catch those. [Us obscure schmucks generally don’t have that problem.]

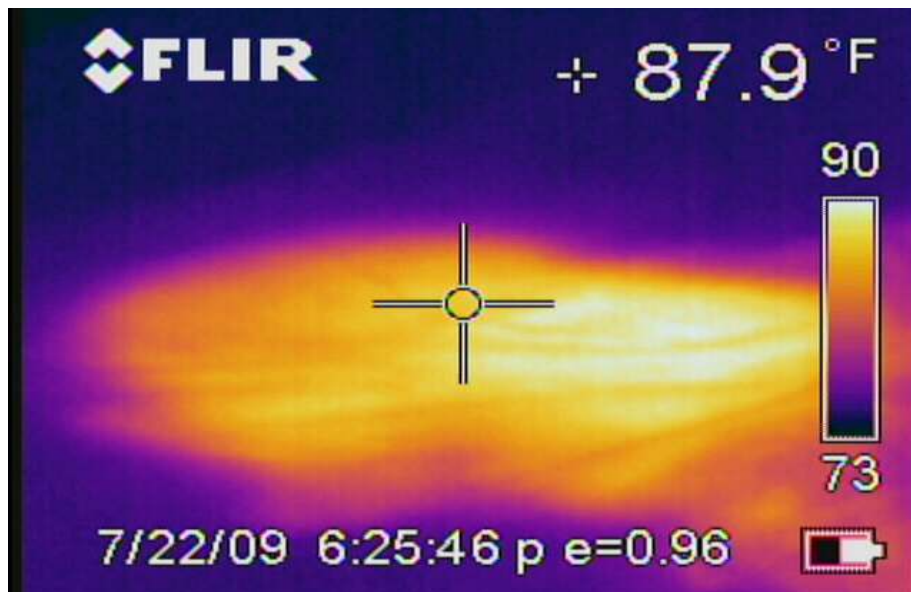
## EXAMPLES

During one investigation, TAPS investigators climbed to an upper floor and found a chair with a heat signature, as though someone had been sitting there. There had been no one up there, so they speculated that it might have been something paranormal, though they did not declare that it was definitely paranormal. The thermograph was presented to the client as evidence. The following series of thermographs show a fixed spot on a bed where a cat had been sleeping, and then left:

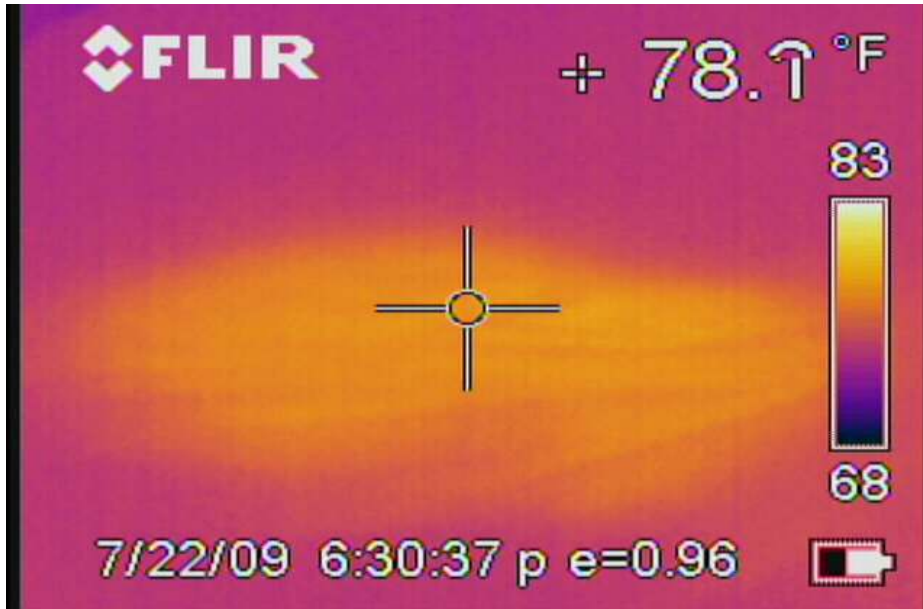
This is the sleeping cat (Stinky):



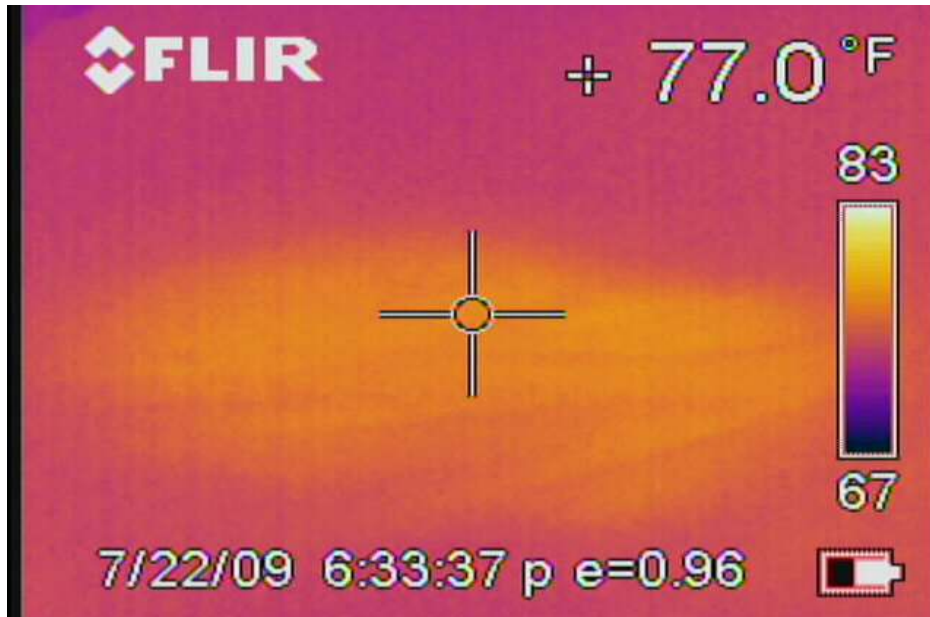
This is Stinky's spot immediately after she left it:



This is Stinky's spot five minutes after she left it:



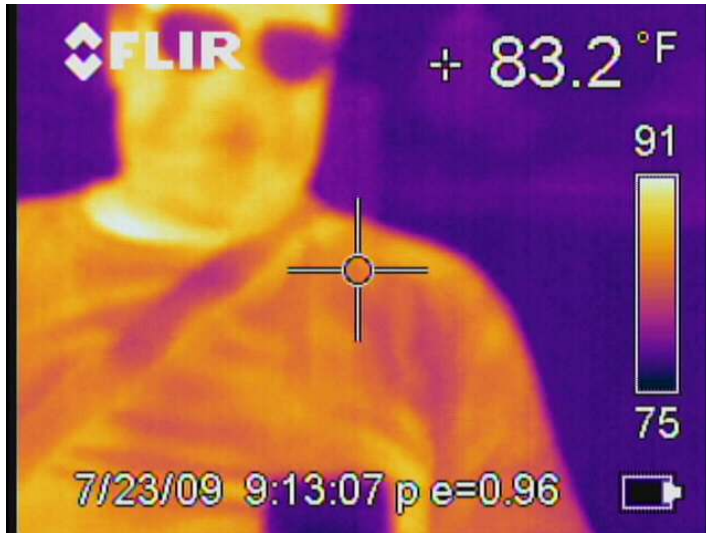
This is Stinky's spot eight minutes after she left it:



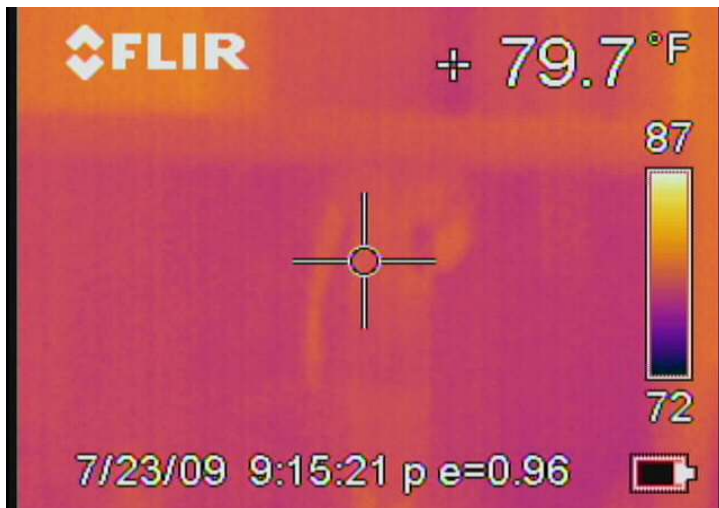
The room temperature was about 72 degrees. As you can see, the heat signature remains for some time after the animal has left. If the ambient temperature was higher, then the signature would remain longer—lower temps and it dissipates faster. A shy cat, and most of them are, hearing strangers approaching is likely to flee the area leaving the signature behind. Could be any warm blooded animal.

This series of thermographs shows the thermographer's heat signature reflected by various objects. A general rule of thumb is that objects that reflect visible light will also reflect heat signatures.

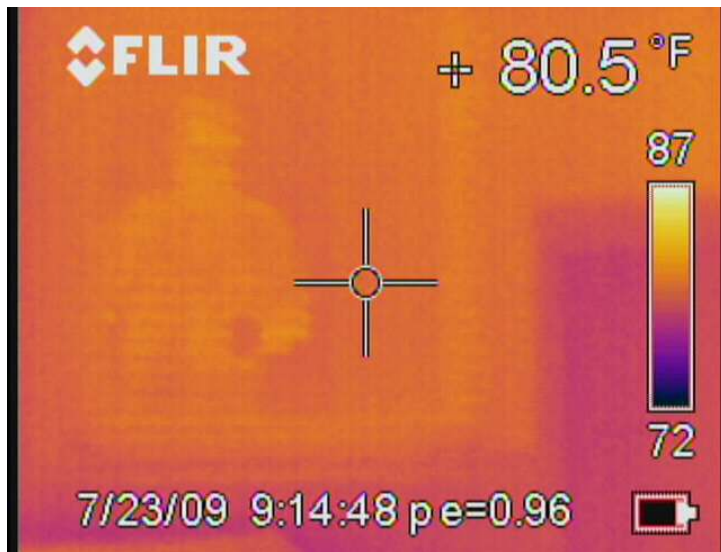
The ghost of the stainless steel refrigerator door:



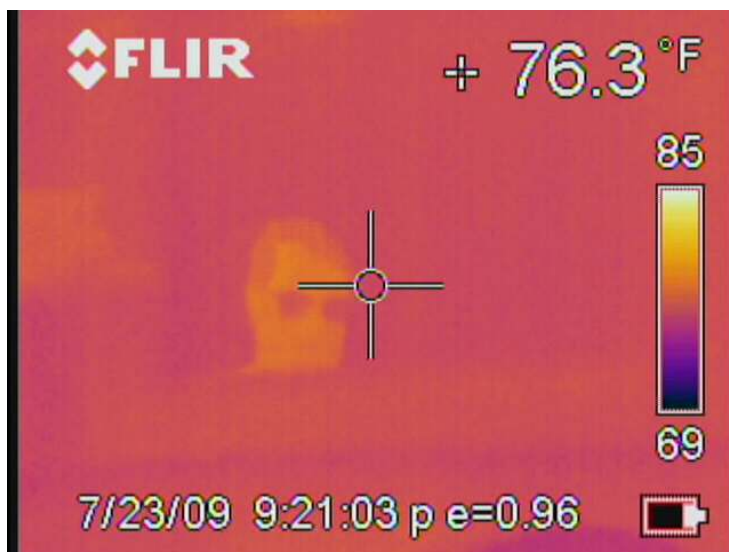
This headless apparition was reflected by a TV screen about ten feet away. The TV was off.



This image was reflected by a window with miniblinds.



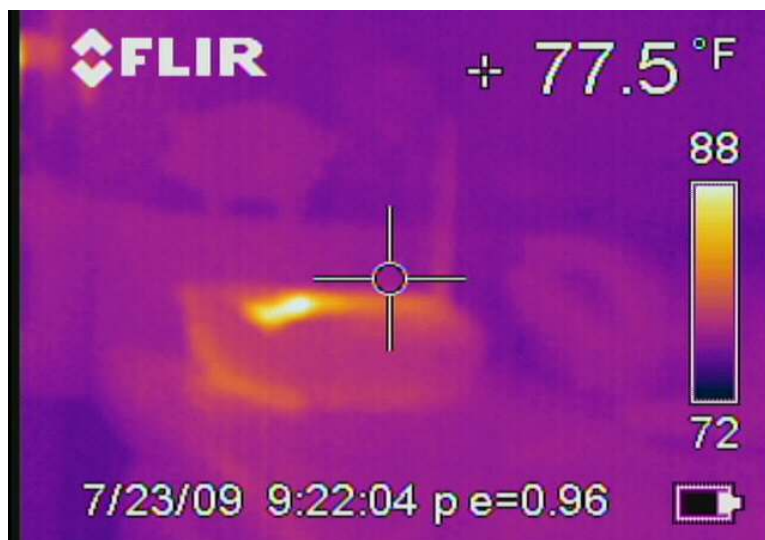
This disembodied head was reflected by a glass panel in a china cabinet.



This ghostly apparition was reflected by a mirror in the next room.



Heat is given off by numerous objects that would not necessarily be obvious. A good rule of thumb is that anything plugged in can give off a heat signature—air fresheners, razors, radios, microwaves, etc. The following thermograph shows a wireless phone cradle without the phone. The bright spot is the main power source.



Objects around it (like the counter top) can reflect its heat signature. In this case, other objects are defined by differences in their emissivity.

If you are lucky enough to have a thermal imaging device, you would do well to test it under all sorts of circumstances before you use it in an investigation.