How to defeat infrared night vision and Thermal Imaging

Night Vision

The surveillance technologies enabling image capture in little to no lighting are *intensified*, *infrared* (IR) and *thermal* imagery. Let's take a closer look.

Intensified Amplifies Existing Light

Technology advances in the past 20 years have resulted in great improvements to the performance of how well intensified CCDs pick up images in low light.

The first area of low-light systems open for discussion is known as the intensified charge-coupled device (ICCD).

This method of night vision amplifies the existing light. It focuses the existing light on the photocathode of an intensifier. The light causes electrons to be released. These electrons are then accelerated by a high voltage (about 15,000 times); the accelerated electrons are focused onto a phosphorous screen. The energy of the electrons makes the screen glow, which in turn is received by a CCD sensor producing a video image.

Technology advances during the past 20 years have resulted in great improvements to the performance of intensified devices. Their ability to identify people and objects at very low light is its major advantage. ICCDs also offer high resolution or detailed images in extreme lighting environments. However, ICCDs do require some existing light in order to function. Intensified CCD cameras also produce a poor daytime image when compared to day-only cameras.

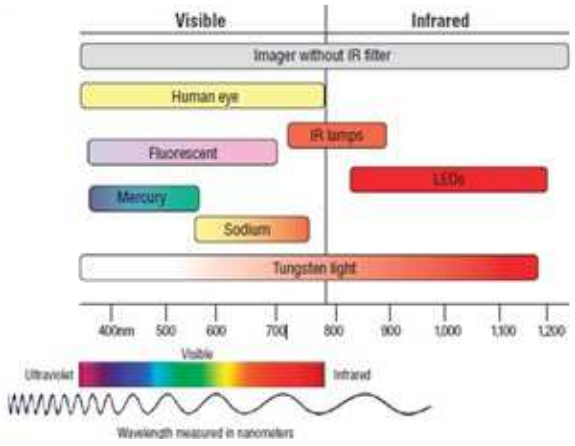
So what do we do if there is no existing light available? IR lighting is one possible solution.

IR Works With No Visible Light

IR lighting is a light source designed for black-and-white cameras or the new day/night switchover surveillance cameras. It is incorporated for extremely low- or no-light applications. This light source has little or no effect on the spectrum of light that the human eye uses to produce an image. Therefore, applications where video is required but the use of visible light is prohibited are cases in which IR light is extremely helpful.

IIR light can be split into three categories:

Near-infrared (near-IR) — Closest to visible light, near-IR has wavelengths that range from 0.7 to 1.3 microns, or 700 billionths to 1,300 billionths of a meter.



Light Spectrum Chart: IR light has little or no effect on the spectrum of light the human eye uses to produce an image. It's well suited for applications where video is required but the use of visible light is prohibited.

Mid-infrared (mid-IR) — Mid-IR has wavelengths ranging from 1.3 to 3 microns. Both near-IR and mid-IR are used by a variety of electronic devices, including remote controls.

Thermal-infrared (thermal-IR)— Occupying the largest part of the infrared spectrum, thermal-IR has wavelengths ranging from 3 microns to in excess of 30 microns.

The key difference between thermal-IR and the other two is that thermal-IR is emitted by an object instead of reflected off it. The near-IR range is by far the most popular. The main reason is the cost of the equipment. Unlike intensified and thermal cameras, near-IR emits a light source in order to illuminate an area.

The other methods rely on existing light or energy to produce an image. Therefore, many more factors must be taken into account when selecting near-IR equipment. They include the wavelength of the emitted light, and power and degree of coverage.

Wavelengths, Power and Coverage

Near-IR can have an 850 nanometer (nm), 880nm or 940nm wavelength light source. The selection is based on distance and the covertness of the application. A camera incorporating an 850nm light source can be detected by the human eye. Thus the covertness of the unit is very low; however, the operating distance can be more than 600 feet.

As the light source increases in nanometers, the ability to view the source becomes less. At 940nm, the source can only be viewed by another IR-sensitive device and not by the human eye. The drawback is that the overall operating distance has also been reduced.

When you need to see in the dark, you get a flashlight ... well, IR operates as a flashlight to IR-sensitive cameras (black/white or true day/night cameras). The greater the distance requirements, the greater the power (wattage) requirements will be.

Additionally, the angle of coverage must also be factored when planning for distance requirements. In most cases, to achieve extreme distances the angle of illumination is reduced. The angle of the lens on the cameras should closely match the angle of the IR unit. A mismatch may produce images that are unacceptable for video surveillance.

IR Safety Considerations

Any research done on IR illuminators will always being the topic of eye safety. Since the IR spectrum of light is invisible to the human eye, the iris will not react. This may cause some damage to the eye. Depending on the light source the safety requirements will vary.

The older style of illuminators incorporated large lamps that could reach distances of 1,000 feet or greater. However, they could cause eye damage if viewed from a distance of 6 feet or less. Newer, safer versions of IR illuminators use LED (light emitting diode) arrays and are governed by Laser Eye Safety EN60825-1 or EN60825-1M.

In 2001, the standard governing the safety of laser products in Europe (EN) and Internationally (IEC) was substantially revised and the classification system was overhauled This resulted in the introduction of three new laser classes (1, 1M, 2M and 3R) and the abolition of Class 3A. The 60825-1 standards apply equally to lasers and LEDs. The word “laser” here is interchangeable with “LED.” Generally speaking, LEDs would be in the lower classes (1, 1M, 2, 2M, 3R), but very exceptionally may be Class 3B.
The phrase “eye-safe” is used in the classifications that will follow. Please note this term is applicable to the whole optical spectrum from 180nm to 1mm (millimeter) wavelength, not just in the retinal hazard range of 400nm to 1,400nm. Outside the retinal hazard range there is potentially a hazard to the cornea. A wavelength outside the retinal hazard range is therefore not automatically eye-safe!
Here is a brief description of each of the current laser classes that are most relevant to our surveillance discussion:
Class 1
This class is eye-safe under all operating conditions.
Class 1M

This class is safe for viewing directly with the naked eye, but may be hazardous to view with the aid of optical instruments. In general, the use of magnifying glasses increases the hazard from a widely diverging beam (e.g. LEDs and bare laser diodes), and binoculars or telescopes increase the hazard from a wide, collimated beam (such as those used in open-beam telecommunications systems).

Radiation in classes 1 and 1M can be visible, invisible or both.

Selecting Gear for IR Applications

As mentioned, IR illumination is only available when incorporating black-and-white or *true* day/night cameras. "True" has been added to the day/night selection because some of the cameras carrying that designation on today's market do not remove their IR-cut filter, which can affect IR functionality.

The IR-cut filter is a mechanical device located in front of the image sensor. During daytime hours the filter is set in front of the sensor in order to produce proper color images. In low-light or night applications the filter is usually removed from the front of the sensor in order to add IR functionality. Without the removal of this filter IR applications are very limited.

Another area to consider is proper lens selection. We talked about how the angle of the lens should also match the display angle of the illuminator. But that is not the only requirement. The selected lens should also be IR corrected. This correction within the lens allows the visible light range and the IR light angle to focus on the same vertical/focal plane. A non-IR corrected lens will produce a well-focused image until IR illumination is supplied.

The use of IR lighting has been around for many years. New techniques including advancement in LED arrays and the integration of illuminators with camera systems, especially when using pan/tilt/zoom (p/t/z) equipment, have launched many new applications.

The main disadvantage is, depending on the scene content and lens angle, positive identification of objects may be impossible. Since IR is a light-generating source, long-distance surveillance can also be limited. Overall though, an average surveillance system can definitely be enhanced using IR for low light applications.

Thermal Works in Total Darkness

The last area for seeing in the dark is thermal imaging. Thermal imagers are forward-looking IR (FLIR) devices. That acronym was generated by the U.S. military where the technology was first utilized. Some of the first thermal imagers were mounted on the front of reconnaissance aircraft.

Cameras equipped with IR illumination are available in many different form factors and are capable of meeting the demands of myriad applications.

Thermal imaging allows people to see in complete darkness. Both intensified cameras and IR illumination require some lighting in order to be effective. By contrast, thermal cameras detect the smallest changes in temperature between objects and turn it into a video image.

All objects emit a certain amount of black-body radiation (defined as an object that absorbs all electromagnet radiation that falls onto it; no radiation passes through it and none is reflected) as a function of their temperatures. Generally speaking, the higher an object's temperature, the more black-body radiation it emits.

A thermal camera can detect this radiation in a way similar to how an ordinary camera does visible light. It works even in total darkness because the ambient light level does not matter. In addition, thermal cameras can penetrate outdoor elements such as smoke, fog and haze.

Cooled and Uncooled Detection

Choosing a thermal camera may seem like a difficult task. Many people are reluctant to make any selection on their own due to the lack of information and the high cost of the devices. Let's start with the basics and see if we can't make it a little less intimidating.

Thermal cameras can be cooled or uncooled. This indicates the type of detector the camera has incorporated. Cooled camera detectors — This type of thermal cameras have an imaging sensor that is cryogenically cooled. Cryocoolers are devices used to reach cryogenic temperatures below -150° C, -238° F or 123° K by cycling certain gases. Cryocoolers have moving parts engineered to specific mechanical tolerances that wear out over time. These devices lower the sensor temperature and reduce thermally-induced noise to a level below that of the signal from the scene being viewed.

This type of camera is the most sensitive to small differences in scene temperature, called thermal contrast. Thermal contrast is the change in signal for a change in target temperature. The higher the thermal contrast, the easier it is to detect targets against a background that may not be much colder or hotter than the target. Cooled cameras are very costly and require yearly maintenance for re-calibration. They also have a MTBF (mean time between failures) of 2,500-8,000 hours.

Uncooled camera detectors — Uncooled cameras are generally less expensive than their cooled counterparts. As they have fewer wearing parts uncooled cameras also have longer service lives. Uncooled detectors operate at or near room temperature rather than being cooled to extremely low temperatures.

When IR radiation from low-light scenes is focused onto uncooled detectors, the heat absorbed causes changes to the electrical characteristics of that detector. These changes are then compared to baseline and a thermal image is created. Uncooled detectors offer lower image quality than cooled units; however, this technology makes thermal cameras much smaller and less costly. This opens up many new avenues in the security marketplace.

The last area one may find on the specifications for a thermal camera is the array configuration of the uncooled detector. Uncooled thermal imagers are available in two different configurations: *microbolometers* and *ferroelectric* arrays.

A microbolometer is a specific type of resistor used as a detector in a thermal camera. It is a tiny vanadium oxide (VOx) or amorphous silicon (a-Si) resistor with a large temperature coefficient on a silicon element. VOx thin film is the most widely known and used material for uncooled microbolometers due to its high temperature coefficient of resistance (TCR) at room temperature. Infrared radiation from a specific range of wavelengths strikes the VOx or a-Si and changes its electrical resistance. Changes in scene temperature cause changes in the bolometer temperature, which are converted to electrical signals and processed into an image.

Microbolometers have a very distinct image with crisp edges on the objects in the scene. However, the dynamic range of temperature for a microbolometer is somewhat limited when compared to ferroelectric arrays. This fact becomes very evident when looking at a scene where a fair percentage of the viewing area is deep space, such as a desert or large body of water.

Ferroelectric detector technology takes advantage of a ferroelectric phase transition in certain dielectric materials. At and near this phase transition, the electric polarization of the dielectric is a strong function of temperature. Small fluctuations of temperature in the material cause large changes in electrical polarization. If the sensor is kept at a temperature near the ferroelectric phase transition and the optical signal is modulated, an IR image can be obtained.

This technique allows ferroelectric arrays to encompass a large dynamic temperature range, and even look directly at the sun without incurring any damage to the detector. The image quality is not as sharp as a microbolometer but most users find it difficult to distinguish between the two. Ferroelectric arrays are slightly less expensive and can outperform microbolometers in desert or large body of water scenes where deep space is a factor.

Thermal Requires Special Lenses

Lenses of thermal imaging cameras are different from those of normal

Thermal cameras detect the smallest changes in temperature between objects and turn it into a video image. Courtesy FLIR Systems

Glass does not transmit IR radiation well and so the lenses for thermal cameras are made of germanium. This material is a good transmitter of IR radiation. However, it is very expensive.
Long focal length is another factor that can add to the cost of uncooled thermal cameras. This relates to another crucial lens parameter — the f-number. This factor is not only important for thermal; it also is a major factor for any low-light surveillance system. The f-number determines the light-gathering power of the lens and, therefore, affects the overall sensitivity of the camera system.

Thermal cameras can see great distances, but accomplishing this means the focal length of the lenses must increase. As the focal length is increased the diameter of the lens aperture must also increase to keep the system f-number constant.

An uncooled camera has to be operated at a low f-number (typically 1.4 ~ 2 f-stops) to achieve the sensitivity comparable with that of a cooled camera. Higher f-numbers reduce uncooled camera sensitivity and there is no adjustment to compensate for the reduction in the light signal transmitted through the lens.

All this means that long-range thermal surveillance applications require long focal length lenses. The cost of lenses rises rapidly with focal length for uncooled camera systems and rather slowly for cooled systems. As a result, even though the cost of a cooled camera is much higher than an uncooled camera, the overall system cost for uncooled could surpass the cost of a cooled thermal camera system.

Using the same technology as airborne law enforcement units, H-Series gives officers the information they need to make quick decisions, enhancing mission effectiveness, maximizing operational capabilities, and improving officer safety.

People can't hide their heat, so H-Series lets officers:

- See suspects in total darkness
- See through smoke, dust, and light fog
- See through camouflage and foliage in any lighting conditions
- See more – and see farther – than with other low-light night vision goggles and cameras.

Using a 320 × 240 thermal imaging core, H-Series provides four times the image clarity and detail of earlier systems, allowing officers to see more of their surroundings than any other night vision technology in the world. FLIR's advanced image-processing algorithms produce, crisp, clear thermal video day and night, in good weather and bad.

Best of all, H-Series is the first personal thermal imaging camera affordable enough to give every officer on the job the unsurpassed tactical advantages of full-resolution thermal imaging night vision.

Flashlights only illuminate a small area, plus they give away your position. H-Series let you see clearly in total darkness while staying covert.

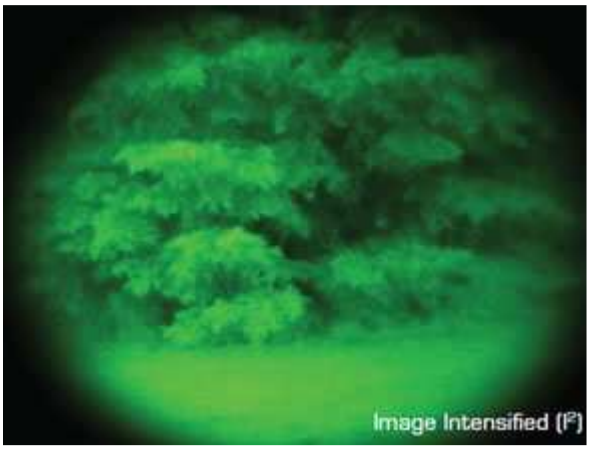


Image intensified night vision scopes can't help you see things that are camouflaged or that have low visible contrast. H-Series cameras don't saddle you with any of these limitations.

Using the same technology as airborne law enforcement units, H-Series gives officers the information they need to make quick decisions, enhancing mission effectiveness, maximizing operational capabilities, and improving officer safety.
People can't hide their heat, so H-Series lets officers:

- See suspects in total darkness
- See through smoke, dust, and light fog
- See through camouflage and foliage in any lighting conditions
- See more – and see farther – than with other low-light night vision goggles and cameras.

Using a 320 × 240 thermal imaging core, H-Series provides four times the image clarity and detail of earlier systems, allowing officers to see more of their surroundings than any other night vision technology in the world. FLIR's advanced image-processing algorithms produce, crisp, clear thermal video day and night, in good weather and bad.

Best of all, H-Series is the first personal thermal imaging camera affordable enough to give every officer on the job the unsurpassed tactical advantages of full-resolution thermal imaging night vision.

Flashlights only illuminate a small area, plus they give away your position. H-Series let you see clearly in total darkness while staying covert.

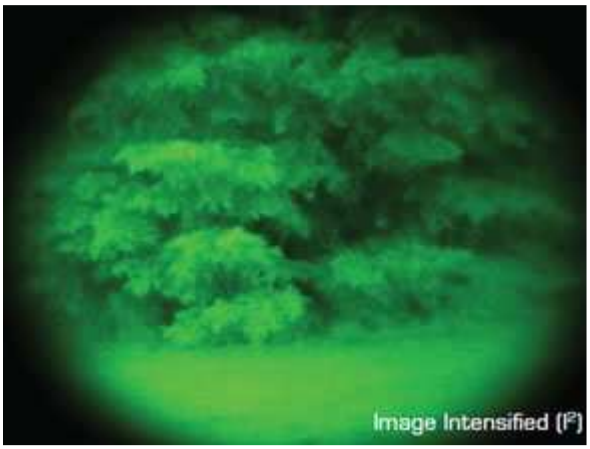
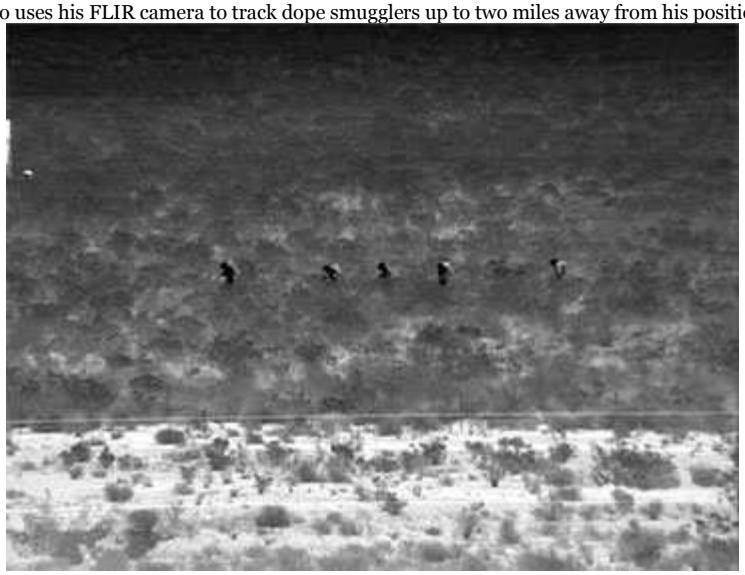


Image intensified night vision scopes can't help you see things that are camouflaged or that have low visible contrast. H-Series cameras don't saddle you with any of these limitations.

Hidalgo County, New Mexico, is home to dramatic Western landscapes, hard-working residents, two ghost towns, and 86 miles of international border that separates it from Mexico. Every year, smugglers attempt to transport thousands of pounds of marijuana across that desert border. Sgt. D.A. Arredondo of the Hidalgo County Sheriff's Department is one of many who work to block those smugglers' efforts, and he uses FLIR technology to help him do it.

Sgt. D.A. Arredondo uses his FLIR camera to track dope smugglers up to two miles away from his position atop his vehicle.



Smugglers trekking through the desert of Hidalgo County, New Mexico, just before midnight.

Download this law enforcement customer success story to see how Sgt. Arredondo uses his FLIR imager for local law enforcement and to support the U.S. Border Patrol.

FLIR H-Series Bi-Ocular Features

Unlike traditional night vision, thermal imaging technology detects radiation and temperature differences. That means you can see even in pitch black, as well as through smoke, light fog and foliage. Your FLIR H-Series Bi-Ocular includes:

Quick-Disconnect Modularity: Choose one or all of the following lenses: 35 mm, 65 mm, and 100 mm. Raised rubber sleeves and captive low-profile lens caps protect your lens investment.
Extended Range Options: Standard 320 x 240 with 2x digital e-zoom is powerful enough for you to detect a human about 2 kilometers away. Optional 640 x 480 resolution comes with up to 4x digital e-zoom that is powerful enough to detect a human almost 2.5 kilometers away.

Fast Power & Battery Swap: Latched door offers quick access to batteries. “Snap” FLIR Scout BHS Bi-Ocular onto its quick-release hot shoe to switch instantly to AC power.
Standard Photo & Video Capture: One-touch recording, focus, and zoom is a necessity in the field when your target is on the move.

METHODS OF DEALING WITH INFRARED AND THERMAL IMAGING DEVICES

All it takes to defeat infrared night vision, and I mean the GOOD STUFF, is a single sheet of 1 mil polyethelene plastic.

I tested only the thin film polyethelene that Wal Mart sells as a painting drop cloth for 99 cents. It works folks, and I will tell you how I know.

It is completely effective against government issued infrared night vision, both the hand held and helicopter mounted units.

This is what you need to accomplish for it to be effective –

Never have it wrapped tight on your body or your body will warm it up, and then the plastic itself will radiate infrared.

You have to have it extremely loose on you so that it stays cold. No where on you should it be close enough to you to be warmed by your body heat. A couple inches will do, it just cannot be in direct contact with you.

A loosely draped arrangement, and when you lay down, put it over you like a blanket.

Obviously if night vision is in your area you don't want to be out walking around, one snag on a tree branch and you could easily be finished. So movement will be slow.

This was tested on the U.S. border patrol, against numerous helicopters, surveillance drones, and SUV's. I was in the back country for three days on my first border bust attempt, and evaded them entirely while they were everywhere. And finally I got tired of the plastic, convinced myself it did not work anyway, and stood up ONCE with it off and got bagged immediately.

Get the DeLorme topo map of your state that they sell at truck stops. It's the one that is a full size book. Don't get the national one, get the one for your state. In it will be the full topographical information for the state, which is great for back country navigation because these maps include all the 4 wheel trails, possible obstacles, lakes, rivers, and most importantly, the TIDAL SPRINGS.

I'd bet you never heard of a tidal spring before, but knowing what one is can save your life.

Don't even think about lighting a fire without extreme caution, satellites are watching!

The Fed thought of this years ago. Under the disguise of catching forest fires early on before they got out of control, the Fed launched satellites to look at the back country and detect when a fire starts. This was stated as having been done to give a first warning of a fire that needs attention. But since forest fires get out of control all the time, it's obvious the satellites are there for other reasons. And I can guess what reasons.

Interesting. Yes that would work. To a point. You do have to move eventually. And it depends on other factors such as ambient back ground temperature, camera settings, software, etc.

If you are discussing Thermography, that is a little tougher to hide from. Your body heat rises and can get around a piece of plastic. Unless you seal yourself in, in which case you might die of suffocation before they can find you. Anything that prevents your "heat signature" from being visible is useful. Hiding behind a tree is enough if you know where the surveillance is coming from. A chopper over head may be running without lights or far enough away that you don't hear it. People with scopes or thermal imaging equipment see different things, depending again upon the settings, software, background temperature, etc.

You could dive into a body of water, you could wear a wet suit (or dry suit). You could hide in a culvert, or blend in with a "hot spot" like an air conditioner or car that has recently been driven. Your heat signature would "merge" with the other thermally "hot" item and make you harder to pick out of the background clutter.

As long as you don't peek out or stand up suddenly. Many layers of clothing tend to trap heat as well but would be useless if you didn't wear gloves and cover your face. Look at this image:

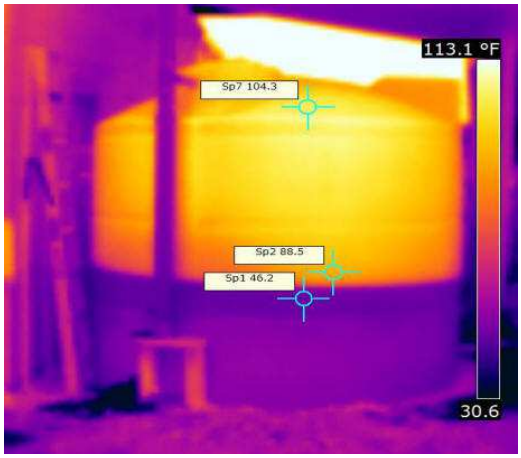
The officers are guarding a Nuclear Waste train. Their "mid sections" are opaque to the imager because they are wearing bullet proof vests. Hers another taken with different temperature setting on the camera:

Notice the difference between the two. Before you begin filming a camera has to be programmed for background and "threshold" temperatures. Setting a hi lo range for the display to represent the colors for differing temperatures(if in color mode). So, below a certain temp, the back ground can appear black or be assigned a color. Its kind of like a gain control or "brightness" setting. Thermal imagers see "Heat" not visible light. They operate in the Infrared spectrum. Heat behaves like light. Thats why you feel the heat from a fire on your skin. The radiant heat energy travels through the atmosphere just like light photons. At the same speed as light.

The camera sees and displays the difference in temperatures in its field of view. So the face of a person is hotter or higher on the color scale than the persons clothing and higher than the ground or buildings. If a roof is hotter than a wall for instance then that is displayed in the next color on the graph.

Thats how you can see the train has moved recently, the colors of the brakes being applied are "hotter" than the cars themselves. The heat from the nuclear waste is warming the containers and the train car walls because it is heating it up from the inside. Like a warm coffee mug. You are not seeing the Radioactive waste inside its container, you are seeing the warm skin of the *outside* of the rail car. That tells you something inside there is warm.

Like these two pics:



The top one is of a half full water tank in visible spectrum and the bottom thermal image shows you the water line. You aren't seeing the water in the tank, just the difference in temperature of the outside of the tank at the water line.

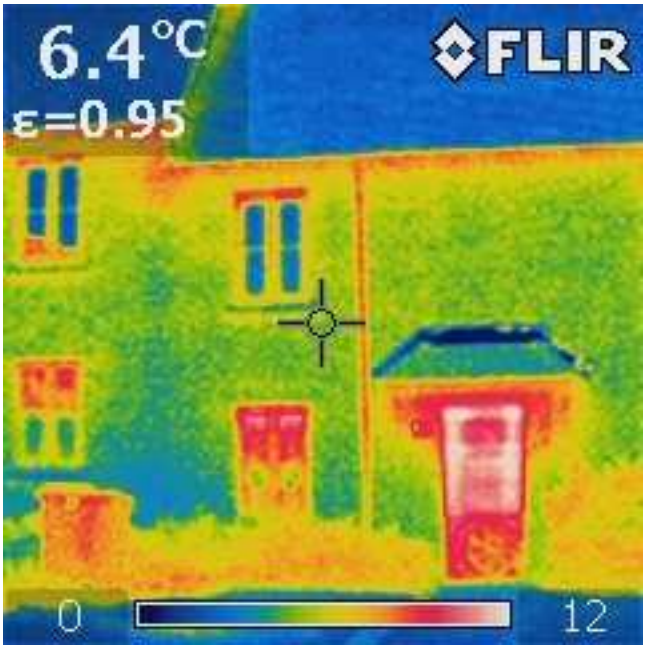
This guy is either a liar, and idiot, or both. I'm picking option 3. Having said that, if someone here on ATS can test his claim about this defeating Night Vision I'd like to hear about it.

Wouldn't a couple of boating flares [either the sticks or those fired into the air] overload the nightvison rendering it useless?

Personal Disclosure: Flares also may be useful screening against thermo vision or heat seeking projectiles although I am quite unsure about the former compared with the latter.

I used to own a $20,000 thermal camera and you can hide from it behind a glass, it cant see thru glass.

Wow, I can't handle the level of complete BS I'm seeing in almost every sentence in this thread so far. If you don't know what you're talking about then don't post it as fact. I own a thermal imager and I will happily go about making you look like a fool just to teach you not to post crap. People on ATS are here to deny ignorance not gain it.

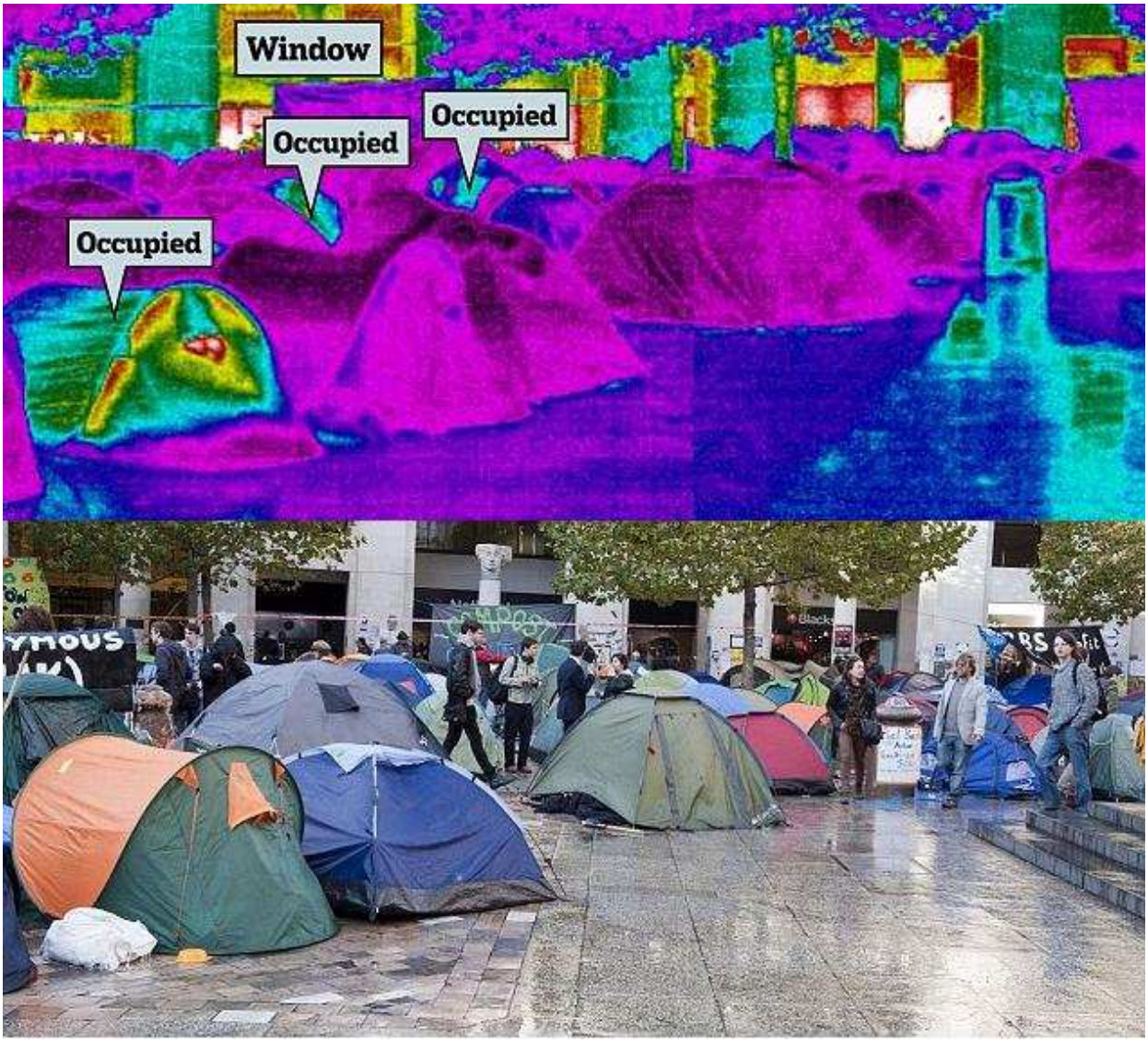


First, the quoted information in the OP is a complete lie, probably by somebody who wants you to think you're sneaking through security unseen. A thermal imager cannot see through very many things at all but the ONE thing it can see through is thin plastic sheeting. This means poly tarps, vapor barrier, garbage bags, cling wrap and practically anything similar. In fact I use cling wrap to protect the lens of my thermal imager in dusty environments or bad weather. I put it right over the lens and the imager sees through it almost like it's not there.

Second, you do not need to seal yourself into something to the point of suffocation in order to hide from thermal imaging. This is because the atmosphere is transparent to most thermal imaging technologies so your warm breath cannot be detected. The fart videos on YouTube are faked with aerosol cans. That is why the fart is registering as a colder temperature rather than warmer. It is the depressurized, thus colder aerosol particles that are being imaged, not the air. Thermal imagers cannot see through foliage, blankets, tent nylon, or anything solid. They can see any heat on these materials that has conducted into them from behind via direct contact. This is why a sleeping bag which has insulation providing a no contact zone between you and the outer layer works so well. Make sure you store the sleeping bag away from your body before use so it isn't heated up. Rebels in Afghanistan, and Iraq have been avoiding detection from US

military grade thermal imagers for decades simply by ducking under thick, ragged cut blankets. Dense spruce trees are an extremely effective cover from thermal imagers. Thermal imagers are practically useless in urban environments during or after a sunny day and their effectiveness is significantly reduced in rural environments after a hot day, particularly in the earlier evening hours.

That is the time for mobilization. If it's been an overcast day then thermal imaging effectiveness that night is at it's peak. Mice, sleeping birds and even ant hills will stand out like wild fire.



Third, who the heck waves flares around to avoid detection??? I can't even explain why someone would suggest this. It won't foil a thermal imager. The operator will see some hot body waving even hotter items around.

I've heard people suggest lighting a bunch of fires to fool the operator. It takes thirty seconds for a helicopter to go from unheard to on scene. It takes 5 minutes to get a single fire together and burning. What will the operator see? A crazy person running around trying to light a bunch of fires.

I've also heard people say that thermal imagers can't see through a sheet of glass. This is true, but you are going to look very silly trying to run around with what looks to a thermal imager like a five foot square mirror in the bush.

What about those reflective Mylar survival blankets?

Thats all good. But you do realize that drones have hover times of hours and helicopters can hover out of sound range and still kill you with cannon or missile. Your need to stay put for any length of time is compromised by the risk of being discovered by a direct search utilizing sweep teams with dogs.

So yah there are ways to hunker down, but the trick is to not get 'pinned down". Do you remember the drones endlessly buzzing over Gaza all night long? My impression is that it is impossible to move at night during that kind of surveillance.

In this video the Apache is watching these guys with Forward Looking Infrared (FLIR). Notice they don't hear the rotors or the gun until its too late. The poor guy at the end sticks his head up to look for it to his demise.

You can't hide from what you can't see or hear. And the thermal imaging optics on these weapons sights are infallible as far as it goes. They already pierce the night when you think it is dark all around. Unless you have one to locate the static "halo" produced on the turbine blades of the helo, you are meat for the vultures.

Didn't Mythbusters also prove that glass stops NightVision/FLIR ?

Two different things.

"Night Vision" scopes are a passive image intensification of "visible" light. They take what appears to us to be low level light (like the moon and stars, city lights) and magnify that many thousands of times. They are still seeing "visible" light spectrum, not infrared (heat) spectrum.

The terms used to describe the two different technologies are based more on the product than the science.

"Image intensifiers" or "Star Light" refer to magnifying visible light.

"Thermal Imaging" or "Forward Looking Infrared" (FLIR) are based solely on the Infrared spectrum (heat).

Both are "passive" which means relying on existing light and heat levels and both are commonly referred to as "night vision".

I didn't see the Myth Busters episode so can't relate. Watch out what the media tells you. They sow dis-info all day long about certain subjects. Since these technologies are what the police and military use to find you in the dark, the less you know, the better.

Yes that is the trick. There are tricks. No technology is infallible. Nothing is impossible and thermal imagers are not magic. They have considerable limits/compromises. You have fallen for that propaganda and what you see in the movies.

Every technology/weapon/surveillance system has it's place but none is 100% effective in every situation. Thermal imagers are relatively easy to defeat if you know how they work and what they can/cannot see. It is not like the movies and it is not like the perfect scenario examples that are released by the military.

I spend a lot of time looking for wildlife with my thermal imager. I'm thorough, very thorough. I search at a snail's pace, even loiter. I have thousands of hours experience. I know very well how to adjust the imager no matter the weather, temperature delta rate, terrain, etc.

Heck, I engineer projects around the technology so I know it inside and out. Yet despite that, animals get past me all of the time, maybe most of the time and they are not even trained.

By the way, Flir is the name of the company and "forward looking infrared" is just a term some yahoo came up with and it stuck.

Thermal imaging technology is easy to block, Flir corp has the data, but you completely lost me when I saw that our borders were to keep us in the country, Just drive thru the gate, no problem....

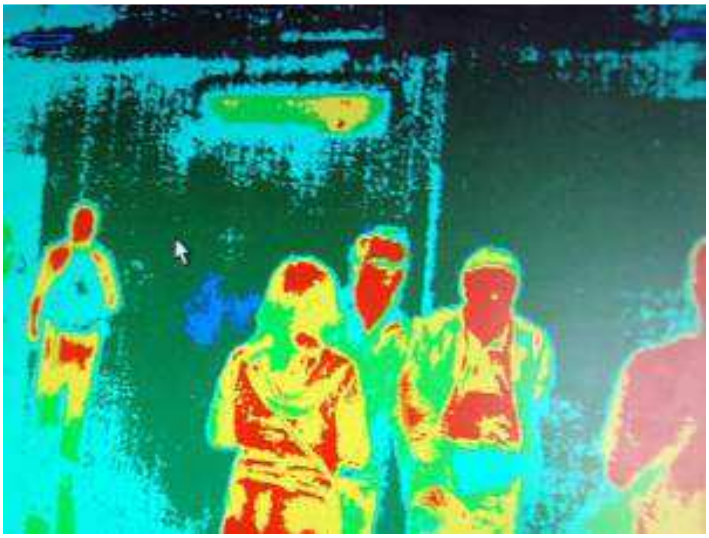
Excellent. Based on that obvious experience tell me, what do you attribute the animals ability to "sneak" by then?

I owned an ANPVS2 rifle scope from Vietnam era. Eve though it was "Passive image intensification" with fibre optic intensifiers, it could see the heat from an exhaust pipe on a car or a warm engine by reflection off the ground. Near infrared I am pretty sure. Still it was awesome to look around at night. I used to see lasers firing over the valley on some nights. I think the kind that they measure tectonic movement of mountains with. But I also saw them hit the ground from Helicopters and planes that flew over head.

A "dry wet suit", the insulated kind that covers your entire body and keeps you warm in extreme cold water scuba divingenvironments is what I was referring to. If it keeps your heat in, then it also makes you invisible to Thermal imagers, "to some extent depending on conditions" You still have to cover your hands and face. But like any other trick, it has its limitations.

Try filming someone in cold water and let us know what you see.

I've done it many times. Something unexpected occurs. You're the expert, you should be able to tell me what it is.



For a college course I got to see some video of police thermal imaging. This was the mid to late 90s so it could be better now, but they had trouble seeing through trees, especially pine trees.

Oh, I'm just condescending to those who post information that is catigoricly false, claiming it is fact and thinking that what they saw on Predator or CSI is what happens in the real world spouting it off to sound all knowledgeable.

When something moves in the water it disrupts the thermal boundary layers and an obvious thermally contrasting wake or disturbed area is left, even if the person/animal is below the surface. Operators (at least good ones) are trained to recognize this. Also, as soon as you pop your head up, it's a bright hot spot in the middle of a (generally) featureless scene.

Of course as always there are things you can take advantage of. If the observer's perspective is at a point where your position is in the reflection of the shore features your thermal image can be significantly obscured. This is because water is both emissive and reflective in the thermal infrared portion of the spectrum. This means that the temperature of objects reflected in the water is added to the temperature of the water itself and so appear much hotter than they actually are when viewed directly. Because most shorelines are lined with trees, the reflected shore image creates a high temperature, highly mottled scene, acting somewhat like camouflage.

Do you know any tricks for helicopters out of audible range? Is there some kind of detector you can use?

I noticed that too on some thermal image footage of a car chase. You could see heat sources on the car but not the driver because he had the window up. When he opened the door to run you could then see him clearly.

It picks up the temperature of the glass, not what's behind it.

There, that wasn't so hard now was it? Yah, you have to come up for air. Its a trick. If a helicopter suddenly appeared overhead you could slip into a river or lake, whatever and hide along the bank (if there was undergrowth). As long as you had a lot of foliage over the top of your head or if you breathe with your mouth just above the water line youi signature is greatly reduced. In a river or "urgling brook" the motion of the current would also help to confuse the IR sensors in the camera. Anyone who didn't know you were there might think you were a small animal say unless highly trained, or the only expert like you.;

I saw a car chase on video once and the car was "hot" on the FLIR. It splashed into an aqueduct and disappeared from the camera view. The operator switched to visible spectrum and turned on the spotlight to see "better".

Because the foliage is "overhead" and the light (heat) emanating from your body can't be seen behind the canopy if it is thick enough. Maybe the pine needles are the most effective blocking the heat signature? Leaves on trees might have gaps and your signature would be filtering thru.

"A DIY Hat To Prevent Your Visibility On Cameras And Video" from this site;

www.secretsofthefed.com...

I am the only expert on here so far. Everybody else is posting assumptions. Most of those assumptions are incorrect yet they are being stated as fact. You are the worst offender here. I don't know why you feel you should carry on offering false advice when it is obvious that you have no experience with the subject matter what soever. It's doing considerable damage by feeding inaccurate information to people who are genuinely interested in learning the truth and it goes against everything that ATS try's to accomplish.

Didn't Mythbusters also prove that glass stops NightVision/FLIR ?

Yup, but so does cardboard, styrofoam, a towel, etc, etc, etc. which are not as heavy, not as breakable and not shiny. In fact almost anything solid will work. Thermal imaging is not magic. It can not see through most things.

Thermal imaging and image intensifier based night vision is passive (generally). This means that there is nothing being emitted from the devices, so there is nothing to detect. When the laser designator comes on to give the Hellfire missile something to aim at then you can easily detect that. You'll have a few seconds to find a lot of cover. That's if they use a Hellfire. Caveat there too - some Hellfire variants now don't use laser guidance. There is nothing that I am aware of that is affordable to the common person and which significantly helps to extend the detection of an approaching helicopter. The helicopter remains an effective sneak attack platform.

I think it would work to spoil facial recognition software as well. Still a red flag to the "watchers". You might do better to "disguise your person" without looking like it. Wearing a hat with a brim or a cap with visor. Grow a beard. Wear sunglasses. All these things confuse software designed to recognize you by your features. That way you just blend in with a crowd, instead of looking like a beacon.

found some interesting stuff:

how to hide making an infrared Mask / hat mods-n-hacks.wonderhowto.com...

some other advice included using any emergency blanket (cut a whole in center and use as a poncho to keep cool)

Thermal sleeping bag test: www.youtube.com...#!

also, use your tv remote to detect hidden IR cams: www.youtube.com...

I tried to make that Infra red mask a while ago, it simply does not really work.

LEDs have a range that they emit light at, like a flashlight. When you turn it on it does not simply light up a full 180 degrees in front of you. So these LEDs don't offer enough range and they are really not that powerfull enough to do what is done in the videos.

All you are really doing with that IR mask is shining a light in the camera to hide your face. Since they are IR LEDs they can only be seen on camera.

When I made it I notices it only really worked when you were kind of close to the camera and facing it. I even went online and bought some high powered LEDs with wide ranges and high output and the result was the same. It never really worked and all I got was some laughs when I would go through the drive through.

I have something that can beat any of the above mentioned things, chances are you have it in your kitchen, and as the OP mentioned, as long is it is not touching your body chances are it will not register your body heat.

Duh da da da duh duh duh... tin foil. Yep the standard stuff can beat thermal imaging, as well as night vision. It's a matter of facing shiny side towards said heat signature or away from it for the device. I am not going to give it away, as I'd like those of us who have these devices to try it out for themselves. Let me know what you discover and let me know. It has worked on both Gen 1, 2 and 3 Thermal and night vision goggles for me and my boys playing a friendly game of air soft. Yeah, I've played games with guys who have brought out their completely ridiculous and unnecessary toys. Oh, and if it's raining this trick pretty much doubles in it's effectiveness. Again, not anywhere near the heat source itself. It works, field tested.

How ever, I will say this, if your " cloak " is in an area with dense brush it may register as an extreme cold spot, which might give away the hidden object based on the fact Thermal will register a big "weird" cold spot.

The alluminum(tin) foil will get really cold, really fast given it's surface area and thickness.

(hint shiny side in reflects any heat the tin[alluminum] foil is exposed to back at it's target and given it's surface area and mass, it does not retain much heat.)

Stealth Wear: New Counter-Surveillance Clothing Makes You Invisible to Drones

Making its debut on January 17th, the Stealth Wear line will include hoodies, scarves, hats, and t-shirts that will make the wearer invisible to thermal imaging cameras widely used throughout the unmanned aerial vehicle community.

The flagship Stealth Wear line will include:

The anti-drone hoodie and anti-drone scarf: Garments designed to thwart thermal imaging, a technology used widely by UAVs.

The XX-shirt: A x-ray shielding print in the shape of a heart, that protects your heart from x-ray radiation

Will it really work? Who knows. If it does, I might have to pick up a few hoodies. Though without covering all body parts, not sure how useful it will be.

In the article they also discuss disguises that will fool face recognition technologies. And an anti-phone accessory that allows you to instantly zero out your phone’s signal. Sad that it has come to needing stealth technology, but big brother is watching so take advantage of it while you can.

Maybe this one will work;www.quora.com...

You can run and hide from flir. THat one poster was correct you just can't get pinned down. A long time ago I knew some teenagers who would infiltrate griffith park a night for fun. Do little commando missions where they'd sneak past the ranger and his dog watching tv. Make their way up to the griffith observatory and then mess with the security there. Skittle little pebbles behind their back from the tree line while they were on patrol.

Well one early morning the ranger was fed up and tried tracking the kids with the dog. SO the kids had to keep moving. THe only problem was there was a helicopter hovering over the ridge line they were using to egress from the ranger, the dog and from the observatory. It was suspected that the helicopter was using flir because it looked like it was searching but without a search light.

Well the teenagers stuck to staying in the low trees which are more like dense overgrown bushes, and took their time constantly moving but hiding in scrub and behind boulders. They got out just fine and the helicopter was last seen still searching the area they were in to no avail. . . . So I've been told....

SO I argue that it is reasonable that one can evade flir actively searching for them. You just have to have the right conditions.

Many growers of a certain substance in California have been using the following for similar purposes for quite some time.

www.discount-hydro.com...

A few years back, some military associates and myself went out on an excursion. The trip was a survival trial. We all were given military grade equipment but with a limit of batteries. We also we told we were allowed to visit the local home department stores the night prior.

The idea was how to overcome/find weaknesses in our equipment.

Surely enough, we all had cameras. On the first night out, this was used by each of us. They used typical tricks, like clay, and synthetics to mess with the imaging, but most of them were still found. **On my turn out, I had decided to place in my backpack 3 cans (didn't need that many) of spray insulation. The kind that foams up and then hardens.**

I found a nice patch of twigs under a short rock cutout, laid myself down, and filled the edges with the spray insulation. Once inside, I found that I had considerable room enough to even light a sterno (portable gas cooker) can and cook up dinner. (this was part of the challenge - long term "drone" avoidance) From the outside, I was told, the area was still in the blue/black. The area was surrounded by circular high-vantage points.

One of those things that shouldn't be said, I suppose, but try as we might, we couldn't find a way to get the cameras to work through the foam sealant. Needless to say, I "won" the experiment. Another guy (1 other out of 6) was not captured either but his methods were a bit advanced, so I won't bother with it here.

Anyways, just wanted to share the personal story. There are limits to the concept, but from an urban-escape-to-wild environment, or other, it may be possible.

Wrapping yourself in tinfoil is the equivalent of wrapping yourself in a disco ball. Don't take my word for it. Watch the videos I made below. But first let me finish reaming you out.

It has worked on both Gen 1, 2 and 3 Thermal and night vision goggles for me and my boys playing a friendly game of air soft.

So you've had at least three different thermal imagers spanning three generations of technology and costing many tens of thousands of dollars out to play air soft? That's impressive.

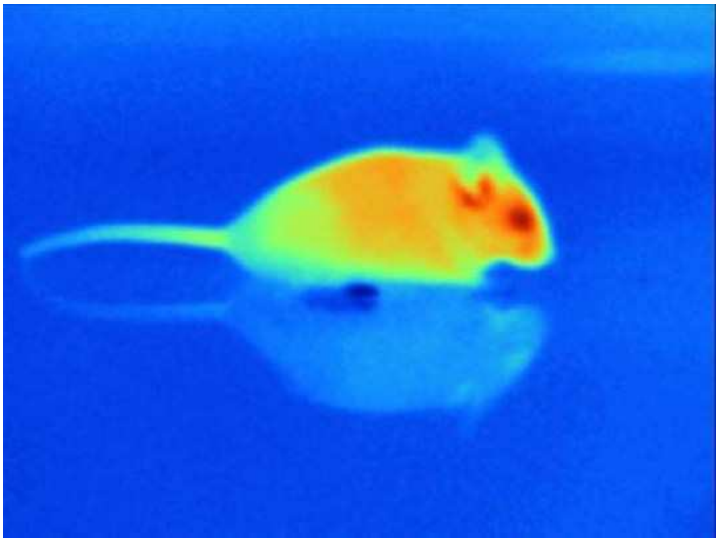
Also, could we presume that anybody with that much experience with these devices would know that thermal imagers are not categorized as Gen 1, Gen 2, Gen 3. Night vision devices (specifically image intensifiers) are. How could you have tested technology that does not even exist?

if your " cloak " is in an area with dense brush it may register as an extreme cold spot, which might give away the hidden object based on the fact Thermal will register a big "weird" cold spot.

The alluminum(tin) foil will get really cold, really fast given it's surface area and thickness.

Really? What made it cold? What conducted the heat away from it? Shouldn't it be at approximately the ambient temperature like all other inanimate objects or acquiring heat from your body and reflecting the surrounding scene because it is metal which is highly reflective in the thermal band?

(hint shiny side in reflects any heat the tin[alluminum] foil is exposed to back at it's target and given it's surface area and mass, it does not retain much heat.)



Both sides of the foil are equally as reflective. However one side is smoother than the other. Of course if you had actually tested this you would know that it doesn't matter because thermal band radiation is of such a long wavelength that even the rough side of the foil is smooth enough to have mirror like properties in that part of the spectrum.

ATS has T&C against purposefully posting false information. I'm asking the mods to take your post into consideration.

Anyway, I knew exactly what effect being wrapped in foil would have but what is the sense in posting it if you can't back it up so here I've done some testing on video.

First foil vs Gen 3 night vision.

As you can see the bits and pieces covered with foil are no more invisible than the rest of me.

Advantages:

-Shooter might miss because they are laughing so hard.

Disadvantages:

-Makes you stand out like a sore thumb.

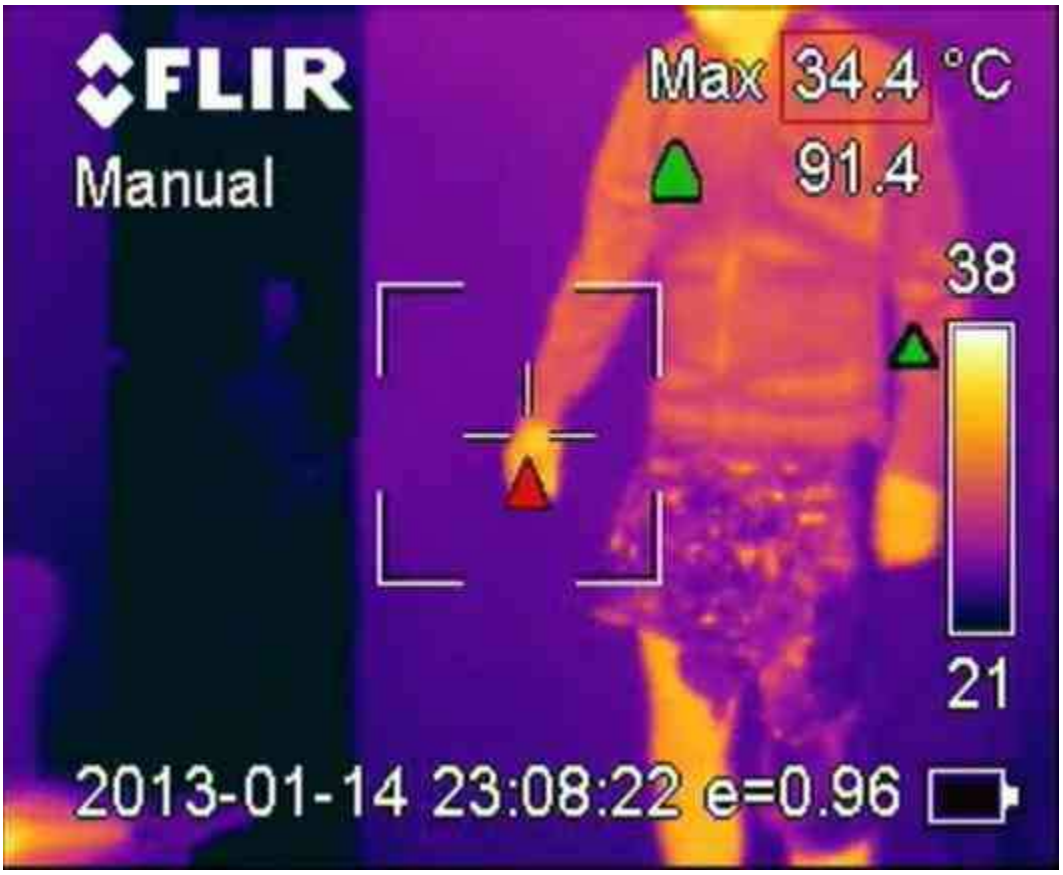
-Crinkles very loudly.

-Is in constant need of repair (I was fixing it several times just walking around in the room and I couldn't bend over without ripping it.

-An overwhelming desire to get out of it 5 minutes ago.

-Itchy -Pokey -Grabs the pubes.

Next Foil vs Thermal imager



As you can see again the bits and pieces covered with foil are no more invisible than the rest of me.

Advantages:

-Shooter might miss because they are laughing so hard.

Disadvantages:

-Makes you stand out like a sore thumb.

-Crinkles very loudly.

-Is in constant need of repair (I was fixing it several times just walking around in the room and I couldn't bend over without ripping it.

-An overwhelming desire to get out of it 5 minutes ago.

-Itchy

-Pokey

-Grabs the pubes.

Just in case for some of you who havent read this article it covers much of the topic discussed here in this post as well. I urge everyone to read this. The article has some very good links to bookmark for further reading.

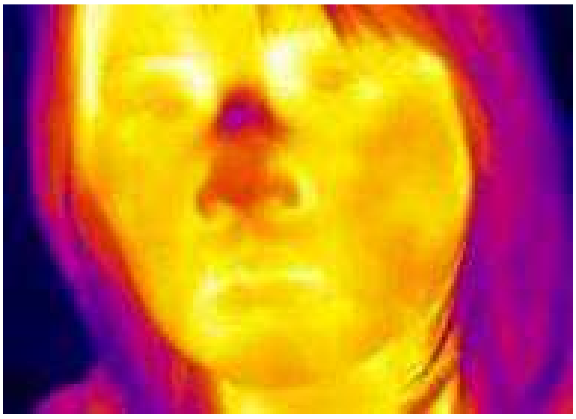
Low tech solutions for high tech tyranny

A considerable threat to those who decided to fight back against the Swedes was the widespread usage of night vision and thermal imagers by troops sent to hunt down and capture dissenters (the Swedes called them “enemy combatants). The use of FLIR cameras on aircraft and the feared predator drones were especially terrifying to those who knew very little about how such technology actually functions.

David, an insurgent against Swede governance, was tired of hearing about how the Predator Drones would be the doom of all who defied the establishment. He felt that this outlandish perception came more from the fact that the drones had no human passenger, and so, no potential casualty risk.

The concept of facing down a machine that feels no combat apprehension is certainly disturbing, but not insurmountable. At bottom, what the enemy cannot see, the enemy cannot kill. And so, instead of trying in vain to fight the drones and their thermal / night vision on the terms of the oppressive military presence, he decided to make their vision advantage irrelevant by studying

IR evasion used in sniper training. Regular night vision relies, in most cases, on the use of an IR light which bounces off targets within the field of view. This is often referred to as “Active IR”.



Thermal Vision reads existing IR at a different wavelength, usually in heat producing or high IR producing bodies, called “Passive IR”. For evading Active IR night vision, David found that regular camouflaging methods along with smoke worked well. For defeating night vision altogether, he found that bright IR flashlights and floodlights, and even regular bright lights like camera flashes, shined directly at the target wearer of the night vision device, would be blinded for a short period of time, leaving room for escape. Thermal vision evasion was more difficult.

David and his team first studied the IR Emissivity Tables of common everyday materials: www.optotherm.com…www.tnp-instruments.com… All objects above the temperature of absolute zero release a certain level of electromagnetic radiation, which thermal imagers pick up and translate into a visual picture. Hiding one’s heat signature is difficult, but not impossible. The key, as David learned through military sniper training manuals and combat analysis, was to match his IR signature with that of his surrounding as much as possible.

He fashioned a hooded cloak using a material that would block much of his initial warmth, then lined the inside of it with emergency space blanket material, which reflects back around 90%

body heat. The cloak design worked well because he could easily take down the hood and unwrap himself when not in immediate danger, allowing the material to cool as he walked. Then David attached local vegetation to the material to help match its IR Emissivity to the surrounding foliage. This combination reduced his thermal signature drastically. Overhead drones could not identify him clearly as a human, if they were able to see him at all. Ground forces were a greater threat, but the element of surprise was still possible for the insurgents with cloaks. In combat, the tandem dangers of drones overhead and ground forces in pursuit with thermal vision made life difficult.

David carefully studied field guides to Predator Drone strengths and weaknesses:

info.publicintelligence.net... David and his team then utilized a special strategy under these extreme circumstances called “False IR Signature”.

Operating in bad weather gave the freedom fighters an instant advantage. Heavy rain washed away thermal footprints and obscured body heat. Thick cloud cover made image integrity poor. Contrary to popular belief, the drones had many downfalls, and their eyes were limited in numerous ways. When in the middle of combat, where drone surveillance was most dangerous to low-tech resistance, multiple fake IR signatures were created using whatever was available.

David used a combination of IR Chemlights and hot burning road flares thrown all over the field to misdirect drone cameras. With IR hotspots everywhere, the thermal cameras had no idea where to focus, let alone which targets were real, and which were fake. IR strobe light flares flashed intermittently causing even more confusion, and masked to some extent muzzle flash from firearms. Larger objects could also be faked using pieces of metal heated with fire, or even heated metallic balloons arranged in a sizable pattern to mimic a hot running car or tank. Drones would zero in on false targets and unleash missiles, only to waste the exp

Don't wrap yourself in tinfoil. Anything touching your body will register a heat signature eventually.

What am I supposed to do with it, squish it into a ball and throw it at the thermal imager? I did what you said in your post. It is complete BS. Even if it wasn't, there are much more practical methods. You have NO idea what you are talking about and I believe you are lying outright.

Night scopes cost a $100 to several thousand dollars. That I could believe, but he was talking about three different generations of thermal imagers which cost tens of thousands each. Not to mention that thermal imagers are not categorized as Gen 1, 2, 3.
Anyway, everything else he says is a provable lie so I have no reason to believe anything he says. Not sure why he's being defended when I have proven this through actual testing.

I wonder if you could just use a giant golf umbrella with plastic hanging down the sides??? Would be nice to test it out...

I would look like a huge jellyfish, lol...

Mountains with trees at night. Thats it. They will only be able to circle the area, they will not fly into any kind of forested area at night. I had a friend who lived in cali, and he was watching a police chase. he outran the cars, but could not loose the chopper (he was watching this from a live news chopper that was also following the guy) As soon as he lost the cars, he booked it into the hills. The news and police chopper just flew circles, and the news anchor said they could not continue the persuit into the trees at night due to safety risks. The guy ended up getting away, came out on the other side of the mountain I can only assume. Cars never could find him. choppers gave up and that was it

What people forget is that the 50 can see through the trees with IR and thermal imagery

Cops proved this time and time again.

Only way to loose them is through a network of tunnels or multi story carparks
Or by even outrunning them in something faster

storm drains and sewers

al-Qaeda's 22 Tips for Avoiding a Drone Attack

According to a document found by the Associated Press in Timbuktu, members of al-Qaeda in North Africa were in possession of a fairly detailed instruction manual for avoiding drone attacks. The document, which includes an easy-to-use list, is a copy of a paper reportedly

penned by Abdallah bin Muhammad, a senior commander of al-Qaeda in the Arabian Peninsula. It was apparently left behind by the North African group as they fled French troops last month.

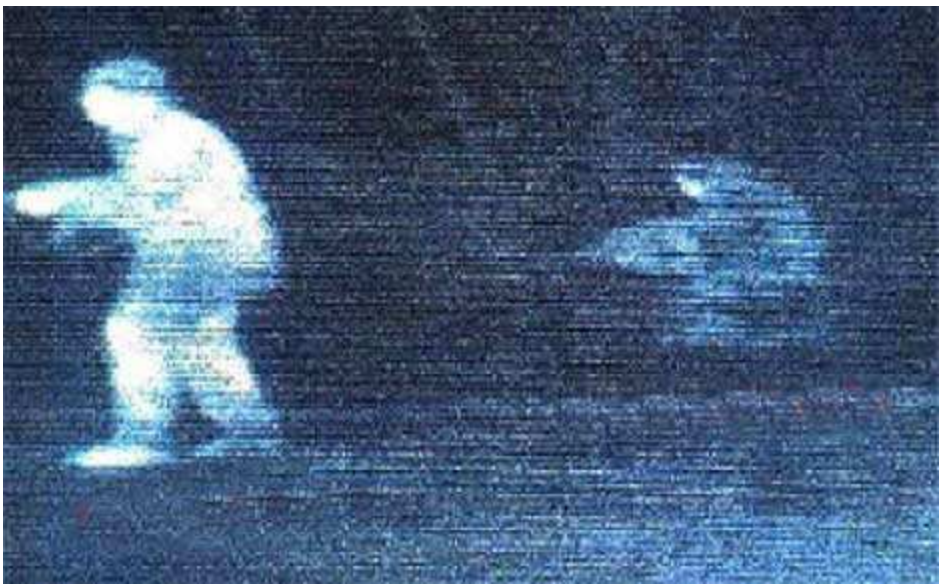
The list features some basic, common sense tips ("Hide from being directly or indirectly spotted, especially at night."), some more complex ones ("Form anti-spy groups to look for spies and agents.") and a few that don't make much sense ("Jamming of and confusing of electronic communication using the ordinary water-lifting dynamo fitted with a 30-metre copper pole"). Altogether, though, the list probably comes in handy when being hunted by killer robot planes.

The full list [sic throughout]:

- 1 – It is possible to know the intention and the mission of the drone by using the Russianmade "sky grabber" device to infiltrate the drone's waves and the frequencies. The device is available in the market for $2,595 and the one who operates it should be a computerknow-how.
- 2 – Using devices that broadcast frequencies or pack of frequencies to disconnect the contacts and confuse the frequencies used to control the drone. The Mujahideen have had successful experiments using the Russian-made "Racal."
- 3 – Spreading the reflective pieces of glass on a car or on the roof of the building.
- 4 – Placing a group of skilled snipers to hunt the drone, especially the reconnaissance ones because they fly low, about six kilometers or less.
- 5 – Jamming of and confusing of electronic communication using the ordinary water-lifting dynamo fitted with a 30-meter copper pole.
- 6 – Jamming of and confusing of electronic communication using old equipment and keeping them 24 hour running because of their strong frequencies and it is possible using simple ideas of deception of equipment to attract the electronic waves devices similar to that used by the Yugoslav army when they used the microwave (oven) in attracting and confusing the NATO missiles fitted with electromagnetic searching devices.
- 7 – Using general confusion methods and not to use permanent headquarters.
- 8 – Discovering the presence of a drone through well-placed reconnaissance networks and to warn all the formations to halt any movement in the area.
- 9 – To hide from being directly or indirectly spotted, especially at night.
- 10 – To hide under thick trees because they are the best cover against the planes.
- 11 – To stay in places unlit by the sun such as the shadows of the buildings or the trees.
- 12 – Maintain complete silence of all wireless contacts.
- 13 – Disembark of vehicles and keep away from them especially when being chased or during combat.
- 14 – To deceive the drone by entering places of multiple entrances and exits.
- 15 – Using underground shelters because the missiles fired by these planes are usually of the fragmented anti-personnel and not anti-buildings type.
- 16 – To avoid gathering in open areas and in urgent cases, use building of multiple doors or exits.
- 17 – Forming anti-spies groups to look for spies and agents.
- 18 – Formation of fake gatherings such as using dolls and statutes to be placed outside false ditches to mislead the enemy.
- 19 – When discovering that a drone is after a car, leave the car immediately and everyone should go in different direction because the planes are unable to get after everyone.
- 20 – Using natural barricades like forests and caves when there is an urgent need for training or gathering.
- 21 – In frequently targeted areas, use smoke as cover by burning tires.

- 22 – As for the leaders or those sought after, they should not use communications equipment because the enemy usually keeps a voice tag through which they can identify the speaking person and then locate him.

How To Block IR Infrared Thermal Imaging



A warm body can be detected by the IR (Infrared) heat that it gives off with thermal imaging equipment, and provides a difficult challenge to someone or some thing wishing to avoid detection. You may be camouflaged in the best concealment that there is, but you may be highly visible to thermal imaging from someone with a IR scope on the ground or that Drone flying overhead… This goes the same for any warm or hot equipment that you wish to conceal.

What is Infrared (IR)? It is light (not visible to the human eye); electromagnetic radiation with longer wavelengths than visible light, extending from the red edge of the visible spectrum. If you could see the waves, the wavelength would literally be only 0.00074 to 0.3 millimeters, or 0.00004 inches to 0.01 inches. Humans at normal body temperature radiate chiefly at wavelengths around 0.01 millimeters, or 0.0004 inches… right in the infrared.

There is no absolute certain way to defeat infrared, but there are some techniques that make detection more difficult.

One of the most effective methods to block IR is to conceal behind glass. Glass is opaque to thermal imaging. It is not a practical solution though, due to the obvious impracticality of carrying around a pane of glass, or constructing your walls and ceiling out of glass

A simple and effective method to block IR is an ordinary ‘space blanket’ or thermal blanket of Mylar foil. The foil will block the IR heat signature behind it. A problem though, is that whatever it is that you are attempting to conceal, its heat will either build up inside to an unbearable degree or it will escape ‘somewhere’, which will then be visible to IR imagers. Concealment for the most part will be temporary without elaborate mechanisms to disperse the heat signature.

For a quick temporary method of IR concealment, throw a blanket over yourself. A thick woolen blanket will help defeat thermal imaging. Covering with a layer of insulation, the heat is blocked (or partially blocked) so that it doesn't radiate. This is only temporary concealment as the heat builds beneath the blanket, but it may work long enough to conceal during a quick TI scan or Drone flyover…

Other methods of partially hiding from IR is to conceal by blending in next to other warm objects like stones or thick walls that may still be holding the heat from the day. The vents in buildings may be out-flowing warm air; a source of heat that can help obscure your own thermal outline. You get the idea… wherever there is existing natural or man-made heat, you can blend in with that to help conceal your presence to an IR or thermal imager.

Wear an insulated jacket, insulated pants and a hat. It won't be 100% but it will help lessen the heat signature. Again, the heat will build and escape through the neck openings and face. You could cover your face with cool mud, which will work temporarily. It's all pretty much common sense; reduce, disperse, or cover the sources of heat.

Netting will help somewhat, but the holes throughout the webbing of the net will reveal some of the thermal IR heat. Netting will help to disperse the heat that may be underneath it as the airflow will be broken up somewhat by the webbing and will hide or smear hot spots better than nothing covering them at all. The heat signature will not be as intense, but spread out more. An example may be to cover a vehicle that has been running with netting, or to wear a Ghillie suit.

Put trees and/or brush between you and the suspected IR imager. Trees overhead will help break up the infrared signature, especially under a heavy canopy of leaves.

A moving heat signature at night is quicker to identify than a stationary one (up to a point).

When you are hiding your heat signature (with a Mylar space blanket or other means), under *some* conditions your signature may look 'too cold' to an IR scan of the area (an extra dark outline, or a 'black hole'), which may make you detectable. Surely this is better than otherwise, but keep in mind that the objective is to blend in with the thermal clutter of the surroundings.

Avoid open spaces and skylines by day or night.

Thermal Imaging does not perform well in falling rain.

The problem with most IR cloaking methods, IR clothing or netting designed to block IR, is that it will also block the *background* IR – creating a black hole of varying degrees. Ideally you would want something that 'cloaks' or blends your IR signature such that the background scatter at your location is what the observer sees.

We are entering the age of the Drones, and there will be (are) all sorts of levels of detection capabilities. But starting with the basics of ordinary IR heat signature is at least starting somewhere…

Shape-Shifting. One of our prepper girls created a series of mylar body drapes, made from emergency blankets, that has cut-outs which allow heat to escape in a desired pattern, like the shape of a deer or elk. It's like IR camouflage. When we engage in practice maneuvers wearing

these drapes we stay in the trees and we don't follow standard tactical movements. Though we do use typical squad techniques we try to emulate or appear as a group of deer or elk moving through the forest. To the unknowing eye we have shape-shifted. Pretty ingenious don't ya think. This idea was presented to us at one of our prepper meetings by an 18 year girl. All of us old, seasoned tacticians looked at each other in total amazement. It was like a light went off in our heads simultaneously. Thinking out of the box is good. We tested it out using a Night Owl Next-Gen thermal-imaging binocular from a helicopter at 8,000′ and at near ground level and the results were amazing. The combination of shape-shifting and the unconventional tactical movements would have fooled even the sharpest of analysts. It actually worked too well. We had to modify the drapes by softening the edges of the cutouts. We achieved this by pounding nails in rows thru a 2″X4″, large to small, and using it as a stamp along the cut-out edges to soften the apparent edges. The results were more realistic.

set a huge fire

CO2 blocks IR. Now go make a practical exploit from that information.

On a ruck sack frame build a canopy frame that has clear plastic attached/draped to it and it should be wide enough to give protection from overhead angles, leave enough room to keep the plastic from heating and on top of that add some camo netting. you can wear it while moving about at night and no heat signature can be detected overhead and 3rd gen nightvision should be compromised also. Of course line of sight from a parallel plane would expose you but you should know what your hiding from and adjust accordingly. Hiding from strictly I.R. cameras will leave you compromised, night vision is getting better.

Has the possibility of thermal decoys been explored? Make dummies with chemical heat packs to "salt" the area with false positives. What about microwave emitters to heat up an area or to use as a focused weapon, trap, or jamming device? I have seen a manual for dismantling a microwave oven to do such a thing. Maybe setting up a drone trap in a salted area could be a workable technique. Would canyon country be a good terrain to set such a thing up? If you can create a funnel area for them to fly and have weapons that can take them at speed and height, manage to jam their navigation or alter their flight in a manner that sets them up for the kill, I think a combination of these techniques might be used to draw them into a better kill box. In other words, actively hunt them instead of passive camoflage evasion.

Infra Red Detection and the Sniper

Now this was written to help the military snipers to be able to blend in, & Avoid the Infrared Flair Thermal Imaging Cameras. & It does an awesome job of explaining in theory how they work & their weak points etc. Well we can also use the same principles talked about here, to help those of us who need to avoid the detection by the Thermal Heat Detecting Flair Cameras.

Knowledge & Information Is The Power To Beat Detection

In Hot Tips & Cold Shots. Fieldcraft. Thermal Detection, there are some pretty gloomy postings about IR detection. As an electrical utility thermographer, I might shed some light (pun intended) on the subject. To qualify this, I am using the latest (I think) commercially available FLIR product, and am a level II thermographer, (total formal IR training: 2 weeks-experience using IR equipment: about 5 years.)

I believe I am at least familiar with IR. Granted, my life is not depending on avoiding IR detection, so I guess I can have my opinions pretty safely. These are my observations about IR imagers using civilian equipment and are.. "just my opinion". It's up to you and yours to check them out in your world.

This is WAY brief, believe it or not. Anyone interested can email for more. This is about THERMAL detection, not IR illuminating sources for "starlight" scopes.

IR is not Xray, Hollywood bedamned-it cannot detect a differential heat image through common solid materials, plastic film (black or otherwise) being an exception. However, a good imager system can see through holes in a masking material ("IR masking" camo net). And if you are inside a dumpster, body heating the bad guy's side, he can "see" the hot spot on the dumpster's outside.

But if you are not leaning (heating) against that side, he can't "see you". Your body heat will not be detected behind most readily available unholed blinding materials if you are not differentially warming/cooling those materials or allowing your own IR to reflect off of something behind/over you. BUT, if the shielding materials are alien to the surroundings, the material itself will probably stand out. See below.

Glass will not allow your THERMAL image to transmit (pass) through; same as the dumpster scenario. The lenses of IR imagers are made of exotic nonglass materials because of this.

Every piece (cluster) of matter, including gasses, emits IR if it is above Absolute Zero (minus 459.69 degrees F). The warmer a body gets, the more IR it will emit. Eventually it will enter the visible spectrum as it gets "red hot".

The surface of a piece of matter is where IR is emitted. Altering an object's surface will alter the rate at which IR is emitted. Stoveblack is a classic example.

Materials physically different from each other will likely emit IR at different rates. BUT the differences may be very slight.

IR imaging (read DETECTION) depends upon two objects having one or more differences in Temperature, Emissivity/Reflectivity, and Absorption of the compared objects. For this application, we can forget about Absorption, and you should all understand Temperature. Now, E + R = 100%, thus the moreemissive a surface is, the less reflective.

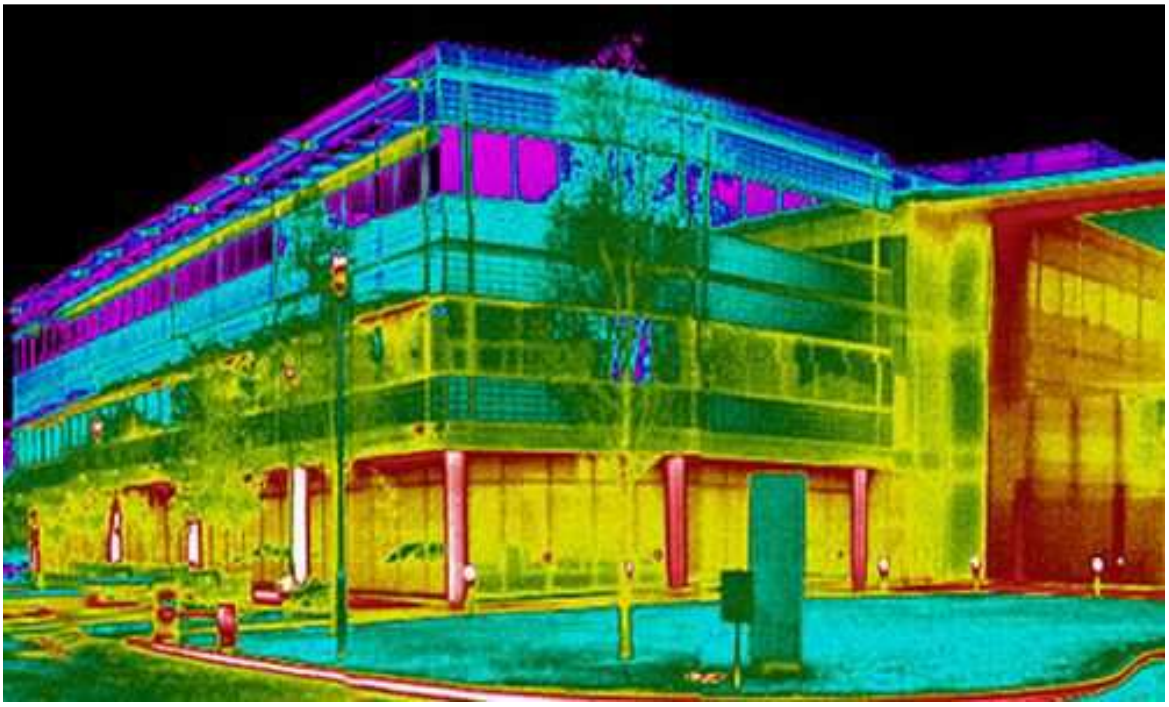
If two dissimilar objects are at the same temperature, a high E will "look" hotter to an IR imager than a low E, thus forming an image. Objects with different Temperatures and the right E's could "look" the same, thus forming NO image. Two objects with similar temperatures and similar emissivities will present an unclear, poorly defined image. Herein lies your IR strength.

Here are some Emissivity values for a few materials, all in percents, all plus/minus a point or

two. These are for short wavelength commercial imagers and may vary slightly for long wavelength/long range military/LE equipment. Military techies should have similar emissivity tables for your equipment.

Human skin: 97
Black vinyl electrical tape: 97
Surface sprayed with Dr. Scholl's aerosol foot powder: 96
Water: 95
Rubber, black, hard: 94
Glass, smooth: 94
Plywood, raw lumber: 90-95
Most painted surfaces (NON aluminum paint): 90-95
Aluminum based paints, depending on formula: 30-50
Oxidized (blued, parkerized) steel: around 90
Snow: 82-85
"Most" organics (vegetation): around 80
Cloth, untreated: around 80 (Cotton was a plant too)
BDU fabric, treated: ????????? Iwould like to know.
Sand: 76
Clay: 40
Gravel: 38
Aluminum, bare and "shiny" (read "spaceblanket"): under 10

Note the materials that cluster around 95, 80, 40, and 10



Now, to apply IR-101: In all of the scenarios below, remember that your body (or ANYTHING above absolute zero) emits IR in ALL directions. If there is a reflective object behind or beside you, it will pick up your IR and reflect it like you were a light bulb. Whichever situation and

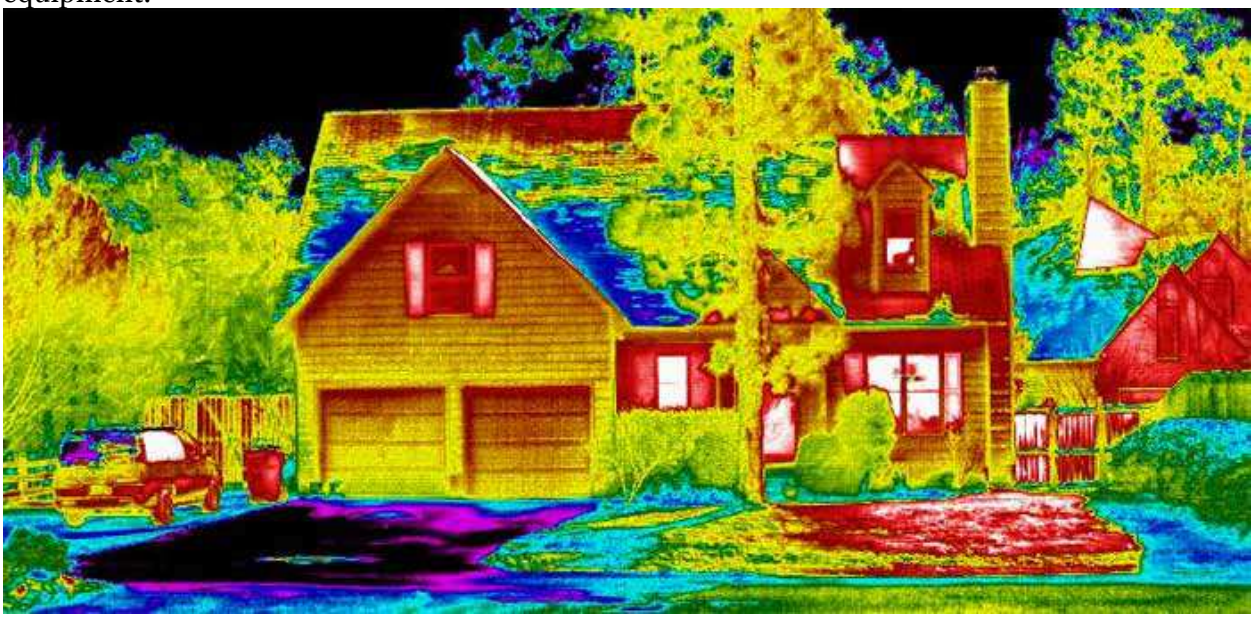
methods you use, if you have the opportunity, have an ally check you out from a flank with your best IR detection equipment. Or get the flyboys to check you out with FLIR's namesake. Do this by day AND night, as the sun will do weird (but predictable) things to the differential temps.

The BEST way to protect yourself from IR detection is get behind/under what is already there, and DON'T change the temperature of it. Since you obviously have to see and perhaps reach out, do so through the smallest portal(s) you can handle. Those "man-sized" targets detectable at 1100 yards are just that - man-sized - not the size of your nose and right eye. Remember that glass reflects some IR (100 - 94 = 6%), and the sky (space) is cold (approaching Absolute Zero), so if your scope is reflecting not sun, but sky, it will look COLD. If you have on a scope sunshade that is hot, the internal IR of the sunshade will reflect out as HOT.

I believe the GI Woodland BDU's are treated with an IR emittance reducer. If so, the "cloth" E figure in the table will change and you have to adjust for the following discussion. Or obtain untreated camo fabric or defeat that treatment (starch, I believe).

The IR reducing treatment makes sense for a situation where the woods is cooler than 98.6 F. I hope the Desert Daylight BDU's are NOT treated, but the nighttime anti-starlight smocks probably should be. If your BDU's image "cold" against hot sand, you are just as "seen". I trust the techies were aware of this, and have specified correctly. But you need to confirm by looking through your equipment at your buddy against some typical backgrounds.

It has been reported that "fresh" BDU's do indeed have an IR treatment that fatigues (pun) with laundering in "brightener" detergents. As a hunter, I am aware of the UV problem with animals with good night vision (is it an overabundance of rods, or cones, in the eye?) and there are detergents available via sporting goods stores that do not contain brighteners. If you need to maintain that BDU treatment, you might try that. But again, look at your buddies with your equipment.



Now, in sand or vegetation (E = 76-80): If you HAVE to have artificial cover for situations where your clothing will approximate the temperature of the surroundings, you want to expose

matching temperature "stuff" with a similar E (around 80). Cover as much of your skin (97) as possible with cloth (80) (remember that I don't know the E for treated BDU's). But also remember that sweaty cloth in a hot, dry background might look cold due to evaporative cooling. If you are in a hot dry situation, a tented, solid (not net), dry camo fabric applied as a screen might do the trick for IR. (Remember, same T, similar E). Visual is another problem. Keep the outlines irregular for both IR and visual. Square stuff in a curvy world stands out, no matter the technology. Fresh local vegetation in front of the screen will help both.

Camo face paint is PROBABLY a high emitter, similar to regular paints (90-95), and sweat (water-95) is for sure. You really have to keep that face behind something. I don't know what a synthetic ski mask would have for an E, but I bet it is below 97. A plain old cotton tee shirt mask would work, but remember the wet/dry/cooling problem.

Black ANYTHING is a good emitter. Blackened steel barrels, synthetic stocks, and painted surfaces (all E's in the 90's) should be cloth wrapped for IR and visual both. Black SWAT uniforms probably have a higher E than camo. You need to test.

Dry rubber boot soles (94) are nearly as hot as your face - sock 'em (80).

Old cut local vegetation will be drier, thus HOTTER due to lack of evaporation.

The name of this game is to keep both the Emissivity and the Temperature of the screen and clothing the same as that of the surroundings and keep those portals small.

If you are on bare clay or gravel (38-40) and are worried about aerial observation, dig in. Cover

yourself with almost anything sufficiently rigid and then cover it with at least a thin but full layer of the local "dirt". This will match the E's. Once the moisture of the new cover layer equals the moisture of the surface around you (evaporative cooling), you will be in decent shape IR wise. Remember that these low E materials have a high Reflectivity, so block your own IR from getting out from under the cover.

If there is a chance your body heat will affect the top surface of the dirt cover, use insulating material between you and the bottom of the "roof" to keep it the same temp as the ground around you. Foam board or sleeping bags will do that.

The most critical times of day for this hide would be as the sun changes, because rapid heating/cooling of a thin layer of dirt will show up compared to the slower heating/cooling of the intact soil masses. If you can set up in a shaded spot where this will not occur, you should be in decent shape. If there is no shade, make the cover layer thick to create a heat sink approaching that of the surroundings.

If there is no threat of aerial observation, and it is only a frontal threat, a "wall" of local dirt with small portals would be the best bet.

Any new foxhole will print either hot or cold depending on the season and surface temperature, even if the surrounding soil is bare. The deeper soil temp is probably closer to 55 F than the surface.

On snow (82-85), build a snow fort or tunnel in and make small portals. Try to dust loose snow to duplicate surface texture. Pray for new snow. If you wore an aluminized face shield behind

that snow fort, it would reflect the "cold" off of the fort, and cover your hot face. This might be a shiny side application of the space blanket, and could be worth testing. Water (95) is your breath when it condenses. And it is warmer than the snow. Only thing I can think of to do here is breath through a ski mask and let it condense before it fogs up over your screen.

As to **"space blanket"** applications: there might be some, BUT. If you are using the shiny side toward you to keep your IR from getting out, remember that the backside of it is probably not a good E match to the surroundings and it will heat/cool a lot differently than most natural things around you.

If you are trying to put the shiny side out angled down to reflect the IR of
the terrain right in front of you, there would be a 10% reduction in the reflection, more if it casts a shadow. If the shiny side is out and up, it will reflect the cold of outer space (or the heat of the sun) - and it is going to look REALLY weird to visual and starlight in EITHER case! I cannot think of a space blanket application that I would stake MY life on.

In an urban situation, you will have lots of "normal" IR blockers to get under/behind. Just remember that you are an IR light bulb on the cold surfaces behind you. You cannot casually set up back in the room shadows of a windowless building anymore. Remember, glass will NOT pass through (transmit) your IR image. BUT, glass (94) has a high emissivity and will show its surface temperature rather well. If you are near the window
warming it with your breath, you will reveal yourself.

If you had a small barrel portal through an otherwise intact glass window, you would be IR blocked, but visually seen. A loose pane of glass back in the room shadows might be a possibility, especially for a spotter. If the room is painted (90-95) and warm (approaching 98.6 F), you might blend in IR wise. But if there is one

warm window/room in an "empty" building, something is amiss. The painted walls behind you might not reflect your IR really well, but a metallic light fixture might blink every time you turn your face toward it. The best I can imagine is forget about the "room" and get behind/under something that should be there - sofas, chairs, drapes, etc. and keep your portal small.

None of the above CONCEALMENT strategies are easy; none are guaranteed to make you disappear to an imager. But they will all help make you a less vivid IR image, thus less detectable. IR imagers may or may not have an adjustment to key in the emissivity for scanning and reading temperatures. I doubt military/LE targeting devices would have that - you don't care what the actual temp is, you just want to see a picture. Military/LEO devices probably have a temperature range adjustment to scale up/down according to environment. They probably have an adjustment to set the sensitivity - the difference in perceived T to go from black to white (dark green to light green; whatever).If this is finely tuned, it is like upping the contrast on your monitor.

There is one comforting thing to consider: unless you are in the desert, there are a lot of different "things" around you, each of them with a slightly different Temperature and Emittance combination. If you can make yourself "nearly" match the most common IR surroundings and the sensitivity is set very high in order to pick up your small T/E difference, the other guy is seeing a lot more clutter around you, so your image will be just one spot on the Dalmatian.

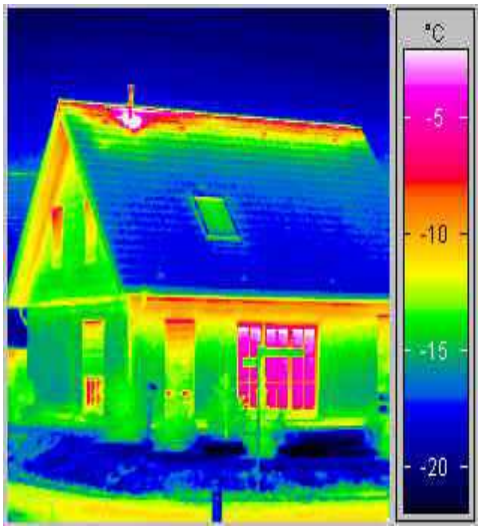
For the Ghillie fans: A man sized wad of only burlap and jute rope at 98.6 F plus or minus a few degrees will have the same E all over it. But if there was some leafage from an IR blocking camo net on one shoulder and a splotch of shredded BDU's at the waist and some foreign force camo material shredded in there somewhere in a cluster, all well supplemented with local veggies, from an IR standpoint it would look like a pile of dissimilar "stuff".

If you have gotten this far, perhaps a little DECEPTION is in order to up your advantage.

Remember that "Sarge WILL find something during an inspection, so ya might as well give him something so he will stop looking." If you want to determine if indeed IR detectors are out there, you might want to give them a cowboy hat to shoot at. I don't know what the E of a bare GI plastic canteen is, but if you either wrapped it with Scotch 33 electrical tape (97) from a demo/como kit or sprayed it with foot powder (96) from your ruck, and had 98 degree water (coffee? Body heat?) in it,it would make a darned good human face (97) to a distant IR imager. Topped with a BDU hat and moved about on a stick behind some intentionally inadequate screening after dark (by somebody else behind that cowboy's large rock), I suspect you would soon know the targeting capabilities of the opposition - and also acquire a muzzle flash. A piece of most anything warmer than the terrain drug remotely through the grass at night should get IR attention. Just don't pull it all the way to your position. But you

get the idea.

If you want to just give him/them something to worry about, scatter some old tire shreds (94) around at points distant from your position. They will look hotter than most surroundings when they are actually the same temperature. Plus, they will heat up more during sunlight, and hold their temperature for quite a while into dusk. If you can make them move a bit, so much the better. If they are behind intentionally poor screens, thus not visually or starlight identifiable, so much the better. This would be a great application for decoys specially made for the purpose - a visually camo'd, high E lollipop on a spindly, flexible stick.



One of the new IR illumination chemlights would do something, but I have no experience with them. I suspect one of them tripped off in front of or to the side of your position, yourself in a shadow from it, would blind any thermal imagers looking at you - like a trip flare would blind a starlight. Obviously this would be a defensive action.

There have been some pretty impressive demonstrations of the capabilities of IR equipment. And it is indeed impressive stuff, but it ain't magic. It can image warm footprints on a cold roof, or a "ghost" where you leaned against a cold wall and walked away. But those images fade pretty quickly - faster than the grass will spring back up on your trail to a nest.

I believe that if one person takes the time to study and understand the theory of IR systems and applies it to likely circumstances in his world and does it better than the other guy does, the first guy has an EXCELLENT chance of being the winner. That is true for sniping or bidding on a roof inspection. Even an unfavorable tilt in sophistication of equipment may be overcome with intelligent application of ingenuity. And it won't take a lot of formal training. After that, it is experience behind an imager. In your case, looking at your buddies in drill hides, and correcting each other's errors. I grant you that my "thermacam" is not a military targeting device, but if your life is professionally depending on IR avoidance, I hope you have access to IR theory training and support along with the opportunity to drill with your own imagers.

If you may be exposed to a "new" technology, you just have to learn it and apply it. Like you did for visual and starlight. In fact, most of those old rules apply to IR: Irregular outlines. fresh vegetation. local materials. etc. The only real new rule is "Similar E - Similar T". Now, get with

some equipment and TRAIN, DRILL,
EXAMINE, Train, Drill, Examine, train, drill, examine.....

Evading the Thermal Imagers on the Drones

Here is a video I did on how to be unseen from the peering eyes of the Drones. It is a lesson on being undetectable by thermal imagers.

[link to www.youtube.com (secure)]

What exactly am I supposed to be hiding from? I just don't think I'm gonna be that interesting or wanted for anything by a drone or it's operator. I just barely have any interest in what I'm doing on a daily basis let alone be that interesting to a drone. You all must be top SHTF preppers and survivalist that are on a bunch of alphabet agencies hit lists. Have fun crawling around in the mud, brush and snow anyway.

I watched your video with great interest, since I'm always looking for great new ideas which are also relatively inexpensive and easy to construct for someone who is NOT very technically gifted or "craft-y" (i.e., ME!!).

I could envision your "layers" idea as very logical, although it seems that if it were to be a form-fitting garment it would be difficult to freely move around. Kind of like wearing a snowsuit.

But something on the order of a poncho/blanket/cloak (with a snap-on hood to cover your head) might be a very useful item. You could use a regular blanket on the inner layer, a space blanket in the middle, and camo-patterned material for the outside.

Being practical, I wonder how that space-blanket center would hold up in the washing machine?!

Bottom line is space blankets will defeat thermal but they show up badly in regular imaging so you need to cover it with a layer of camouflage. I think a poncho would be the best solution as it can cover you in any situation. Lacking camo find a depression in the ground, cover yourself with a thin layer of leaves then put a space blanket on top and finally cover that with leaves and woodland debris.

Any direct contact with the space blanket will transfer your body heat through so you must have a layer between you and the blanket. Infrared is another thing to think about so you may want to wash your camo poncho in IR wash available at sporting goods stores.

never heard of ir wash what stores carry it?

The wash can be picked up at most any place that carries hunting supplies - from Walmart to the specialty stores. It's relatively inexpensive.

You can also do some searching around the 'net, and there are also other means to wash with that will assist as well - as the store-bought product(s) will surely run out at some point.

It's not IR wash. It's UV wash. The premiss is that animals such as dear can detect or see in the ultraviolet wave length. There is no such thing as infrared wash.

1. light a big fire

2. laugh as their thermal imagers are overwhelmed by heat

if a drone can pick up warm bodies in a house, how about using the foil used for insulating attics, comes in rolls.

if a drone can pick up warm bodies in a house, how about using the foil used for insulating attics, comes in rolls.

a layer of that in the attic would do the trick, right?

or the foil can be used for shelters etc?

Thermal cannot see "IN" a house. They can only see the surface temp. For instance, if you were in a box thermal could not see inside. However, if your body temp heated up the box the box would then appear to the thermal imager as warmer than the surrounding environment. If you put tinfoil on the inside of the box it would radiate your body heat back towards you, raising the temp of the inside of the box. But because nothing is 100% reflective some of the heat would eventually leach through the tin foil and heat up the box.

BTW, that is exactly why you find reflective materials in insulation for your house.

I own a thermal imaging device and have tried to defeat it it pointless anything tat seems wo work is signifigantly degraded over time as heat works its way through whatever seems like a good idea.

the thing that really gets you detected is your breathing it looks like a great plume of heat and trails behind you like a scarf. you cant hide if if any part of you is in the detectors field of veiw you done unless you are behind a tree or a rock but then youre stuck there if you move its over. And from above well.....

no i dont know who will "benefit" but i do know its time better spent polishing other skills because you cant hide and be effective

Myth Busters did this too. They found that using painters plastic (the plastic sheeting you lay on the floor before you paint) blocks your thermal output. However after 10minutes it "leaks" heat.

BUSTED!

Bottom line is space blankets will defeat thermal but they show up badly in regular imaging so you need to cover it with a layer of camouflage. I think a poncho would be the best solution as it can cover you in any situation. Lacking camo find a depression in the ground, cover yourself with a thin layer of leaves then put a space blanket on top and finally cover that with leaves and woodland debris.

Any direct contact with the space blanket will transfer your body heat through so you must have a layer between you and the blanket. Infrared is another thing to think about so you may want to wash your camo poncho in IR wash available at sporting goods stores.

How do you take a practical approach to evading drones? As you pointed out, a "thermal drone-proof" suit is practically impractical. Do other governments/agencies have mechanisms to avoid thermal cameras?

The SAS have a ghille suit although I don't know much about it and BAE systems have developed an active "camouflage" for tanks that is basically a big thermal TV screen. They can make tanks look like a number of things, cars, the background. There is a video on this:

Thanks for the support. First, I guess yes, I am a "prepper". I can thank my day job for helping to develop in me a very useful skill. I spend my days developing plans to secure assets against threats. It has developed in me an ability to take a look at a situation, any situation, and detect, then delay or eliminate threats. If you decide to protect an asset, whether it be a person or property, first you have to identify a threat. Then you can only delay or eliminate a threat. For instance, if you have a valuable in your home and someone comes to your door. First you have to identify them as a friend or foe. Obviously, a friend you may let enter. If you identify the target as an enemy, you can lock your door and delay a would be thief, or you can stand guard and shoot the thief (eliminate). This method of thinking is essential in a survival situation. My whole purpose in investing time in a youtube channel is to teach other like minded individuals how to think and react in survival situations. I hope I can convey in the videos this premise.

it's called a grow tent.you can buy them in hydroponic grow supply stores.it has built in Ir and other protections.I fig i'd use one to sleep in and take another, cut it up and sow it into a set of clothes to wear/or a hood and poncho type of setup...they range from 3x3 to over 10x10's...plenty of material to use....

The grow tent probably wont work. If it does it would be for a very short time. The outside fabric would heat pretty quickly. Remember, the mylar isn't 100% reflective. The idea behind two layers of mylar and insulation between is that the OUTSIDE layer of fabric has the best chance at being the closest to the ambient environment.

In a thermal cloak the heat EVENTUALLY has to go somewhere. My future tests will note just how long you will have in a thermal cloak. If a thermal cloak is effective enough your body would overheat before your signature would appear.

if you used the cloak to cover your body while laying on the ground you may also buy yourself some time as the ground itself would sink some of the heat. You would have to lay on the ground a really long time for your heat to leach far enough away to be detected.

guess you need to research grow tents more then,because 4 1k hps lights put off a ton of heat,yet it never leaks that heat out.it's not made of mylar..

Mud will not work. Your body will quickly heat up the mud to warmer than background temperature. That trick only works for Arnold and Sly.

space blanket covered in mylar, another space blanket, more mylar and then camo. something like that.]

glass works but it is too uniform and heats up easily, space blankets and aluminum foil alone work, but in visible light your as shiny and visible as, well, aluminum.

problem is how hot inside these layers would you become after 10 min. In southern region this heat exposure with these layers could end disastrously.

fire will be hotter than you even if you stand in front of the fire in relation to the observer you will show up as a cooler human shaped blob i own thermal and have tried that.

thermal cant "see through glass" ie a window

thermal cant see through solid objects unless your body heat migrates out through contact

try for dense overhead cover

your footprints can be tracked, the residual heat signature does'nt last long but depending on the senstivity of the device its doable

anything you touch will show your interaction with it unless you use a standoff device a stick, pliers, a rag, gloves ect. however if you interact with your standoff device long enough for your body temp to migrate to the working surface....

Modern military uniforms(the good ones) have TI defeating fabric.

Beat combination of nv. Flir, backdrop inconsistency algorithm and emf sweep sensor.....sadly most of you don't even know what I'm talking about.

About that hole in the ground thing. If you have watched a few of the AC-130 gun camera videos, in one of them a system operator using the FLIR notes to another the heat plume coming out of a tunnel entrance.

Get that? They were watching the heated air seeping out of the hole. That's how sensitive this gear is.

The upside of the thermal issue is it is expensive and not common yet for the unwashed to have. the liklihood of coming up against thermal in small. The main platform for thermal is airborne the odds of the device operator seeing you and identifing you as a threat is small. In broken overhead cover the image can be writted off as a deer or such. the odds of a weapons release is minimal think about it who wants to get known as the "Deer Hunter". Same goes for vehicle mounted except its little more problematic. dismounted blocking unit set up using the terrain, vehicles used to "herd"

Concentrate instead on solid patroling techniques, weapons proficiency, noise light disipline, vigilence, observational skills, land nav and actions at danger areas or on contact with bad guys. These will do more for you than worrying about a unatainable goal.

Great observation. That shows that the type of fabric used in the cloak is just as essential as covering the heat signature. The "glove" was nylon. The helmet cover is cordura. Both are "Multicam" to the eye but very different in thermal.

yea, nice helmet. the guy wearing it has to breath. his breath comes out of his body at a differtent temp than his surroundings either cooler or warmer both are visible as a color gradient. that is heat loss or signature throught convetion.

The other side to the TI/ IR coin is that you need to be aware and careful of creating an anomaly that would be seen as a "blank" spot.

"What is missing" can create just as much interest and attention as "What's out of place".

that can be handled by gluing/patching certain natural things that give of non human heat sigs...

In a thermal cloak the heat EVENTUALLY has to go somewhere. My future tests will note just how long you will have in a thermal cloak. If a thermal cloak is effective enough your body would overheat before your signature would appear.

If you used the cloak to cover your body while laying on the ground you may also buy yourself some time as the ground itself would sink some of the heat. You would have to lay on the ground a really long time for your heat to leach far enough away to be detected.

EVADING THERMAL IMAGING AND RADAR DETECTION

Covers:

Expedient equipment
Instructions for manufacture
If you are reading this while evading hostile forces, you have a problem. You may be aware of the techniques taking advantage of terrain, cover and darkness to evade hostiles, but you must also be aware of thermal imaging and night vision devices that will be utilized by enemy forces.

Modern night vision and thermal imaging devices detect energy in the infrared range such as heat and convert the detected energy to an image on the device's viewing screen. Hence the term, thermal imaging.

Because the human body radiates heat that is usually in excess of the temperature of it's surroundings, advanced versions of thermal imaging technology can effectively detect human thermal energy through woodland, fog, smoke and a variety of conditions. This technology also detects the heat emitted from car or truck engines.

Reducing a vehicle's thermal energy

As long as a vehicle's engine is running it will be detectable by a thermal imaging device. If you are mobile in a motorized vehicle and suspect that hostiles are conducting a search for your presence, you must find a source of water, shut down your engine and cool it down to ambient air temperatures by pouring sufficient amounts of water over it. Don't forget to cool down your exhaust system as well. When your vehicle's engine has been cooled to air temperature, camoflauge the vehicle under trees or brush to prevent detection by sight.

Your vehicle's engine, frame, and probably body are made of metal. As such, it will reflect radar signals emitted by satellites, J-STARS and other reconnaissance aircraft and ground troops.
To avoid detection by radar, magnetic tape found in audio and video cassettes may be obtained and mixed into automotive or other paint. The vehicle may then be painted with this mixture. This mixture has the effect of scattering radar energy, rendering a much smaller and less effective return signal. With a less effective return signal, your vehicle will not appear to be what it is to those searching for you, thus you will have a good chance of being overlooked.

Reducing human thermal energy

Beside your vehicle, you must also take steps to reduce your own thermal energy in an evasive situation. It is not possible for you to cool your body temperature down to ambient air temperature. Any attempt to do so will induce hypothermia and you may die

In summer months when air temperatures rise between 96 and 100+ degrees there is very little to no contrast between your body's temperature and it's surroundings. During these conditions you will be able to elude thermal imaging devices by camoflauging against detection by eye sight and traveling in the heat of day. Avoid shaded woodlands or areas where temperatures will be reduced and will provide a contrast between your body's heat and surrounding air temperatures.

To elude thermal imaging devices at night and in cooler weather, obtain a metalized "space" blanket and a wool blanket. Form a hood with the space blanket over your head and allow the rest of the material to drop over your back. Wrap the rest of the space blanket around to your front forming a poncho. Make certain the space blanket fits over your slung rifle and gear. Also make certain that a slit is formed in the front of your space blanket poncho to allow you to thrust your arms through for work or for firing your rifle.

Fasten the poncho at your throat with electrician's tape or duct tape if necessary. This will prevent over 80% of your body's heat from escaping into the environment and being detected.

To further reduce your heat signature, moisten the wool blanket and form it over the top of your space blanket in like manner as your space blanket. This will act as an evaporative cooler and quickly dissipate escaping body heat, thus further reducing your heat signature.
Heat signature can be further reduced by obtaining an extra space blanket and cutting it, utilizing the material to form socks, leggings or mittens. Also forming a veil over your face with your poncho will help to block a large avenue of heat escape from your facial area.

The above technique will reduce your heat signature so that you will appear to be nothing more than some mice or rabbits to an enemy observer. Crawling upon the ground, lying prone or curling into a ball will further confuse your heat signature to an observer. Should you hear or see the approach of a helicopter or other aircraft, or ground vehicles, it would be wise to incorporate such tactics in conjunction with the use of equipment described in this pamphlet.

Individual protection against radar

Your equipment, such as your rifle or space blanket, will reflect radar signals, making you detectable by enemy surveillance utilizing radar sources from satellites, J-STARS and reconnaissance aircraft and ground troops.

Radar detection by these sources is highly effective, as demonstrated in the first Gulf war.

To reduce radar signature, mix magnetic tape from audio or video cassette sources with fabric or carpenter's glue and brush liberally into your wool blanket. Wear the blanket with the magnetic tape on the inside of the blanket and over the space blanket, as before. Do not wet the blanket with the magnetic tape/glue mixture. That could tend to rapidly degrade the magnetic tape content.
As a further benefit, the space blanket also has the effect of providing protection against weapons utilizing micro-wave and electromagnetic technologies.

Use of equipment by Militia formations

For Militias to maneuver as units, personnel must utilize equipment like that described in this pamphlet to elude detection by thermal imaging and radar devices that will be used by enemy forces. Unit concentrations will attract enemy attention and will invite attack by superior forces. To avoid attacks and ambushes, unit commanders should inspect personnel's equipment to ensure that all personnel utilize thermal imaging negating equipment before operations.

In order to further reduce detection of unit sized maneuvers, it will also be necessary to spread formations out rather than to bunch up. While spread out in 2 or 3 man teams and all personnel utilizing the described equipment, a unit may appear to be a number of randomly spaced mice or rabbit sized animals foraging in the underbrush.

Much of the modern night vision devices also utilize light amplification technologies, so that it is always important to camouflage against detection by sight, as well as detection by infrared, heat and radar. This should be borne in mind when selecting your wool blanket. A poncho made in ghillie fashion with burlap strips would act in the same manner as the plain wool blanket and provide better camoflauge from sight. Brown or olive drab and green colors and at night, gray or a dark purple tend to hide an individual well.

The space blanket utilized alone without the wool blanket will hide your thermal energy well, but will appear to a night vision device to be a hole in the surrounding environment as the metalized material will not only reflect your body's heat back toward you, but is also cooler than the surrounding environment. It is best to use the space blanket with the wool blanket as the wool blanket will stay closer to your surrounding environment's temperature. A blanket of wool or other natural material will provide protection from thermal energy detection for a short period of time, but will eventually warm to the point of radiating more heat than the surrounding environment. Always use the space blanket and wool blanket in conjunction.

On cool, rainy or damp days it is not necessary to moisten your wool blanket. Moistening your wool blanket is best done on dry days when utilizing cover in woodlands and scrub brush. This will greatly negate the chance of being spotted by aircraft using FLIR technology. When in grasslands or more open areas, do not moisten your wool blanket. Allow it to reflect the same temperature as your surroundings, but utilize your space blanket underneath to hide your own body heat.

Wool was chosen as the material of choice for the outer blanket because as natural material it tends to reflect the same thermal energy as the surrounding environment and for it's practical, utilitarian purpose. Wool drys quickly when heated by your body and it's insulating and heat retaining factors are restored by your body's heat quickly, thus making a wool blanket a life saving piece of equipment when staying warm becomes a factor.

Used underneath the space blanket, the wool blanket can help to build back lost body temperature and warm an individual when desperately needed, making an extremely useful expedient sleeping bag. Other natural materials are not effective at this.

Always wear the side of your wool blanket that has been coated with your anti-radar detection magnetic tape/glue mixture inside against your space blanket. This will protect the layer of tape/glue from being rubbed off in brush and on the ground as you are evading detection.

You are NEVER completely invisible! ALWAYS use evasive techniques such as cover, concealment and camoflauge! Your night vision/radar negating equipment is only to help mask you from these devices. You are always detectable from sight, even at night.

Micro-wave weapons are being developed for crowd control that emitts micro-waves in a tight beam like a laser. This is used to burn the skin and damage the eyes of those targeted. Your space blanket will dissipate micro-wave beams away from your body, as long as you are not hit on an exposed area. It is the same principal as wrapping a potato in aluminum foil and placing it in a micro-wave oven.
Certain electromagnetic fields can influence the human brain.

Weapons are in development that create electromagnetic fields that induce a sence of apathy, depression, and a state of surrender in the human mind. Your space blanket is effective in negating such fields, as well; however; if you notice that such weapons are being deployed, it would be prudent to vacate the area, employ a faraday caged electromagnetic safe structure or ground your space blanket.

Would a survival blanket help a criminal to evade detection from a thermal camera?

I have a survival blanket that claims to reflect back 90% of my radiant body heat and I've always wondered:

If a criminal were to hide under a bush wrapped in a survival blanket would he be able to evade a police helicopter searching with a thermal imaging camera?

I think because wraping your self with a blanket defuses your heat or it traps heat inside the blanket. Meaning for a short period of time before your body heats up your blanket the blanket stays cold/ neutral avioding bieng semm by the camera. If you know what I mean. I think quilted would do better.

have a look at this - around 2,40 for the thermal image bit.

They were testing heat detectors used in burglar alarms so the test is not directly transferable to an ir camera like the police use.

And while mythbusters is one of my fav. shows they don't always use complete scientific method or maybe that part ends up on the cutting room floor.

It might help, but it might also draw attention by creating and abnormal hot or cold spot.

Yes to some degree. The army use similar techniques to avoid detection. Remember however that if the heat isn't getting out - your going to get hot.

A heat detector can be fooled by cooling the body down using a CO_2 fire extinguisher.

busted

Not only was the sensor not fooled, using a fire extinguisher on a person is dangerous.

A heat detector can be fooled by a neoprene diving suit.

busted

The neoprene suit did insulate body heat from its surroundings, until the suit itself warmed up.

A heat detector can be fooled by being covered in mud.

busted

Like the neoprene suit, it only worked until the mud warmed up from body heat. Also, Tory left behind mud tracks while attempting this.

A heat detector can be fooled by heating the room to body temperature.

busted

Heating the room from the ceiling immediately set off the sensor, while heating the room from the ground did not. However, the sensor was still sensitive enough to detect the difference between human body temperature and the ambient temperature.

A heat detector can be fooled by wearing a highly insulated fire proximity suit.

confirmed

The suit blocked the body heat, preventing the sensor from seeing the wearer. However a small breach in the suit triggered the sensor when pointed towards it.

A heat detector can be fooled by placing glass between the intruder and the sensor.

confirmed

Glass blocks out infrared light (i.e. heat).

An ultrasonic motion detector can be fooled by wearing thick-padded clothing.

busted

The sensor was still able to pick up Kari's movement.

An ultrasonic motion detector can be fooled by holding a bedsheet in front of you.

confirmed

The bedsheet absorbed enough of the ultrasonic waves to mitigate any return signals.

An ultrasonic motion detector can be fooled by moving extremely slowly.

confirmed

Although it took Kari 20 minutes to cross a relatively short hallway, she moved slow enough to stay below the detector's sampling threshold.

The anti-drone Hoody, Burqa and Off Pocket are available to purchase from our online store:

Anti-Drone Burqa – **PURCHASE HERE**

Anti-Drone Hoodie – **PURCHASE HERE**

Anti-Drone Scarf – **PURCHASE HERE**

Drone T – **PURCHASE HERE**

OFF Pocket – **PURCHASE HERE**

Building off previous work with CV Dazzle, camouflage from face detection, Privacy Mode continues to explore the aesthetics of privacy and the potential for fashion to challenge authoritarian surveillance. Presented by PRIMITIVE at TANK MAGAZINE HQ will be a suite of new designs, made in collaboration

with NYC fashion designer Johanna Bloomfield, that tackle some of the most pressing and sophisticated forms of surveillance today. Including:

The anti-drone hoodie and anti-drone scarf: garments designed to thwart thermal imaging, a technology used widely by UAVs.

The XX-shirt: a x-ray shielding print in the shape of a heart, that protects your heart from x-ray radiation

And the Off Pocket: an anti-phone accessory that allows you to instantly zero out your phone's signal

Accompanying each project will be videos and tests revealing the process behind each technology and counter technology.

NYPD testing scanners to reveal concealed guns

The technology, similar to infrared imaging, can detect a natural energy known as terahertz radiation

NEW YORK — New York City police say they are testing a new way to find concealed guns by using radiation scanners that can detect people carrying firearms.

NYPD Commissioner Raymond W. Kelly said the new technology can reveal a firearm concealed under clothing, the New York Daily News reported Wednesday.

The technology, similar to infrared imaging, can detect a natural energy known as terahertz radiation emitted by the human body, Kelly said during his State of the NYPD address Tuesday.

Because that energy cannot travel through metal, a concealed gun can be detected from the image captured by the detector, Kelly said.

"This technology has shown a great deal of promise as a way of detecting weapons without a physical search," he said.

The technology has been undergoing testing by the NYPD and the U.S. Department of Defense for the past three years.

The NYPD hopes to install the heat-seeking devices on police vehicles in the near future, Kelly said.

"We want to use new technology to protect the public and police officers from illegal guns," he said.

But civil libertarians say they worry the scanning devices will be unable to distinguish between a gun and other harmless metal objects such as an iPod.

If the technology only picks up only fuzzy images of possible guns, civil liberties lawyer Norman Siegel said, it could prompt police to make unwarranted stops.

"It will make an already aggressive policy of stop, question and frisk seem tame," he said.