



APPLICATION STORY



The thermal imaging camera is installed in a common auxiliary light housing that can be found at any motorcycle shop.



Thermal imaging makes night-time driving safer for motorcyclists

Installation of a FLIR Systems thermal imaging camera on a motorcycle.

Thermal imaging cameras produce a crisp image in the darkest of nights. It makes them excellent tools for a wide variety of applications. In recent years, thermal imaging cameras like the FLIR Systems PathFindIR are also being integrated in cars for driver vision enhancement. But what about motorcycles? Can the same technology be used to make driving at night safer for bickers as well? This article describes how a FLIR Systems thermal imaging camera was seamlessly installed on a BMW R1150 GS.

We can all agree that proper lighting is of the utmost importance. Ample lighting serves two primary purposes for motorcycles. To see the road ahead. And perhaps more important... to be seen by others sharing the road with you. But what if you could see a little further? What if you could see potential hazards your headlights don't illuminate?

Seeing what our eyes can not see

For over thirty years, FLIR Systems, has sought to help people see what our eyes can't. FLIR has taken what has been traditionally a military technology and promoted it into commercial markets. The technology is thermal imaging. Thermal imaging uses a complex camera technology to sense heat rather than light. The heat captured from the camera is then displayed in black & white on a monitor as a scale of intensity. Warm objects appear white and cooler objects appear black. The image is

abstract for the first minute or two, but before you know it you can understand what you are seeing, and quickly the benefits of this technology can be seen.

In recent years FLIR has developed thermal imaging cameras for aiding high-end automobile manufacturers to ensure their luxury car customers can see potential hazards before they become a danger. Thermal imaging cameras have become a safety device that has proven invaluable for use in an automobile. In select cars, the thermal camera resides on the front exterior of the vehicle and the imagery is displayed on a flat panel display inside the car. Drivers glance at the screen for a split second, much like looking in side or rear view mirrors, constantly scanning for potential hazards. It works!

The FLIR Systems PathFindIR has been especially

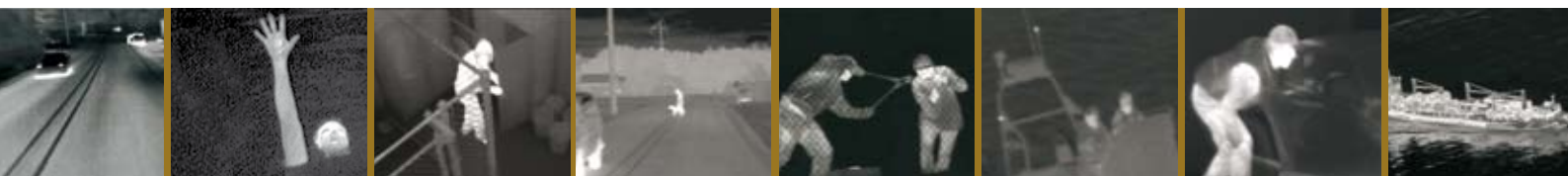
A FLIR Systems thermal imaging camera produces a crisp image in total darkness. The bump in the road is clearly visible on the thermal image but can not be seen with the naked eye.

developed for driver vision enhancement. The PathFindIR can not only be bought as an option on selected BMW models. Numerous cars, trucks, emergency vehicles, ... have been equipped with a PathFindIR thermal imaging camera as well.

The system allows the driver to quickly see pedestrians, animals, debris on the road, and to see further than their headlights allowing for greater reaction time to events down the road.

Installing a thermal imaging camera on a motorcycle

"Knowing how this technology has helped tens of thousands of automobile customers, and knowing sooner or later I would get caught out after dark again, I decided to adapt this technology to my BMW R 1150 GS.", says Darren Haley, motorcycle enthusiast.





The image from the FLIR Systems thermal imaging camera is being projected on a GPS with video input.

"The project started as an experiment to see if the benefits seen in the automotive market would be a benefit in the motorcycle market. From the beginning I was concerned that adding another visual device would be too much of a distraction. Let's face it; riding a motorcycle takes more concentration than driving a car or truck. I was skeptical."

"Once I was committed to the experiment I had to cross a few hurdles; like how to display the imagery; where to mount the thermal camera; and how to install it to my bike and still maintain good aesthetics. I started the experiment by using a common auxiliary light housing that can be found at motorcycle shops around the country. The housing design matched my secondary driving lights so I felt good strapping the extra housing onto the side of my bike and knowing it wasn't going to look out of place," continues Darren.

"I mounted the thermal camera inside the housing by replacing the inner bulb and light ballast. An infrared protective window was installed where the light bulb lens was. The window looks like a black opaque mirror to human eyes, but is completely see-through to the camera. This has a benefit that no one knows that a camera is inside; it just looks like a radar detector or another light of some kind." "At this point the camera was housed in a sealed enclosure protecting it from the elements; now

I had to figure out how to mount the system onto the bike. A little research over the internet and I found a mount that replaces the 1150 GS traditional turn signal arm with a rigid aluminum arm creating a perfect bracket for the camera. A quick installation in my garage and one set of hurdles crossed."

Displaying the images of the thermal imaging camera

"Coming at me quickly was the next hurdle; How to display the image. The thought of having both a GPS and a second screen to look at seemed illogical and redundant. Not only would it be more to pay attention to, but finding handlebar space and then running more wires for power didn't sound appealing. It took some searching, but I finally found a GPS with a video input. The screen is a 4.8" diagonal screen which provides usability in both GPS and Video-In modes. The display wasn't designed for a motorcycle or to be mounted outside a vehicle so it isn't ideal out-of-the-box, but has actually proven itself useful and hasn't broken down on me yet. Since the unit isn't weather proof, I do take it off the mount when parked outside in less than ideal conditions. This is something I hope to improve over time."

"Both the thermal imager and the GPS were integrated into the Beemer's electrical system using a secondary fuse box added by my local BMW shop. Also incorporated into the installation was an on/off switch for the camera to be able to turn the camera off when not needed. I had the installers do the final wiring to make sure I didn't route the wires in bad locations or short anything out. I am not sure the installers knew what they were installing until the end of the install. Once completed however, everyone at the shop took turns viewing the camera and installation."

Thermal imaging proves its worth on a motorcycle

"The system proved itself the very evening of the installation at my BMW shop. After talking with the guys at the shop until after dark, I had about an hour ride to get home. With my headlights on, my auxiliary lights powered up,

I set off. The benefits of the thermal camera rapidly became obvious. The first time was on the highway. I was able to see, and react, to debris in the road that I didn't see with my lights until I was right on it."

"Now I might have been able to swerve the bike just fine with only my lights, but this gave me a slight edge to start reacting before the debris came into my headlights field of view. Closer to home I have to take a two lane drive for a few miles. Oncoming headlights often make me squint as I focus on the road and I am forced to almost look head-on into the oncoming headlights. Since the thermal camera doesn't see visible light, it isn't affected by oncoming headlights. This was huge! I was able to do an extended glance at the display and see the road, the oncoming auto, and not feel blinded as I approached the oncoming traffic."

Thermal imaging: see clearly at night

In contrast with other technologies, such as 'night vision' using light amplification or near-infrared systems, thermal imaging needs no light whatsoever to produce an image. Thermal imaging provides full visibility irrespective of the prevailing light level and most weather conditions. It can see in total darkness, through light fog, through smoke and is able to see clearly into shadows. The contrast of hot objects, like people and animals, show up crisp and clear using a thermal camera; far better than other technologies.

Today the adaption of this technology into the motorcycle marketplace is only an experiment. Thermal Imaging has proven itself to be worthwhile in night time automobile driving. Those who have seen the technology in use have marveled at the potential safety benefits. And safety is what this experiment was all about.

"About three thousand miles have been put on my GS since the thermal camera was installed. It has taken part of the anxiety of night time riding away. The dangers are still there, but at least now I don't fear what my eyes can't see," concludes Darren.



With a thermal imaging camera, driving at night is less dangerous. You do not only have a clear view in total darkness but you will also not be blinded by on-coming traffic.

If you would like more information about FLIR Systems thermal imaging cameras please contact:

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