



THIS WEEK IN TRAINING

THE THERMAL IMAGING CAMERA

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Overview:

Today's technological advances have left their mark on the public like no generation before and the fire service is no exception. We have smart phones that can give us all the information we could possibly want, at our fingertips. In a hazmat incident, everything from chemical properties to wind direction and evacuation zones, Mobile Dispatch Terminals (MDT's) give us, really, anything we want it to regarding a given location. The S.C.B.A. tracking systems give the incident commander the ability to see where we are in burning building (when they work). The list goes on and on, some good, some bad, some will come and go, but the Thermal Imager (TIC) is definitely here to stay.

Benefits of Using the TIC

Years ago, usually you pulled up to a house fire and you had that nasty foul brown smoke pumping out of what ever opening it could find. Not only did you know you were going to have to go look for it, but it was also going to be Hiroshima hot and, you were well aware that if you did not find it quick enough, there was a good possibility it was going to find you.

Back then you usually arrived before it had a chance to flashover because the fuel the fire was consuming didn't have enough energy to heat the room to flashover temperature. Today, it's worse. You

HEY, YOU NEVER KNOW

We just don't get the fires these days like we used to. That's why it's so important to train as much as possible. Sometimes reading a ten minute article could save the life of a brother/sister firefighter...or even your own...

“Let no man's ghost say his training let him down”

could arrive to the same conditions as above, or you could arrive to nothing showing and have a blast furnace roaring inside. Either scenario is the same in that both are just waiting for the oxygen to get the fire churning again.

How many times has an engine company had to back out, unable to find the door to the basement stairs, or worse, taking too long to find it and now going down the chimney, to a well advanced fire? How many times have you crawled down the stairs to a smoke filled basement, unable to find the fire? Then it gets hotter and hotter because with the basement door now open you given the fire a flow path that it needs to grow. Now, with the TIC there is no more searching, exposing a gloved hand or an ear to see if you can feel which direction the heat is coming from. There is no more confusion or yelling at your people to “shut up” because you are trying listen for the crackling. With the TIC, the officer gets to the bottom of the stairs, does a scan around and finds the fire room or the seat of the fire within seconds.

Anyone who has used it, knows how easy is it to do a search in a burning building with the smoke removed by the TIC. What about Vent Enter Isolate and Search (VEIS)? It can be real nice to climb a ladder look in the window and know exactly where the door is, to go and close it. The value of the TIC to a truck company is immeasurable. Think about it, no more “zero visibility” Anywhere in and around the fire-ground (Fig 1.)

How about the obscure things we don't always think of? A few months ago we had a gas leak on Jericho Tpke., we used the TIC to get a visual on which way the gas cloud was going. The cold gas coming out of the ground was clearly visible against the background of the ambient outside



FIGURE 1: SIDE BY SIDE VIEW FOM EXTERIOR

temperature when using the TIC in color mode.

The engine officer has more than enough time to do a 360 jog around with it. You can see inside windows and doors and basically find the fire or at least get a general direction from which it is seated. **Click below for video:** <https://www.youtube.com/watch?v=cutZ5EEglbo>

Limitations

So we all know the benefits of having a TIC. We all know that every officer *should* bring the camera with them along with the officers tool and tool pouch. The problem is, like any other tool, if you don't use it properly it can either be ineffective or worse give a false sense of security. I can't tell you how many times I've seen someone walk into a house and the officer hands off the camera and tells someone to check the wall for heat. The firefighter then calls out

"It's cool its only 72 degrees..." The only thing that fire fighter did was check the surface temperature of that wall. Sheetrock is an incredible fire/heat stop. The TIC is not designed to see *through* a solid object. The temperature sensor should not be solely relied on to tell you how hot something is. We had a call at 450 Moreland Rd one Saturday morning. I was called in because the building had lost power and when crews arrived they had an electrical odor that dissipated before they left. They checked the switches and circuit panels with the camera and nothing was glowing with heat. They pointed the camera above the switches at the access panels as well and they were cool. When I arrived I took the one of the covers off above one of the switches and found that there were 3, two inch diameter electrical cables that had all arced apart and were still glowing hot. These were the main feeder cables for the entire building. Point is, the TIC can't see through anything solid. It will only give you the surface temp of that object to which you put the crosshairs on.



FIGURE 2: TIC'S ON LEFT SIDE SHOWING TWO DRASTICALLY DIFFERENT TEMPS. NOTE THE COLOR CHANGE IN THE BAYS HOWEVER

Do not rely on the temperature sensor alone, you must use the gradients of color as well as the temp sensor. In exterior wall test fire, run by UL, a thermal imaging camera was pointed at both the outside of the wall, which was on fire and was showing readings upwards of **1000F**. Another TIC was on the inside of the sheet rocked and spackled wall. The temperature sensor went up only 5 degrees and was reading **59F**. (Fig.2)

When using the TIC and entering a house, give a scan inside the front door floor to ceiling, the temperature gauge pointed at the floor will likely not be elevated, but what you want to look at/for is the changes in color at the seams where the floor and walls meet (Fig.3). Another trick is to hold it "Gangster Style", turn it sideways to get an image from floor to ceiling to see all of the seams. Look at the outlets because if there is a basement fire below you, the wiring will be heated and travel up to the outlet



FIGURE 3: PURPLE HOT SEAM

showing as “hot” on the TIC. The floor itself may not be elevated in temp/color at all. Especially if it is tile or hardwood, it can mask the roaring basement below you (Fig.4).

Conclusion

The TIC, like any other tool can be helpful in many ways, but if you don’t train with it, it may as well be a chock. Any firefighter can find themselves riding in the front seat, you need to know not only how to

turn it on, but more important than that, you need to know how to use it properly..

It should **ALWAYS** be carried up to the scene by the officer. The Incident Commander shouldn’t have to tell you to “bring in the camera”. Every member on the rig has specific tools they carry, the “can man” takes the can and a 6’ hook, the “nozzle man” gets the knob. The officer of the rig should carry the tool pouch, officers tool and **THE TIC!** Make it second nature and train with it. You’ll likely see it can do something new, every time you turn it on...

Thanks for reading,

Have a safe week!

Fire Marshal Digiose



**FIGURE 4: UPPER RIGHT THERMAL VIEW – COLD FLOOR
LOWER LEFT HEAVILY INVOLVED BASEMENT FIRE BELOW THE FLOOR**