TI TRAINING 2.0:
Maximizing Thermal Imaging Use in Your Department

BY **MANFRED KIHN**

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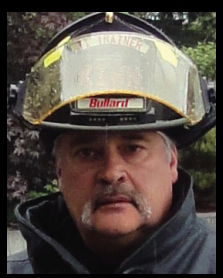

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Thermal Imaging for Recruits

During one of my recent training sessions, a question was posed to me about whether thermal imaging training should be delivered to recruits when they are going through their basic training. This is one part that I love about my job—getting to interact with fire departments from all over the world.

Every fire department operates differently based on its region; demographics; and whether it is full-time, composite, or volunteer. But, their training is pretty much the same when it comes to following National Fire Protection Association (NFPA) standards for the fire service.

So, out of curiosity, I posted this question on my social media pages to see what the comments would be, and I was surprised at the amount of support I received back.

RESPONSES

Following are some of the responses I received.

"I'm a little surprised this was a question; thermal imaging training has always been a part of recruit training I've been a part of."

"Totally agree. I don't think they're used enough in the fire service. Maybe if we teach the recruits to use them, they'll be used more often."

"Yes, it can be a very effective tool that makes firefighters more effective and improves safety."

"Agreed, they need to know the basics."

"Covered on recruit course and then incorporated into other ongoing training."

"Once a new recruit starts with any fire department, the learning curve is steep. Part of the curve is learning all the equipment in the hall and on all apparatus—including the thermal imager (TI). When they are on an incident, anyone can be in control of the TI, and even basic knowledge through the recruit process is better than none. This makes the department look more professional on the scene."

"Agreed! The basics of thermal imaging should be instilled early so when they are at the company officer level, it isn't such a giant leap of faith to learn these concepts."

"Well, this is mandatory in times like these. Thermal imaging should be treated as an essential skill like driving a car these days. We have already started implementing these."

"Somewhere in addition to increasing the three hours of fire behavior training in Firefighter 1. Yes! First year wildland firefighters have a better understanding of fire behavior than most structural folks of the same tenure. Thermal imaging training can only bolster this critical knowledge base as well as complement survival, search, and fire control skills."

As I stated above, I love the interaction with firefighters worldwide and value their opinions. So, where to deliver the thermal imaging program to recruits is a question.

POLICY OR GUIDELINE

If you follow NFPA 1408, *Standard for Training Fire Personnel in the Operation, Care, Use, and Maintenance of Thermal Imagers* (2020 ed.), here are some of the recommendations:

1. Firefighters learning about the basics of thermal imaging while using a Max Fire Box. *(Photos courtesy of Bullard.)*

Chapter 4, Fire Service Thermal Imager Training Policy and Procedures

- 4.1.1: A TI training program shall be implemented.
- 4.2.1: The [authority having jurisdiction] AHJ shall establish policies for TI training that meet the requirements of this standard.

Chapter 6, Student Prerequisites

- 6.1.1: Prior to being permitted to participate in the TI training program, students shall have received training to meet the JPRs for Firefighter 1 in NFPA 1001, *Standard for Firefighter Professional Qualifications*, or NFPA 1081, S*tandard for Fire Brigade Member Professional Qualifications*.
- 6.1.1.1: Students participating in TI training who have received the required training from other than the AHJ shall not be permitted to participate in any TI training without first presenting prior written evidence of having successfully completed the prescribed minimum training to the level specified in 6.1.1.
- 6.1.1.2: Students who have not yet met the full requirements of 6.1.1 shall be permitted to participate in cognitive-based TI training to obtain knowledge of basic TI technology and operation.

I had an opportunity to chat with a recent fire school graduate and asked him what was delivered regarding thermal imaging training. I was surprised at his response. The instructors had brought a TI to class and showed the students what a hand rubbed on the desk looked like and pointed the TI at a microwave—that was it!

2. Firefighters advancing their knowledge about thermal imaging during live fire training.

Yet, a friend of mine, who is a training officer with his fire department, says that they train them during the recruit program. They discuss TI operation and advantages and limitations and conduct hands-on practical training.

THOUGHT PROCESS

I am biased and a true believer in thermal imaging. It should be taught as outlined in Section 6.1.1.2 during basic training. This process would allow the mindset to be formed around the following:

- What is thermal imaging?
- How does a TI work?
- What about infrared energy?
- What about using a TI?

During the portion on fire behavior, thermal imaging should be introduced for students to get a better understanding of reading the heat, neutral plane, and flow paths, which are all parts of fire dynamics.

Thermal imaging training should also have been built into elements of structural firefighting training to enhance fire suppression skills, develop competent search techniques, and see it as a vital tool in fighting fires. Firefighters can then manage on the fireground should they be deployed with a TI or if it fails during an operation.

Recruits are far more likely to be proactive about using a TI in an operational sense because it will become part of their basic firefighting skill process. To leave this training until after they have left the training college would be a missed opportunity and likely create a segmentation in their skills and mental process on what to take to a fire. Trained correctly, recruits will be an active reminder to those who won't automatically think to bring a TI to a fire.

Recruits will still require the same length of training in thermal imaging as any firefighter. But in their case, it will be combined, both practical and theoretical, with much of their education and skill development in various fire and search technique instruction.

If recruits are taught thermal imaging in their basic training stages, they are better able to hit the ground running if they are tasked with using a TI once they graduate and receive their station and apparatus assignments.

How to Interpret Thermal Imaging

We have seen a distinct trend toward lower-cost, smaller, lighter, and more capable thermal imagers (TI) in the fire service.

Quick advancements in technology cause the cost of that technology to fall, converting what was once unattainable into something that is now widely attainable. With higher deployment of new TI across units comes responsibility. The benefit of owning a TI relies solely on the training and interpretation of the operator.

We know that TIs are designed to process emitted infrared "heat signatures" and convert that information to an LCD screen to be interpreted by the operator. The cost, brand, resolution, or complexity of operation of a TI cannot overcome the strengths or weaknesses of the firefighter's individual capability. A firefighter's ability to quickly recognize a heat signature as normal/abnormal and know the TI's reliance in all situations is the key factor to success.

Scenario 1: Atmospheric Attenuation

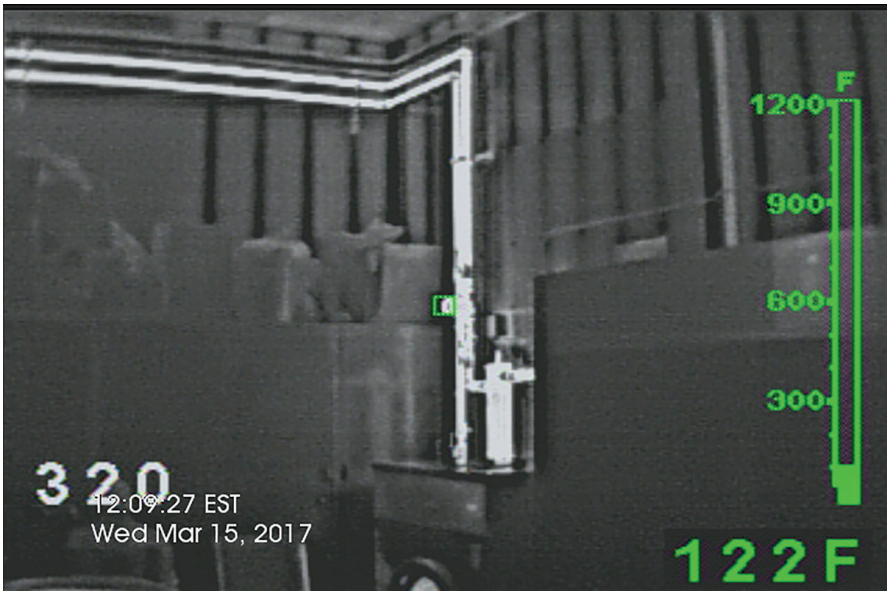
Recently, I talked with a captain who responded to a motor vehicle fire in a large underground parking garage. He experienced some perceived issues with the operation of the TI. They entered the structure, trying to determine the location of the vehicle, and were met with a wall of thick smoke. Using the TI was an added benefit until 13 of the structure's sprinkler heads were automatically activated. This caused a loss of vision with the TI. The captain's question to me was, Why did this happen? The answer is that the water particulate from the sprinkler system was dense enough to cause absorption of infrared energy from being detected or interpreted by the TI, rendering it ineffective for operation. The same effects can happen outside in heavy rain or snow or in extremely dense fog. This is called "Atmospheric Attenuation."

Manual search procedures then went into effect, as they were unable to locate a standpipe and air management became a major concern; additional firefighting resources were brought in to control fire extinguishment. In this event, they relied heavily on their TI but quickly learned to revert to traditional search techniques.

Scenario 2: Thermal Saturation

A response to a water treatment pumphouse that showed light smoke challenged firefighters in this scenario. On investigation, the source location was condensed to a small but complex concrete mechanical room located within the structure. When firefighters made entry, they were confronted with a multitude of electrical panels, general wiring, pumps, and motors—all operating in close quarters while generating heat. This scenario created an environment

1. A large underground parking garage, showing normal heat signatures from vehicles and overhead lights. (*Photos courtesy of Bullard.*)



2. Distinction of hot water pipes in a boiler room.

bordering "Thermal Saturation." This means that most or all the items in the field of view were close to or at the same temperature with little definition apparent on the TI screen.

Investigations in such an unusual environment are hampered since a mechanical room is an atypical comparison of multiple systems generating heat. This scenario is not a typical baseline process of locating an item that is obviously warmer than its surrounding objects. With additional investigation, the firefighters were able to isolate an overheated pump motor as the source of the light smoke, although it was obscured by numerous hot water pipes and valves.

Scenario 3: Normal Use Case

In another incident, involving an electrical odor, firefighters grabbed their TI to quickly ascertain an electrical panel malfunction, as the main breaker had melted behind the panel, filling the structure with a light haze. The firefighters were quickly able to access the situation by using the TI to see the drastic temperature variation between the molten breaker and the rest of the interior wall.

APPLICATIONS

These three "contrasting" examples are at opposite ends of the interpretation spectrum. We often speak of locating the seat of a fire, conducting primary search, or finding extension of a fire in an attic or a wall. Notice that these applications usually create a sharp contrast of solid surfaces on the TI display. In many circumstances, especially in the case of investigations, the signs and clues are subtle, making image interpretation anything but automatic. Departments may go out to purchase TIs, only to check that item off their loose equipment list and move on to the next procurement need. Never overlook the most essential element of TI use: training.

Once we move past the standard operating guidelines and explanation of technology and limitations, we fall into a black hole called applications. Every application is unique, and situations may be similar but appear vastly different on your TI display. There are a host of variables including the time of day, outside/inside temperatures, building materials, weather, access, and location. Small volunteer departments see everything larger fire departments do, just not as frequently. This puts many small and volunteer departments at a distinct on-the-job training disadvantage, as they are less likely to see the same situation twice. However, training cannot be overlooked for any variation or application.

The message is simple: Proper training with your TI develops a knowledge base of what is normal, so you can immediately recognize what is abnormal. Use your TI on calls that will help you develop greater familiarity with it. This includes car accidents and medical calls. Also, incorporate routine inspections of heaters, ballasts, freezers, stoves, furnaces, plumbing, lighting, and electrical panels. Prepare and use your TI in daytime and nighttime situations.

Environmental context and ambient temperatures can affect the speed and your ability to interpret what the TI is telling you. Understanding your TI will help you make an informed decision, enabling you to respond quickly and appropriately in the most critical situations.

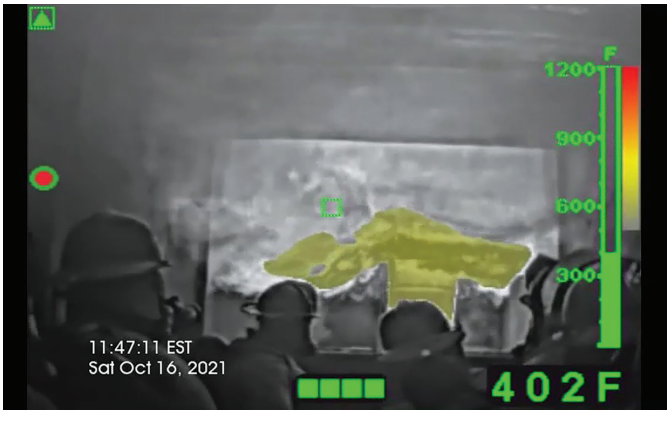
Can Thermal Imagers Help During a Flashover?

Flashovers are extremely dangerous and have claimed the lives of too many firefighters over the years. Many articles and training programs have been produced to help firefighters understand a flashover situation and how to escape safely. In a flashover, fire conditions progress rapidly from a hot fire to what becomes fire that is inescapable.

As an instructor, I have heard firefighters say that a thermal imager (TI) can help you during a flashover. This is not true. A TI is a tool to help detect a flashover, but it cannot help you if you are caught in one. Think about the amount of time, or lack of time, you have in a flashover. You only have a few second to get out of that situation and must move quickly. In this type of scenario, you don't have time to look at your TI.

A preflashover situation is where a TI can help. The TI can give you a visual indication of warning signs that you would otherwise not see. Without the use of a TI, the thick smoke acts as a visual barrier to what is going on above you. Convective velocity, thermal layering, and even rollovers are often hidden inside the smoke and are difficult or impossible to detect. The TI can help you visualize these events. The TI can help you identify how rapidly the fire gases are moving across the ceiling, indicating that the gases have some place to go other than the room you are in. Thermal layering is also visible to the TI. When any of these two visuals change (convective velocity slows or thermal layers descend), it can serve as an early indicator of potential flashover conditions.

The key part to staying safe when entering a burning building is to always have your TI with you to scan a room prior to entry. This is so important when avoiding a flashover. Scanning with your TI enables you to look for signs of excessive heat buildup, particularly near the ceiling, or levels of high heat closer to the floor where you might not otherwise expect it. The TI will also help you locate potential vertical or horizontal



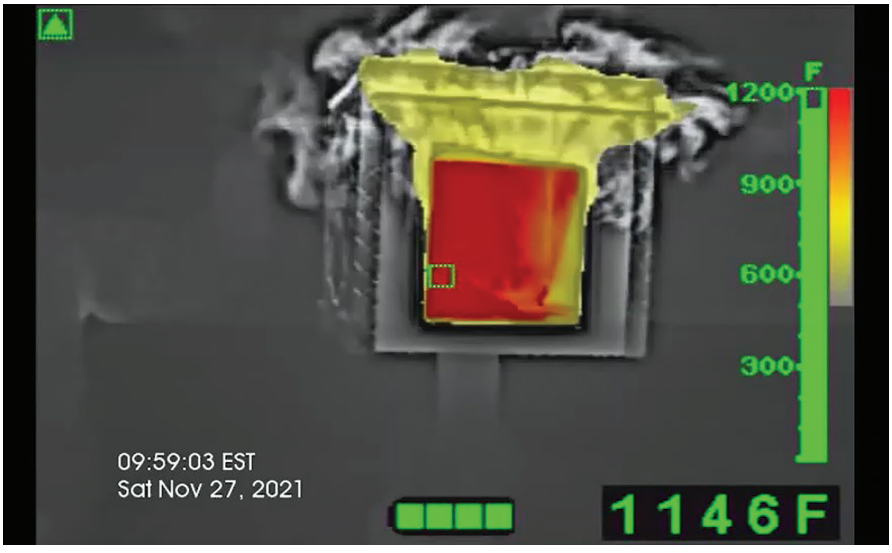
1. The importance of conducting flashover training to recognize the signs. *(Photos courtesy of Bullard; photos 3, 4 with permission from Max Fire Box.)* **2.** Recognizing the preflashover signs is important; this is "the calm before the storm."

vent points in case you need them and where the secondary means of egress are located. In a flashover situation, these tactics are lifesaving.

The TI is there to help you recognize the danger that you may encounter before it happens so you can avoid the danger and go home safely. Simply put, if you have no other means of control such as ventilation or a hose stream, you must get out quickly. If you wait until the flashover is taking place, it is too late for the TI to help you escape this extremely dangerous occurrence.

It is important to note that the temperature-sensing feature or Relative Heat Indicator (RHI), as it is often called on your TI, is not a reliable indicator of flashover or preflashover conditions. It cannot accurately detect the temperatures of gases, which is where the greatest threat usually lies in the growth stage of a fire. The TI is designed to detect surfaces, not gases. RHI is best used when evaluating the temperature differences in the same or similar materials. For instance, when performing overhaul, you might use the RHI feature to tell you what portion of drywall is hotter than another portion of drywall. When comparing like materials, the actual temperature displayed does not matter as much as the difference between the temperatures.

Fortunately, a flashover is not a routine occurrence but a culmination of successive, prior events that can lead to a potentially catastrophic outcome for firefighters. It is these preflashover events that you must be aware of. In the same way that you use a TI to size up a building prior to entry, you must constantly size up the interior conditions of a fire environment and be observant of change. Once you see the changes coming, you can find a path out of harm's way.



3. Understanding fire behavior. **4.** A fully developed fire.

Many fire departments have training facilities that include flashover or live fire simulators. However, not all departments have that luxury. Training as a firefighter is paramount to understanding fire behavior, stages, and dangerous conditions. If training facilities are not available, there are training props available such as "wooden dollhouses" you can build, or you can use a Max Fire Box, which can enhance your department's knowledge of these conditions.

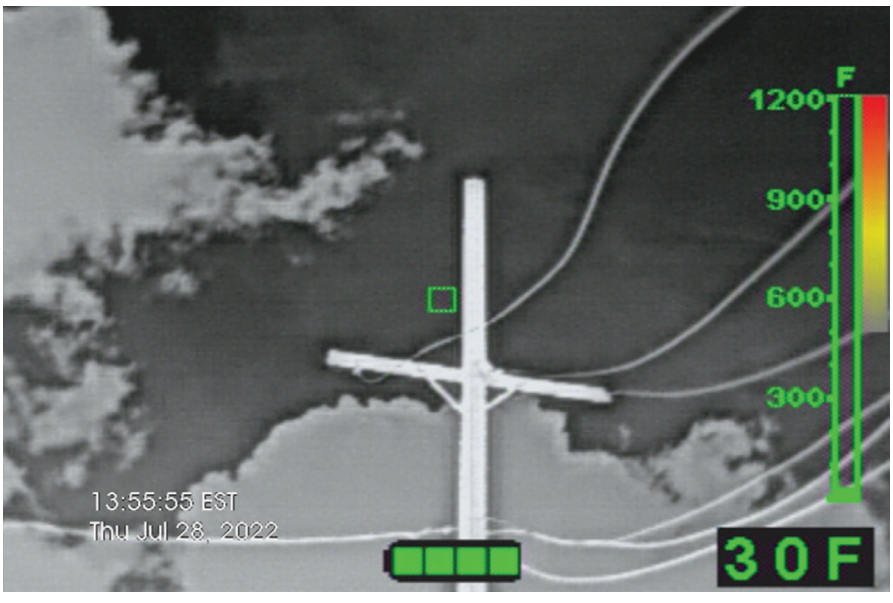
Elevating Thermal Imagers to the Next Level

The use of thermal imaging in the fire service continues to evolve as firefighters look to expand the technology to every aspect of firefighting.

We know how valuable the technology is for interior fire operations and direct fire suppression activities, but how can we apply this tool to help firefighters with aerial attack applications? A thermal imager (TI) can be extremely helpful to firefighters on the ladder crew. This group of firefighters is responsible for placing the apparatus in the right spot, opening vent holes, and positioning the master stream. The decisions made by the ladder crew are critical to attacking the fire aerially and on the ground.

Best Positioning of Apparatus in Multiple Scenarios

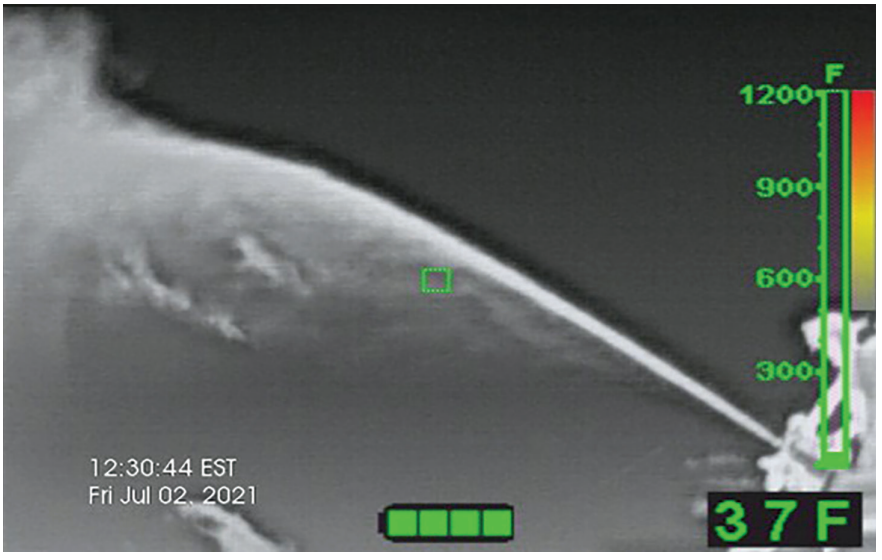
Placing the apparatus for attacking the fire from above depends on many factors, including the type of structure, building construction, obstructions overhead and on the ground, the size of the area needing to be contained, and access points. Knowing the best place to position the ladder truck is a critical one as this impacts hazards, scene coordination, and overall effectiveness. The greatest concern with apparatus placement is the presence and location of overhead electrical lines. Inadvertent contact with electrical lines can have catastrophic consequences for anyone on or touching the apparatus. During a nighttime fire, power lines can be difficult to see. Add inclement weather, and it can be even harder to determine where these lines are. This is where your TI is a valuable tool; it can help the truck operator determine the best placement of the apparatus to help with search and rescue, extrication, ventilation, and overhaul.



1. Energized power lines. *(Photos courtesy of Bullard.)*

Identifying Various Hazards

Aerial ladders are often used during high-rise fires. Add smoke and darkness to this scene with zero visibility, and it is nearly impossible to see the structure's upper windows and roof line for hidden dangers. Your TI can help identify electrical lines because electricity generates heat as it travels through the line, and the TI can identify heat, making the power lines easy to locate. Now, scan the scene using your TI to help locate problems such as electrical service wires, window-mounted air-conditioners, and a host of other hazards you need to avoid. The TI can also help detect people who are at the windows but obscured by smoke. Never use your TI to determine whether down lines are energized—just whether they are present.



2. Monitoring a deck gun flowing water.

Ventilation Tasks

You can use your TI to perform a variety of ventilation tasks—for example, to identify the warmest area of the roof. If you are in the bucket, be sure to scan the roof with the TI from your elevated position to identify the area of the roof where the heat is collecting or the warmest part of the roof. Now that you have scanned the roof area, you know where to start making your cuts. Remember, during the day, warm spots can easily be mistaken for higher temperatures under the roofing material.

Use your TI to scan the overall structure to monitor the effectiveness of vent operations. If you notice that one area of the roof is warmer than another and that location is supported by visible fire conditions, you may be able to move the ventilation hole to a more appropriate spot. Your TI can help you identify the most effective place for your ventilation hole.

Precision Aim and Effectiveness

Elevated master streams are used to send water down from above a fire in an upper floor. But how often have you seen the gallons of water streaming from a ladder pipe shooting over the top of the building, never hitting the fire? Use a TI for a more precise aim at the fire and a much better chance of suppressing it quickly and safely.

Heavy smoke conditions and darkness in general can impede the ability of the crew to place the stream where it is effective. Using a TI lets you direct the stream to its intended target. You can use the TI to place the stream with pinpoint accuracy and get the water exactly where it needs to go, with no more guessing involved. Operations will be quicker and more efficient while using less water. Be sure the TI is properly secured to the firefighter in a way that would not impede his movements while fighting the fire.

High Deployment of TI = Efficiency

Ideally, when fighting a structure fire that involves more than one ladder company, a TI is equipped on each apparatus. Ladder companies often split up on the fireground to simultaneously work together to fight the fire; having an apparatus without a TI is impacting the safety and efficiency of all the responding crews. Having multiple TIs on the apparatus lets the crews operate at a much higher efficiency level than if they only had one TI available.

A TI has many uses—not just for interior fire suppression. It is a valuable tool to firefighting crews on ladder companies, who benefit from the technology in a variety of situations. Ladder crews can perform their jobs safer, faster, and more efficiently with a TI.

Using Thermal Imaging in RIC Incidents

A rapid intervention crew or team (RIC/RIT)—two or more firefighters designated to perform firefighter rescue—is stationed outside the hazard and must be standing by throughout the incident.

The development, planning, training, and standby use of RICs has increased in recent years. Proper RIC planning and training includes determining what tools should be available to the RIC besides communications, air, extrication, lighting, and an obvious one being my opinion that the most important tool is the thermal imager (TI).

Key considerations for TI use during RIC deployment follow:

- Determine who will carry the TI and use it. While the most likely scenario is having the RIC officer use the TI, it is important to train within your RIC system to ensure that this approach is feasible and is the best option for your department.
- As with civilian search efforts, firefighters must look for key shapes to help them identify humans. For the RIC seeking a missing firefighter, three of the most likely visual identifiers are the self-contained breathing apparatus (SCBA) cylinder and face piece and the fire helmet.
- If the firefighter in need is completely covered by debris, the TI will probably not be as effective at locating him. The RIC will have to use traditional search techniques, possibly moving debris prior to searching an area. The TI will, however, still be helpful to the RIC in guiding its members more safely through the structure and helping them identify debris piles that require additional investigation.
- Protective clothing can absorb significantly more heat than civilian clothing, so the relative temperature of the firefighter in need could be much higher than temperatures normally encountered with civilian victims. A firefighter could appear as white or light gray on the TI display.
- TIs only return a semblance of sight to the RIC. There are limitations to a TI, so a firefighter in need still must rely on the basics for guiding the RIC to his position: give a "Mayday" on the radio with his location and situation, activate his PASS, make noise with a tool, and activate any hand lights available.
- To see if the firefighter is still breathing, check the SCBA tank and regulator for color. If black or dark, there is still air flowing;, if opposite in color, this is not a good indicator.

PRACTICE MAKES PERFECT

The TI can be an important tool for RIC operations. As I have emphasized before, proficiency demands regular use, and regular practice can help firefighters avoid overreliance. As with any other TI drill, it is important that firefighters know how to perform their required tasks with and without the aid of a TI to ensure solid skills. It is also important to conduct drills where the TI is "lost" at some point, verifying that firefighters can continue with their assignment even if they lose the TI.

During RIC drills, firefighters should train to look for key visual indicators of a down firefighter. By dressing a rescue dummy in firefighting gear or by having a firefighter wear his gear during the drill, TI users can practice looking for unique shapes. As with other searches, remember that shape is usually more important than the shade of gray seen on the TI's display. The SCBA tank and face piece and the fire helmet are unique shapes that clearly indicate a firefighter. A firefighter's bulky clothing, gloves, or boots also should be easy to identify with practice.

During drills, begin by ensuring the RIC will be able to see one of the obvious indicators of a firefighter

1. Five SCBA cylinders indicating different colors based on duration of use. (Photo courtesy of Bullard.)

down (SCBA cylinder and face piece and the fire helmet). As firefighters master this skill, start covering parts of the down firefighter to ensure that they can detect a down crew member if only his arms or boots are visible to the TI. These drills will emphasize the importance of shape in identifying a firefighter. As firefighters gain comfort in identifying forms and shapes, instructors can introduce drills that involve loss of the TI, forcing firefighters to rely on traditional search efforts.

KITCHEN TABLE TALK

Once standard operating guidelines (SOGs) have successfully incorporated the TI into RIC operations, spend 15 minutes at the kitchen table reviewing the applicable SOGs. Ensure that each member is familiar with the specific assignments, including who carries and uses the TI. If there is a separate TI SOG, review it as well to verify that members know operational procedures, battery change procedures, and emergency procedures in the event of equipment failure.

When determining your department's need for TIs as well as the placement of the TIs, do not forget the TI for the RIC. A properly deployed TI can help RICs move through structures faster and safer while also helping them find a firefighter in need more rapidly. Regular practice with and without the TI during RIC drills will ensure that your firefighters can operate under different conditions, even after possible equipment failure. By cultivating a high skill level with the TI, your RIC should succeed more quickly should it ever deploy at a real RIC incident.

Thermal Imager Applications on Roadway Responses

Thermal imaging has become a mainstream in the fire service, and potential uses for the technology are virtually unlimited if you think outside the box.

Many firefighters think of a thermal imager (TI) as a "firefighting tool" and immediately deploy it at incidents that involve charged hoselines and burning structures. However, a TI is an extremely versatile tool that has uses and potential applications at a number of emergency incidents. Anytime your eyes are not giving you all the information you want or as rapidly as needed, the TI may assist to make your efforts more successful and less time-consuming. There are also times where a TI can reveal information you never knew existed. Let's look at some of the "nonstructural" applications as we explore outdoor uses for TIs.

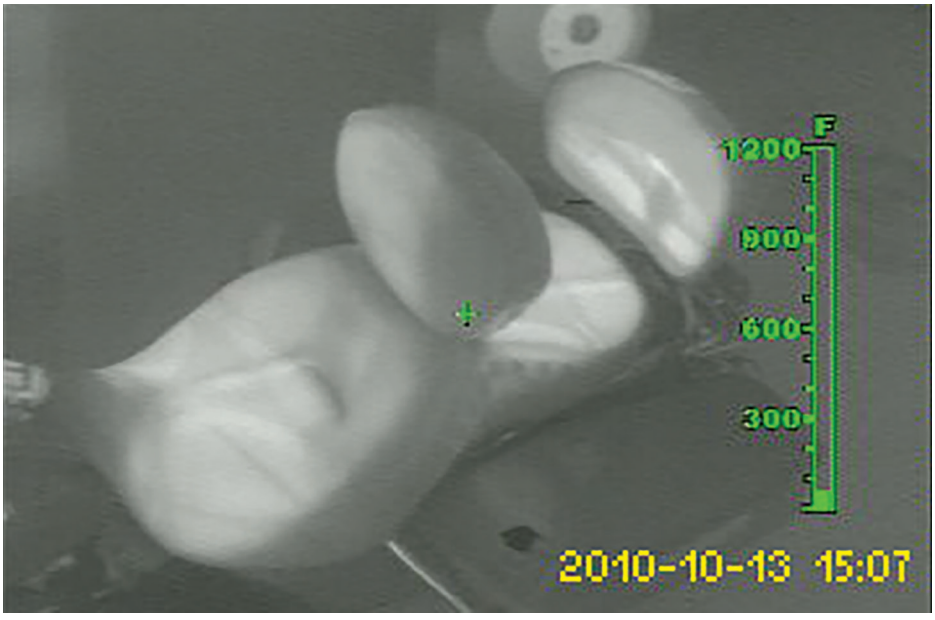
I have been fortunate to have the opportunity to travel throughout the country and around the world, working with all sizes of fire departments, and I have seen a broad range of levels of understanding about the limitations and applications for fire service TIs. It's always a good refresher to review some of the outdoor uses of TIs that, while obvious to some, may not be considered by others.

Motor Vehicle Incidents (MVIs)—victim accountability

There are dozens of nonfire applications for your TI. One example is MVIs. Determining how many occupants were in the vehicle immediately prior to the accident can help the incident commander determine the potential patient count. When using the TI to check for potential heat signatures in the automobile seats, remember, TIs cannot see through glass, so you must open or remove the window or door before you make the scan with the TI. Also, remember to scan multiple seats at the same time for comparative purposes. Your TI will show residual heat. Looking only at one seat, however, doesn't always tell you all the information. What you are looking for is contrasting heat signatures. This application is particularly useful when dealing with rollovers or overturned vehicles.

If you find a child seat either installed or ejected, be sure to check for indications of a thermal contrast that might suggest it was occupied at the time. Many of us have had to deal with the stress of locating a child seat at the scene of an accident and trying to determine if it was occupied. A scan with the TI can quickly reduce your anxiety level. A very common question I get from firefighters during training is, "How long will the thermal contrast remain after the person has left the seat?" The answer is simple: It depends. There are many conditions that play

1. The MVI victim found hiding in a tree. (Photos courtesy of Bullard.)



2. Heat signatures on both motorcycle rider seats.

a role in the contrast reduction over time, including ambient temperature, humidity, the seat and clothing materials involved, and the amount of time the person was in the seat. Vehicle seats are considered inanimate objects that primarily absorb and dissipate IR energy (heat) from active or direct emitters but, as a "rule of thumb," you can usually see some contrast for 20 to 30 minutes.

You can also use TIs to search around vehicles for ejected or walk-away victims. In a recent situation, the fire department was called to a car vs. tree accident. On arrival, responding crews located a severely damaged vehicle with air bag deployment and blood present on the air bag but could not locate a victim. They used the TI to look in the car and only the driver's seat showed an occupant's imprint. They performed a search of the area without locating any victims. On termination of the search effort, two firefighters were making their way back to the apparatus and using the TI for night vision purposes. As they approached the apparatus, they noticed an object in the branches of the tree immediately above the vehicle. This object turned out to be the driver, who was intoxicated and had warrants for his arrest; the only place he could find to hide was in the tree he had hit!

The same is true for motorcycle accidents. Because of the frequent high speeds of these accidents, victims can be thrown great distances or out of sight of first responders. The thermal contrast of the seats should be able to tell you how many victims you may be dealing with. Get your crews comfortable with scanning seats to determine precrash occupancy levels. It could save you some time on the scene and maybe even someone's life.

MVI—Fire

I remember a story about a local fire department responding to a wood chip truck fire. It was en route to the local pulp and paper mill when a fire developed inside the fully loaded 40-foot trailer, caused by an overheated wheel bearing. The driver was on the scene in a huge panic, but there was no option to dump the load onto the highway to save the truck body and chassis because of the location. The responding fire crew deployed the TI to assess the trailer and, with the use of a penetrating nozzle, the officer was able position the crew to enable them to punch holes through the side of the trailer into the hottest spots within the chip pile. This method of thinking and use of the TI saved countless hours of work, and the fire crew was able to save the truck body and majority of the trailer while still keeping the remaining load intact without having to dump it.

I have heard more than one fire department say that thermal imaging is probably the best innovation for the fire service since the self-contained breathing apparatus. By finding new uses for this technology, including the nonstructural ones, we can help reduce losses to life and property and keep our fellow firefighters safe!

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