

Thermal imaging cameras, also called infrared cameras, detect the heat given off by an object, product or person. The energy given off in the form of infrared radiation or IR is not visible to the naked eye, which is why a thermal imaging camera is an excellent tool for firefighters to determine the amount of energy (measured as heat in degrees Celsius) being given off by an object or contained within products of fire, such as pyrolysis gases. TICs record more accurate readings from darker non-reflective surfaces as these radiate more energy, whereas lighter coloured or reflective surfaces radiate less energy (even though both objects may be the same temperature). This demonstrates that TICs are a great tool, but not without their limitations, hence a multi-faceted approach to reading the fire is required.

The varied uses of a TIC include:

SIZE-UP of a structure fire

- Reading the heat signature of a room from outside the structure in order to determine the likely fire room
- Reading the heat signature of a door before making entry

FIRE ATTACK

- Determining the likely seat of a fire, ignitions in the overpressure region and heat signatures of internal doors before making entry into a compartment

SALVAGE and OVERHAUL

- Picking up 'hot spots' within concealed areas and reducing unnecessary exploratory damage

HAZMAT INCIDENTS

- Identifying fluid spills such as oil on a roadway
- Determining fluid levels in tanks and cylinders, such as LPG
- Identifying the source of gas and fluid leaks

SEARCH and RESCUE

- Use during SAR to search for and locate the heat signature of missing persons

RECONNAISSANCE

- Identifying hotspots from the air or on foot

MOPPING UP

- Identifying under surface hotspots from the air or on foot
- Reading heat signatures of smouldering logs and other possible ignition sources
- Identifying hot spots in the mulch fires

TICs have limitations

TICs should not be turned on in extreme heat environments as this will distort the image and give an inaccurate reading. Objects with a low emissivity (such as glass) will not give accurate readings due to their reflective nature. TIC users should make themselves familiar with these and other limitations and never rely solely on a TIC to develop your full appreciation of the incident.

A range of TIC accessories are available, such as retractable lanyards and neck straps. These tools allow the cameras to be carried and used easily, freeing the operator up to undertake other tasks. Attaching the retractable lanyard to a BA set should be done using karabiner on karabiner system, as this allows for easier detachment with a gloved hand.

Like any new technology that we haven't used before, it's easy to make this tool the focus of our actions, which can lead us to ignoring other fire behaviour indicators such as a rapidly lowering neutral plane (an indicator of possible imminent flashover) or creating tunnel vision by only using the images on the TIC as our visual indicator.

Training with a TIC will help make you comfortable with the tool and demonstrate some of its weaknesses as well, such as its inability to see through walls, read reflective surfaces and its limited depth perception.

If you have a TIC on your appliance, give consideration to where it's stowed and whether or not it's available as a first attack tool for your BA team. If you're not sure about the most suitable place to keep it, speak to your relevant local officer, so as to ensure consistency in approach.

Would you like to know more?

If you're a Village Firefighter instructor or a Breathing Apparatus Instructor and would like to know more about Thermal Imaging Cameras and their various uses, consider nominating for one of our instructor workshops (see the workshop information on pages 24 and 29). These workshops include a comprehensive hands-on TIC session. Then you can take your new found knowledge back to your district!



THERMAL IMAGING CAMERAS

By Matthew Reeves, Learning and Development Officer

Thermal Imaging Cameras, or TICs, as we often refer to them, are a great piece of equipment and are extremely useful in low visibility environments. Recently the NSW RFS purchased numerous TICs from the NSW RFS and Brigades Donations Fund and distributed them to districts around the state.

Some districts have had TICs in use for many years and would be more than familiar with their use in a structural fire environment. More recently, as the technology has improved, their use in many other environments, including bush fires, has also proven successful.



THERMAL IMAGING CAMERAS

see the unseen



IN THE NSW RFS THERMAL IMAGING CAMERAS CAN BE USED IN THE FOLLOWING SCENARIOS

DURING RECONNAISSANCE

Thermal imaging from fixed mount cameras on aircraft, provide information back to planners during bush fires. Identifying hot spots in rugged and in accessible terrain allows for ground crews to be inserted and to work these areas with aviation support. The accuracy of the information reduces the time it takes to detect and deal with dangerous hot spots and reduces the risk of re-ignition near containment lines.



FIGHTING STRUCTURE FIRES

Used in conjunction with your knowledge of fire behaviour a TIC can help you interpret the fire behaviour indicators and therefore make the best strategic and tactical decisions. From size-up (reading the heat signature of an external wall to detect the likely 'fire room' or estimating the height of the neutral plane prior to entry) to use during fire attack (detecting ignitions in the overpressure region or the seat of the fire) thermal imaging cameras are a great tool. Use during Search and Rescue, a TIC can be used to see through smoke and detect casualties.



ON THE FIREGROUND

A hand-held TIC can be used to identify hot spots that are not visible to the naked eye, such as smouldering tree roots or peat/mulch fires. At non-fire related incidents, a TIC can be used to identify the source of gas leaks, spot oil spills and to search for lost people in thick foliage and to estimate the fluid levels in tanks.



INFRARED IMAGE

In this image you can see the gray (cooler) shades of the firefighters sitting below the neutral plain and back from the seat of the fire. In front of them you can identify the seat of the fire and fire gases (red) the yellow perimeter identifies fire gases at a lower temperature than those nearer the seat of the fire and they trail off to a gray colour as the are cooled down by hose streams or heat dissipates from them.

KEY FEATURES

