

THERMAL IMAGING CAMERA: AN ESSENTIAL TOOL FOR FIREFIGHTERS

Experts from LEADER discuss the role TIC's have in firefighting and search and rescue operations

The thermal imaging camera (TIC) is a vital tool for any fire department. It detects infrared radiation from thermal energy emitted by a body, an object, a surface, or an area (heat waves invisible to the naked eye), records infrared radiation and transcribes this infrared radiation by displaying it on a screen so that the user can view this infrared radiation, analyse and interpret it. Thermal imaging cameras (TIC's) for firefighters produce an image of the intensity of the thermal radiation detected. Each colourisation mode has its own color palette. Thus, the same observed scene can produce a different image depending on the colorisation mode used.

Thermal imaging in firefighting

The firefighting thermal imaging camera is useful for firefighters in various situations. Firstly, it makes recognition and movement in a room invaded by smoke easier, this is essential when it is impossible to see with the naked eye. Secondly, it helps the rapid search/detection of the fire source or a smoldering fire. It can also identify dangerous elements that could threaten the safety of firefighters/rescuers, such as:

- Presence of gas cylinders
- Monitoring an overheating electrical circuit
- Identification at distance of the liquid level in a tank (fuel tanks, unloading of wagons or tanks, transport of hazardous materials, etc.) to collect the information necessary for the intervention
- Locate a hydrocarbon stain on the roadway following a road accident in the middle of the night

Furthermore, it can locate ventilation points, identify residual hot spots after a fire has been extinguished (chimney fire, etc.) that could cause a new start of fire, and help search for emergency fallback routes in a smoky environment.

Search and Rescue missions

In search and rescue missions, thermal imaging can identify/locate victims in difficult conditions. For example, when attending a scene that has a smoky atmosphere or requires firefighters to work in the dark. In these situations, a thermal imaging camera allows the rapid identification of unconscious victims who are difficult to spot with the naked eye due to the opaque smokes.

Road accidents and natural disasters

When attending a road accident, thermal cameras provide the ability to assess the number of passengers in a vehicle involved in an accident by visualising the heated seats by the person(s) and help to quickly identify road accident victims who have been thrown from a vehicle in the middle of the night by looking for the victim in the surrounding area. If a first responder is on the scene of a natural disaster, such as earthquakes, landslides or building collapses, a portable thermal imaging camera will give the ability to easily spot unconscious victims in the dark, where a standard search camera will show nothing on the screen.

Thermal cameras are also used by coast guards and rescuers when carrying out search





operations. In particular for looking for people overboard. The same can be said for high mountain rescue missions where crew are looking for victims of skiing accidents. The LEADER TIC Long Range thermal imaging cameras can help detect a victim up to 1000m away.

Choose the right thermal equipment

The choice of a thermal imager depends on the application for which it is intended. Ergonomics, compactness, size, resolution and sensitivity

of the sensor, the resistance of the camera and its battery to high temperatures are all vital. However, vision and temperature are also important criteria for the selection of a firefighting thermal imaging camera.

Vision is the first aspect to consider when using a thermal camera. Typically, human binocular vision is in the range of 120° horizontally and 105° vertically (45° up and 80° down). This vision will be reduced by wearing a breathing apparatus mask and will be further reduced with a thermal imaging camera.

As the use of the camera is most often done while wearing breathing apparatus, the attack team will therefore have to use "scanning" techniques in order to collect as much information as possible during this recognition phase.

The scan technique, whether done in strip, Z, X or 6-sided, must be done with rigor and repeated during the recognition phase, to allow the construction of a mental image of the progress. The combination of repeated scans and progressions without a camera will help to identify dangers. The LEADER TIC cameras have a



viewing angle that is among the highest on the market, 51° horizontally and 40° vertically, thus making it possible to scan an intervention area more quickly.

In terms of temperature, in the case of a "Firefighting" thermal imaging camera, a wide temperature range camera should be used in order to guarantee the reliability of the device, and especially the safety of firefighters. To avoid image saturation a camera equipped with a wide temperature range going beyond 1000°C (1832°F) will allow all the situations encountered to be analysed without risk of saturation (inability to discern the observed scene).

Indeed, when the maximum detection temperature of the camera is exceeded, the image is saturated and it is no longer possible to clearly see the contrasts on the camera screen, thus making it impossible to read or understand the situation. Depending on the temperature range, it will not be possible for the firefighter to analyse all the elements of the observed scene. A thermal camera with a temperature range of up to 450 or 500°C (842 to 932°F) will not be able to understand the triggering of a flash-over occurring between 600 and 650°C (1112 to 1202°F) or analyse the risk of collapse of a metal structure building.

Even for first responders, it is necessary to be equipped with a firefighting equipment that can warn them of a danger! LEADER has chosen to equip its portable thermal imaging cameras for firefighters with the widest temperature range on the market (from -40°C to + 1150°C) [-40 to + 2102°F] in order to give firefighters the opportunity to analyse all the situations encountered.

Understanding colour modes

The use of several color modes allows the user to analyse the observed scenes with greater precision in order to facilitate understanding (temperature level, smoke propagation, traffic

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axis, danger, etc.). This is why it is important to have the ability to change the colorization mode, in order to highlight other unseen elements. LEADER offers up to 5 colorizations modes on its LEADER TIC cameras: Fire, Search, Inverse, Cold and Multicolor. Each colorisation mode has its advantages, disadvantages and limitations. It

is therefore essential to know the specificities of each mode in order to choose the most suitable according to the situation encountered. This is why the training of the users is essential for a good understanding of the observed image.

The importance of training

As with any firefighting equipment, it is important that the firefighter is trained to properly use their thermal imaging camera. This knowledge will allow them to fully understand the situations encountered during interventions by integrating into their analysis the information obtained thanks to the thermal imaging camera.

Since training is too often forgotten, it turns out that many firefighters do not always appreciate the value of their thermal imaging cameras and are unable to use them properly. It is for this reason that thermal cameras are too often left in trucks and are therefore underused.

As you have clearly seen from the few examples given throughout this article, it is very important to be trained in the use of the firefighting thermal imaging camera, but it is also just as important to be trained in the interpretation of thermal images.

LEADER, manufacturer of thermal imaging cameras specifically designed for firefighting, assists all its customers in choosing the thermal imaging camera that best suits their needs and also trains them in the use of its firefighting equipment.

Wishing to join the firefighters and rescuers in a process of acquiring knowledge for the use of thermal cameras, LEADER also trains all its customers in the interpretation of thermal images so that they can use all the potential of this powerful equipment! Find info on LEADER website www.leader-group.company!