



3M Personal Safety Division

Advanced PPE's to manage Fire risks and Confined space working

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Type of Emergencies



Confined Space Entry solutions



Fire Emergency, Escape, Accountability



Current Solution



- SCBA to provide breathing air
- Independence to move around
- Buddy breathing to provide air to Fellow firefighter / Victim
- Handheld thermal imaging to find hot spots, search and rescue
- To assess the thermal activity



Situational Awareness

Outside a fire

See

Hear

Touch/Feel

Taste

Smell

Inside a fire

See (smoke & dark environment)

Hear (fire noise, sirens)

Touch/Feel (gloves & fire hose)

~~Taste~~ (mask prevents)

~~Smell~~ (mask prevents)



Use of Hands



Firefighters use their hands in almost all fire-fighting tasks;

- Search & Rescue
- Victim Extraction
- Forced Entry
- Creating escape point
- Communications

Hands are critical for firefighting, so manufacturers seek ways to “free-up” firefighter’s hands

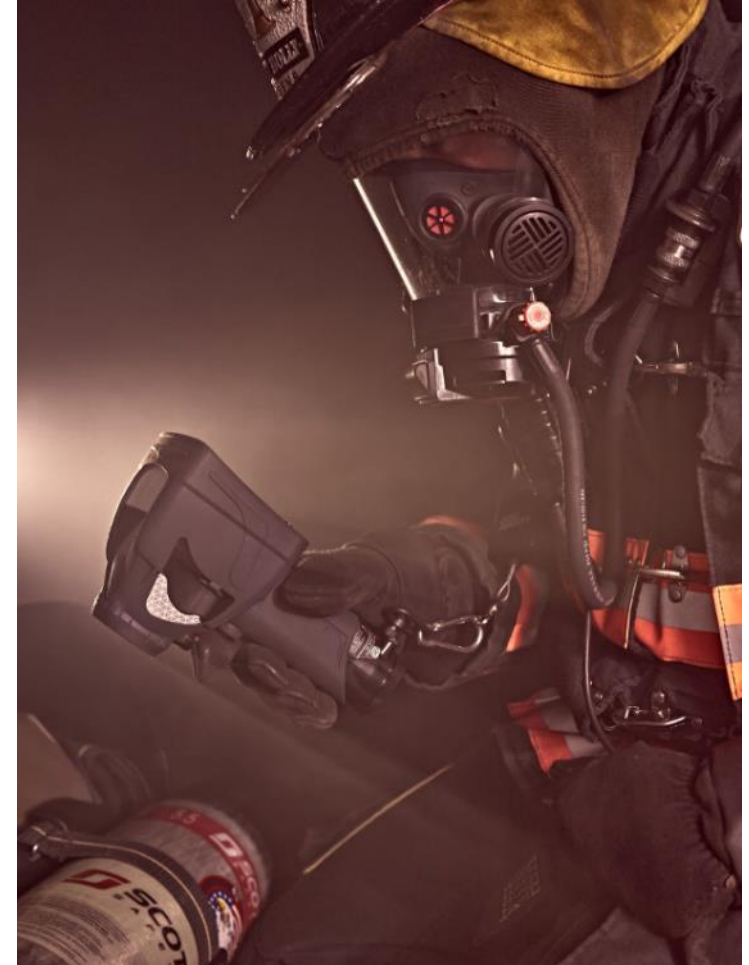


Restoring Vision

The traditional method to restore vision is to use a handheld thermal imager

- Handheld thermal imagers are effective, but they **restrict the use of one hand** when in use
- Usually **a tool has to be dropped** to use the handheld thermal imager

Key Point: Temporary vision is **restored but one hand is used to hold the camera**



Hands-Free Thermal Imaging is the solution

Allows fire fighters to:

- Use hand tools
- Always see in the dark or smoke

In-mask display (IMD)

- Thermally protected
- Unobstructed view

Always have it

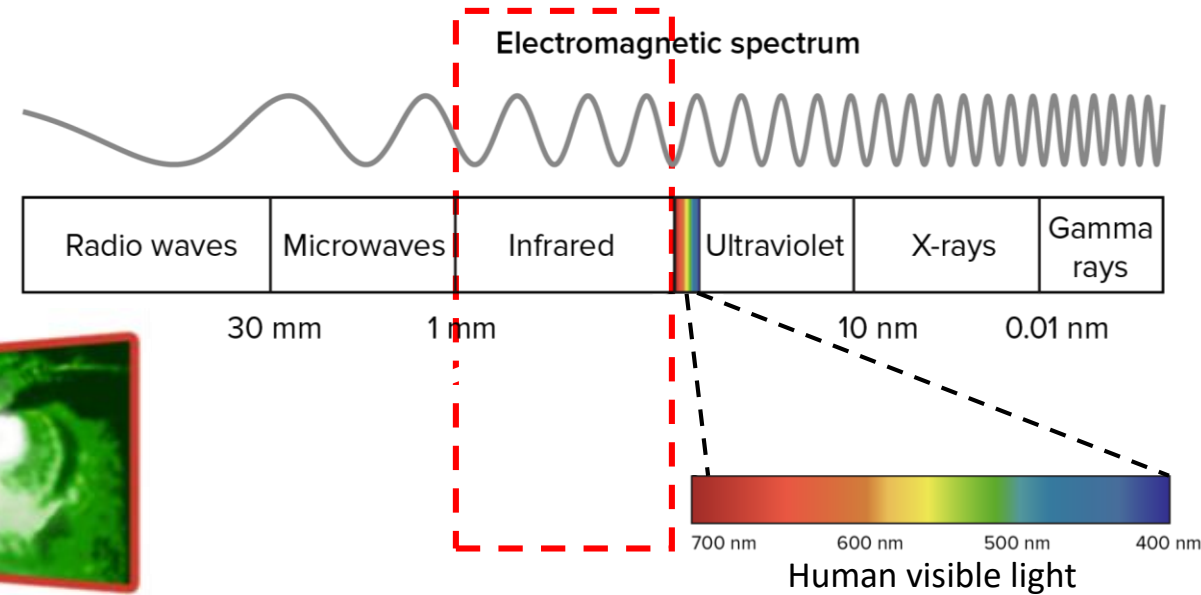
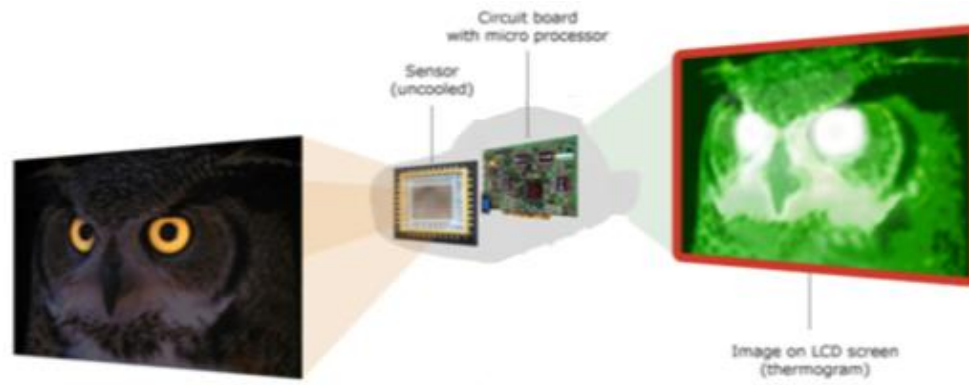
- Use it on the move
- Can't forget it in the truck

Every firefighter can afford one



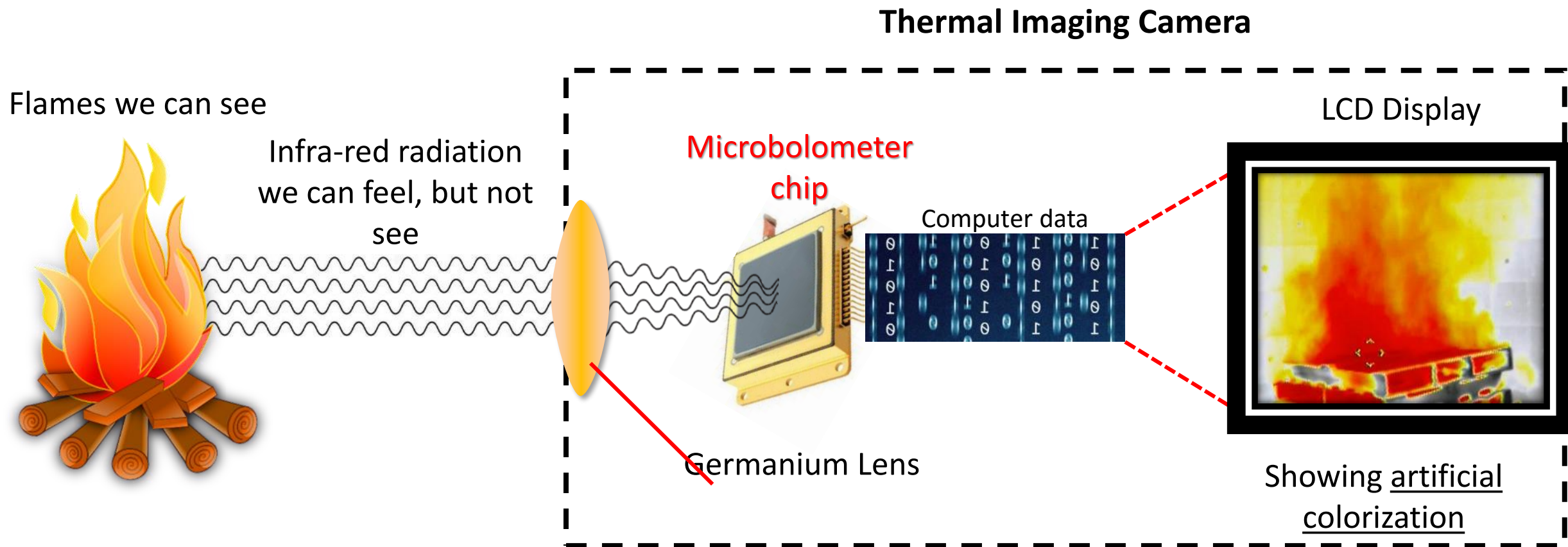
How Does A thermal Camera Work?

- All objects radiate or reflect energy – electro-magnetic radiation
- The name depends on wavelength



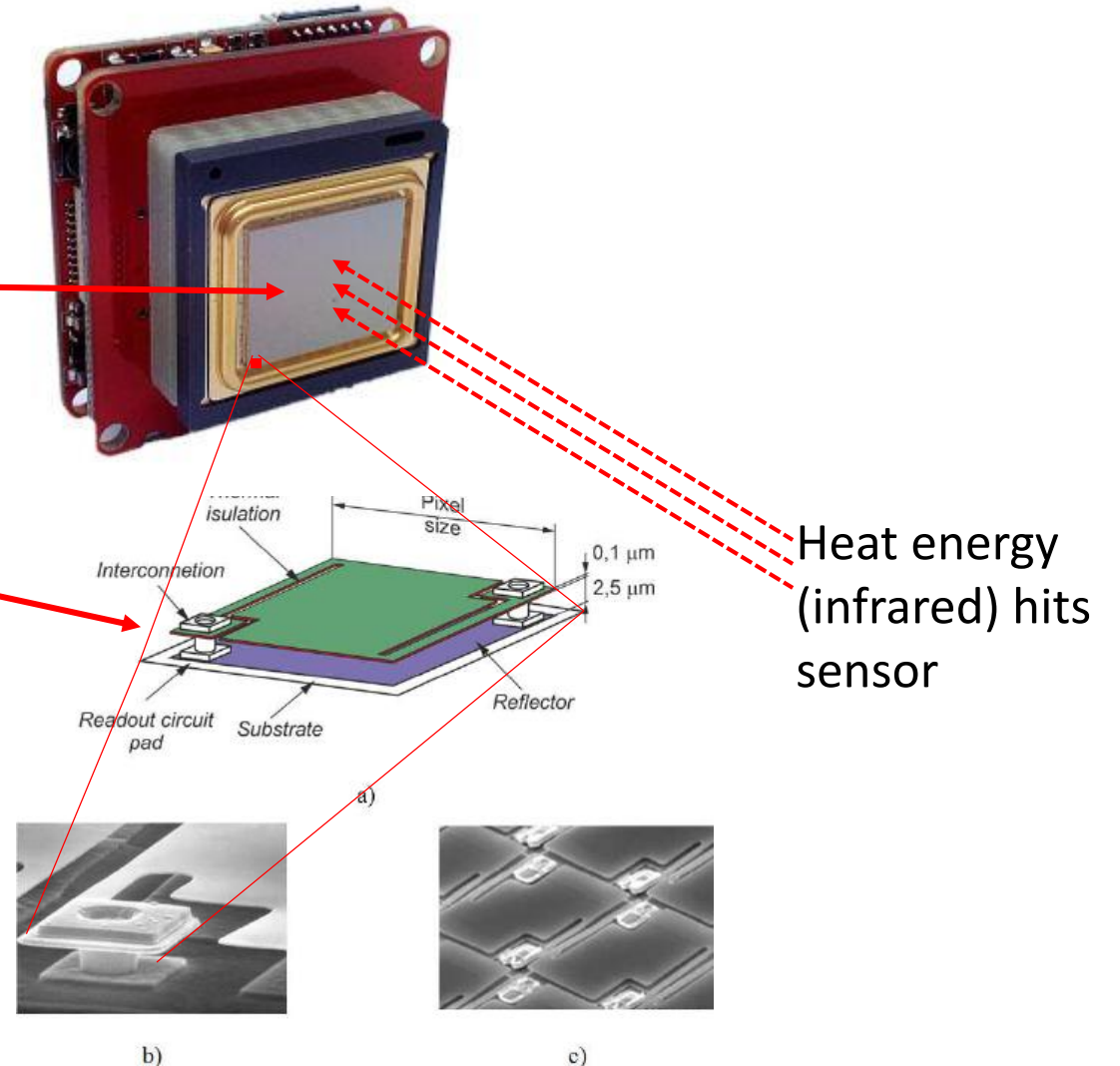
- Thermal camera sensors detect **infrared**/thermal radiation
 1. Temperature variations detected
 2. Converted to electrical signals
 3. Signals converted back into images on LCD screen

How Does A thermal Camera Work?



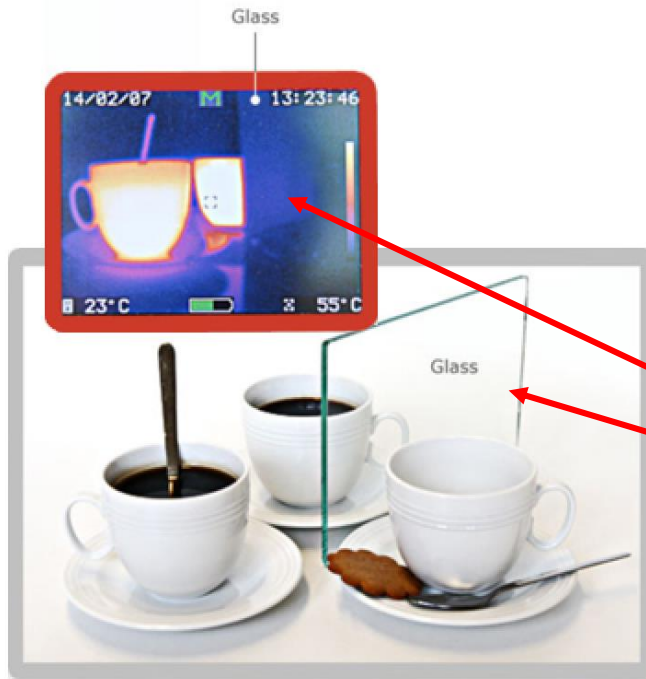
How Does A thermal Camera Work?

- Microbolometer (special sensing chip) detects variations in infrared wavelengths (7-14 μm)
- Variations affect elements in the chip causing variations in electrical resistance
- Variation in resistance used to report heat sensed in each pixel as an electrical signal
- Electrical signals converted to human-visible display pixels on an LCD screen
- Each sensing element is housed in a vacuum, making them difficult to manufacture (and expensive) – *more than just a digital camera*



**X380 has > 110,500
sensor elements**

How Does A thermal Camera Work?



- Thermal Cameras **do not depend on visible light**
- Objects in **total darkness** surrounded in smoke can be seen

- **No thermal imager can see through;**

- Walls
- Glass
- Water
- Anything that absorbs thermal radiation



- If radiation/thermal temperature heats or cools the surface, then the heat **effect** can be seen on a wall, door, glass etc. (Similar to when you touch the surface and **feel the heat**)

How Does A thermal Camera Work?



- Here the camera would sense a hot wall, **it does not “see” the fire on the other side**
- A good example is when a firefighter images a door handle –metal handles conduct heat from the other side, suggesting a fire in the next room



- But, the advantage is that Thermal Cameras **can see through smoke or in complete darkness**

Components – Mask Mounted Thermal Imaging Camera



Components – In-Mask Display (IMD)



Improved functionality

NEW Scott Sight **Pro Package** (1.2 Pro):

Hot Spot Tracker

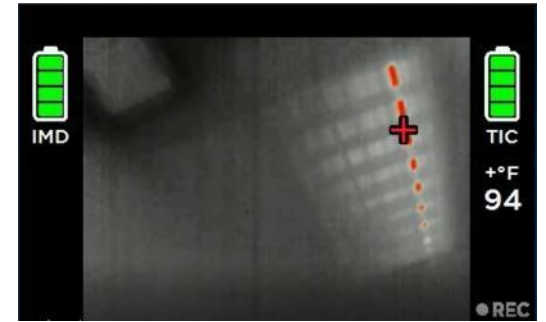
Immediately identify the hottest part of the scene and display it's relative temperature. Ideal for investigation, search and rescue, and risk assessment

Cold Spot Tracker

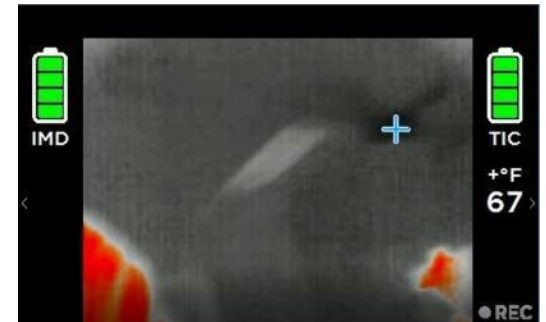
Locate and pinpoint gas leaks in seconds. Cold spot tracker can also be used in hazmat environments.

Tactical Video Recording (TVR)

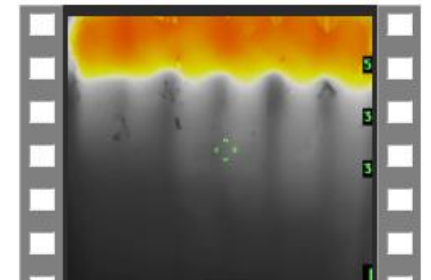
Automatically record the thermal video shown on the IMD for review later. Records up to 30 hours of video before over-writing files



Hot Spot Tracker

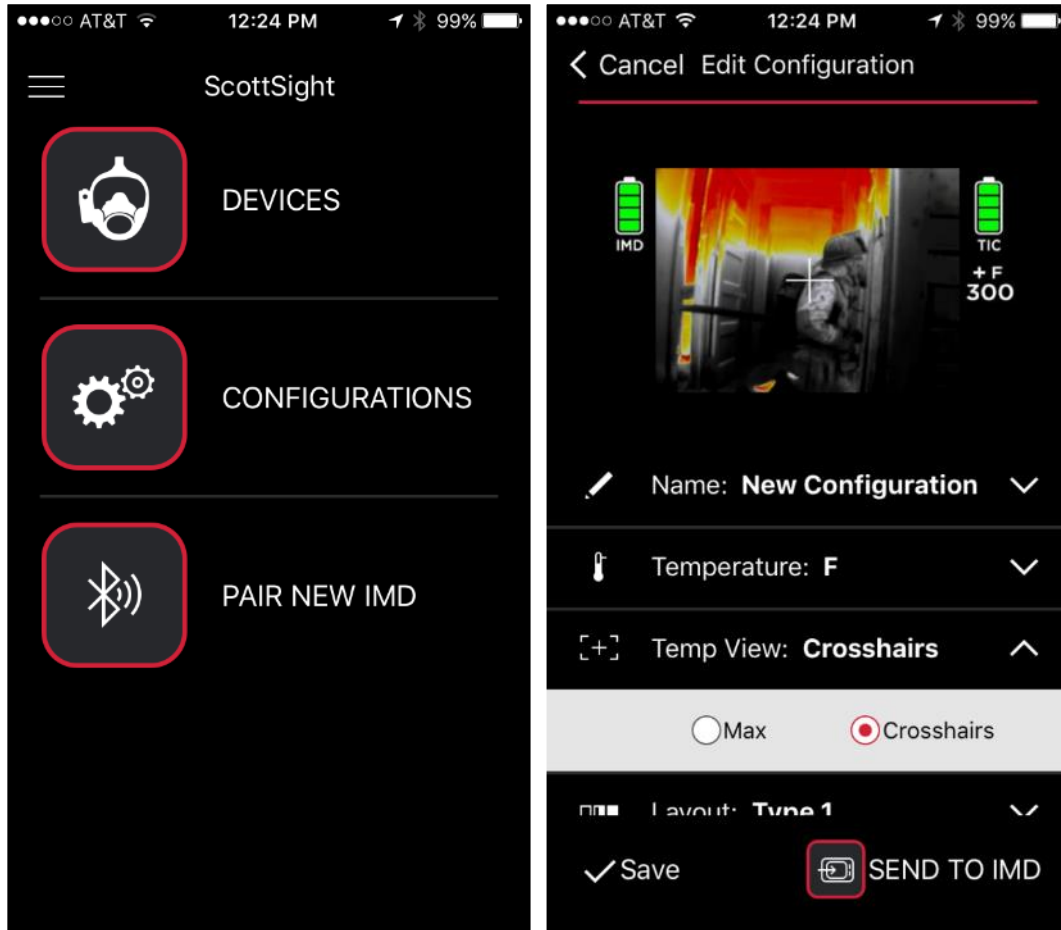


Cold Spot Tracker



Video Recording

Mobile Configuration App



Scott Sight mobile app configurator:

- **IOS** and **Android** compatible
- Temp. readout; °F or °C
- Display layout of icons
- Temp View; *Crosshair vs max temp*
- Color; *Grey, fixed or dynamic*
- Brightness intensity; 1 – 5
- *Getting Started Tutorial*

Pro Package added features:

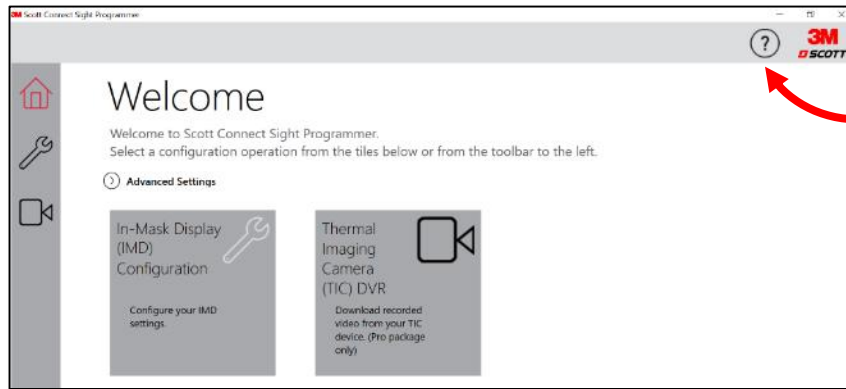
- Set hot-spot tracking
- Set cold-spot tracking
- Enable or disable video recording

Pro-Package File download

To download Scott Sight 1.2 Pro-Package video files;



1. Customer needs;
 - 3M|Scott Universal Bluetooth programmer interface
 - **Scott Connect Sight** Windows application
 2. Connect to Scott Sight Pro unit
 3. Download files to laptop for review
- Click on ? for instructions



Communication Solutions

EPIC 3 RI for clear and effective communication on the fire ground



- Improved user communication from incident scene to remote locations
- Voice Amplification and wireless communication interoperability with mobile field radios
- Clear and pervasive communication improves first responder safety and situational awareness
- Durable high-heat rated construction withstands the rigors of firefighting
- Bluetooth connectivity between Radio Interface and Microphone

Effective Escape Solutions

Designed for rapid escape from Fire and hazardous environments



- Worlds leading constant flow escape set
- Emergency escape made easier with Elsa on your shoulder
- Provides clean breathable air in hazardous atmospheres
- Lightweight and quick donning
- Easily rechargeable and reusable

Confined Space

Typical Confined Spaces

- Storage tanks
- Ship compartments
- Process vessels
- Boilers
- Sewers
- Tunnels
- Utility vaults
- Pipelines
- Storm drains



Issues in Confined Spaces

- Ascending / Descending/Side entry
- Rescue / Retrieval systems
- Oxygen deficiency
- Flammable/Toxic gases
- Entrapment
- Distress / Unconscious
- Communication
- Situational awareness
- Lack of Mechanical retrieval system

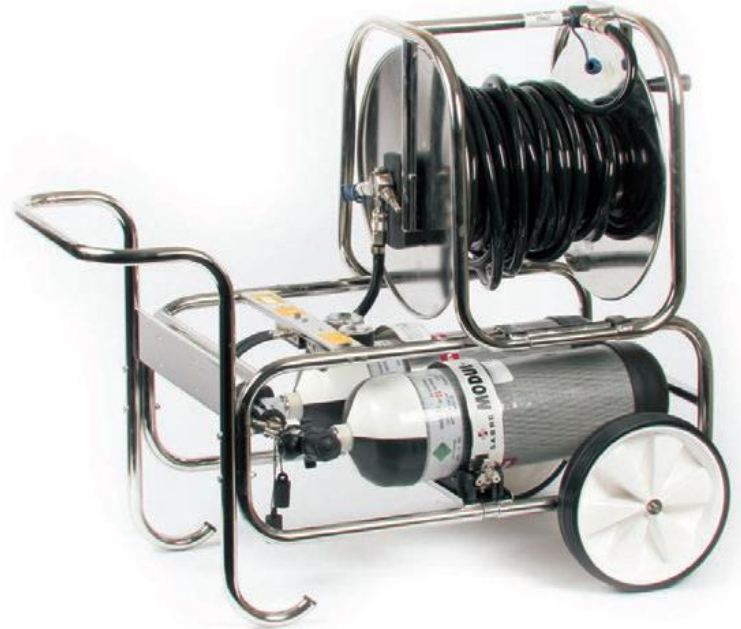
Confined space entry Solutions



Flite with Escape



Facemask



Modulair Trolley with accessories



Distress signal unit



Gas Detector



Communications



Questions?



Thank You For Your Time