

## SITUATIONAL AWARENESS FUNCTIONAL BRIEF

Despite the best planning and safety systems, accidents happen. In a tunnel, the effects are magnified and disastrous. Quickly after an incident occurs, the temperature rises, lights go out and the sprinkler system engages. Traditional technologies such as CCTV, are quickly rendered ineffective as images are masked by smoke. Thermal technologies, while good at detecting hotspots, have very limited performance through hot gasses or water spray from the sprinklers.

Radar technology is different. The high frequency 77GHz signal can penetrate complete darkness, the thickest smoke, fire and even the mist from the sprinklers.



### Fire, Smoke and Heat

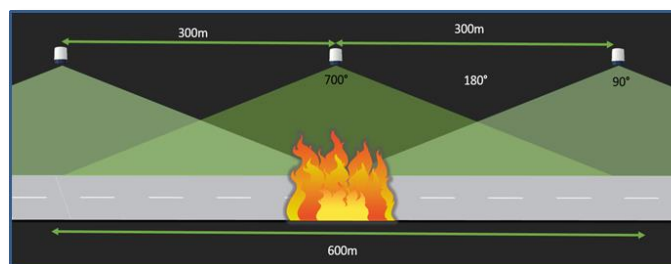
An incident in a tunnel that results in fire, creates a harsh environment with high temperatures, zero visibility and noxious fumes. To maximise the effectiveness of the response it is vital to understand the location of the incident and the location of people, vehicles and debris that remain in the tunnel.

The monitoring system needs the right technology that can deliver complete situational awareness to the operators in real time and in a way that is easy to understand and accurate.

## When all others fail, radar is the only technology available

### Sensors Protected By Distance

In a tunnel, radar sensors are typically spaced several hundred metres apart, whereas CCTV and thermal cameras are spaced much closer together. When a fire occurs, the heat quickly destroys any sensor equipment in the vicinity. By design, radar sensors are positioned so that their coverage overlaps. If a radar sensor local to the incident fails, the length of road remains covered by the radar sensors located either side, that maybe hundreds of metres away from the point of combustion.



### Clarity of Vision

At the operating frequency of radar, the signal has different properties to visible light and infra-red that is used for thermal imaging. The radar signal operates in complete darkness and can easily pass through hot gasses, fire and water spray to provide accurate detection and tracking of objects. Navtech's ClearWay system will continue to refresh the image up to 4 times a second so any movement can be seen.

# Smoke and High Temperatures

ClearWay

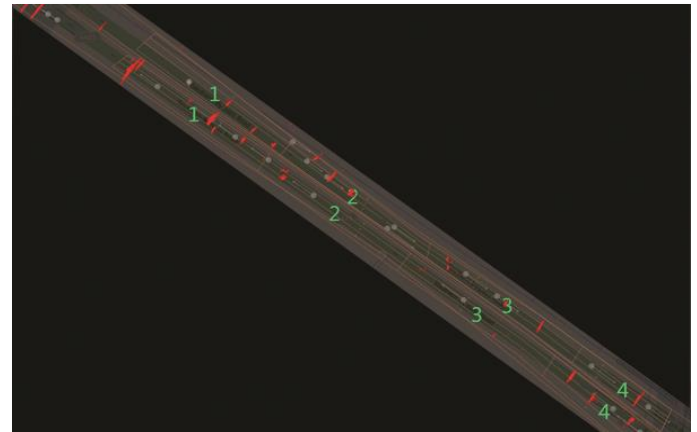
EFFECTIVE WHEN ALL OTHER TECHNOLOGIES FAIL

Detects Objects	ClearWav	Thermal Camera	Visual Camera
In Good Conditions	✓	✓	✓
Cold Smoke	✓	✓	X
Hot Smoke & Gasses	✓	X	X
Through Fire	✓	X	X
Through Water Mist	✓	X	X
>200m Away From Heat	✓	X	X

## Fully Integrated Video Output

Navtech's ClearWay produces a video stream showing the precise location of objects that is routed through to the control room's video management system. The operator sees a dimensionally correct plan view image of the incident with people and vehicles. The situation is updated four times a second to detect any movement. The operator has the ability to replay the previous 5 minutes of activity.

As soon as an incident is detected by ClearWay, the trained operator will be presented with an option to view the real time activity. ClearWay will give a clear representation of the position of cars and people that are present, and provide authorities with information such as movement and how many people need to be evacuated.



Situational Awareness Illustration

## Summary

Despite all efforts, accidents happen. In a tunnel, the rapid environmental change, quickly renders traditional technology ineffective. In a critical scenario, Navtech's ClearWay situational awareness module, provides operators with vital information to assist the responsive activities.

Contact Navtech Radar for further information and a demonstration of how ClearWay's Situational Awareness Module can improve safety.

The situation is clear, the solution is ClearWay.