

# VESPer Virtual Extra Sensory Perception

Superior understanding of complex terrain



**VESPer is a modular, multispectral, three-dimensional (3D) mapping capability that provides rapid, precise and understandable geospatial 3D mapping for security and defence applications.**

In a complex, ever changing environment, up-to-date geospatial intelligence is paramount to the success of operations. VESPer has the ability to collect and process precision, three-dimensional (3D) intelligence on demand, on the day.

VESPer fuses geolocated 3D terrain information with multi-spectral sensor data; together this fused data can reveal more about the environment than any single sensor.

The ability to use data in this manner provides the operator with virtual extra sensory perception.

Three-dimensional mapping provides the 'extra dimension' giving the operator an instant understanding of topography. The data provides precise real-world dimensions and the fidelity required for detailed planning of operations in complex terrain.

A modular open architecture allows the VESPer system to be scaled and configured to suit operational needs.

VESPer establishes a commonly understood three-dimensional reference frame that forms the spearhead for future developments in geospatial technologies and techniques. It can form a key part of an enhanced real time '3D-aware' intelligence cycle.

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# Military applications: Special Operations and Conventional Forces



## **GEOINT support for close target reconnaissance**

- VESPer data provides the option of full immersion within a virtual 3D environment in order to gain exceptional familiarity with terrain and features prior to operations.
- VESPer data assists detailed mission planning by providing accurate and up-to-date geographic intelligence, including form, terrain, foliage, buildings and textures that are not readily available from other means.

## **Mission rehearsal/ pre-deployment training**

- Export of 3D data supports high fidelity modelling in Simulation and Training synthetic environments.
- Multi-spectral data allows mission rehearsal with truly representative night vision and thermal imaging effects.

## **Battle damage assessment**

- Physical damage can be measured quickly and accurately from post-attack 3D scans.

## **Route planning and surveillance**

- 3D VESPer data shows the true topology assisting the understanding of potential route limitations eg narrow streets that offer no possibility of turning around.

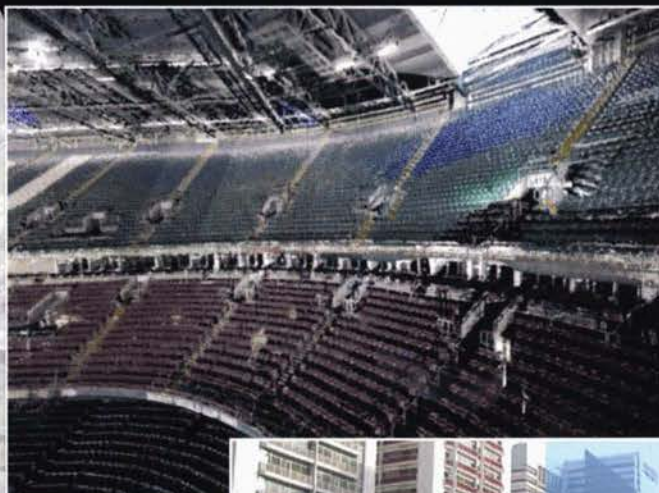




# Civil applications: Security and Resilience

## Rapid mapping for planning and control

- Large scale, 3D mapping of real interiors and exteriors records the environment 'as built' and provides superior support to contingency planning, environmental monitoring and 'smart city' applications.
- Simple and rapid capture capability provides on-demand map updates – local changes can be captured faithfully and incorporated in the space of hours.



## Threat detection

- Fused multi-spectral data can find concealed objects and positions; Near Infrared and Long Wave Infrared help to reveal disturbed ground and camouflage materials invisible to the naked eye.
- 3D change detection acts as a cue for further investigation. VESPer is offered with optional complementary diagnostic technologies such as Raman sampling and Compton X-Ray backscatter.



## VESPer technology



VESPer is a rapid, mobile, multi-spectral three-dimensional mapping system. It fuses 3D spatial data, gained from LIDAR sensors, with imagery from colour and infrared sensors; it then geolocates this fused data forming 3D maps in the WGS84 world reference frame. Interior data can be captured in near real time from a man-portable dismounted system whilst whole districts can be scanned, discretely and at normal road speeds, from a bolt-on vehicle-mounted system. The captured data is quickly turned into precision multi-spectral 3D maps; these can be viewed and exploited in the VESPer system or exported to other GIS or simulation platforms.

Colour sensors make VESPer's data simple to interpret; full colour, 3D maps with recognisable landmarks and legible road signs. The near and long wave infrared imaging sensors extend the operator's view beyond that of the naked eye – differentiating the real from the camouflaged, and the active from the inert, and all in 3D.

Users of VESPer data are not confined to fixed viewpoints along a defined trajectory; the environment is fully mapped in 3D within the

range and lines of sight of the sensors. Users can rise above the map for a panorama or drop to street level to investigate doorways; they can look out from windows to assess dead ground or drive the mission route in a 3D, fully immersive view. Ranges and angles can be measured with point precision and in real world units.

VESPer provides superior speed of operation; static scans are available in near real time whilst mobile maps have a 1:1 relationship between collection and processing time ie a one hour mission, 35 miles of road at 35 mph, would take just one more hour to process. VESPer produces high fidelity, multi-spectral 3D mapping on demand, on the day.

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## VESPer Sensors

VESPer is capable of using many different sensors according to operational requirements. The core 3D mapping system can be extended by the addition of optional sensors offering specialist capabilities.

### Core Sensors

- **Light Intensity Direction and Ranging (LIDAR).** This sensor is essential to providing three-dimensional data. It uses an infrared laser to scan the environment measuring the distance between reflective objects and the mobile platform.
- **High Definition colour video.** This sensor provides the visible band data key to the intuitive understanding of the 3D map.
- **Thermal Imager.** This sensor provides long wave infrared data that reveal temperature differences in the environment. This sensor can provide useful environmental data at night and/or in hazy or dusty conditions.

### Optional Sensors

- **3D Through-The-Wall radar.** This can be used to locate people inside buildings or to assist in determining the internal structures of buildings.
- **Compton X-Ray backscatter.** This can help detect hidden materials, such as explosives, in vehicles and metal containers.
- **Raman laser sampling.** This can be used for the stand-off sampling of explosive and other materials.

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