



TWR-S

TWR-S is the SELEX Sistemi Integrati innovative solution to see inside buildings, suitable for emergency and life-threatening situations. The new hand-held system provides immediate detection of humans behind concrete walls and their continuous tracking, as well as building layout and life signs detection.

THE SOLUTION

Based on the new “Through-the-wall radar” technology, TWR-S allows to see through obstacles such as walls, doors and other visually opaque materials, covering a broad range of applications:

- to detect and locate survivors trapped inside a burning building or in areas which have been plagued by natural disasters (e.g. earthquakes, avalanches, landslides, dense smoke)
- to get an accurate overview of the inside of a building in e.g. a hostage crisis. People within the building can be detected and located.

In all these scenarios that demand entering unsafe buildings, interventions can represent a danger for firefighters, emergency relief workers and public security operators. Through-the-wall technology can improve situational awareness and reduce risks, before undertaking an intervention inside a structure. To this aim, SELEX Sistemi Integrati has developed an advanced solution able to meet these requirements, in particular this new system has been realized in collaboration with IDS Ingegneria Dei Sistemi S.p.A..

THE SYSTEM

Based on a consolidated expertise on inverse electromagnetic scattering, the solution is able to:

- estimate the thickness and the electromagnetic features of a wall
- estimate the internal layout of buildings
- detect vital signs
- track people movements inside buildings

Wall Parameters Estimation

The aim of this function is to estimate the thickness and the electromagnetic properties of a wall, supposed homogeneous. This kind of information is extremely useful and it represents the first step for the reconstruction of the internal layout, as it is extracted from the measured signal.

Layout Estimation

This function allows to estimate the geometrical features of the investigated structure, providing the internal layout. Thanks to a model-based representation that best matches collected data, it is possible to determine the internal geometrical features of the structure. This capability is of particular interest in post crisis management and in all those cases where a priori structural information about the area of interest is not available. This capability completely avoids the need to enter critical areas, then supporting a safer intervention planning.

Life Signs Detection

This function allows to detect life signs, like heartbeat and/or breathing in a through-the-wall context, in particular revealing motionless people in real-time.

The detection of still people is performed by illuminating the investigated area with electromagnetic signal and exploiting the phase-modulation induced from the breastbone movement.

This feature allows to locate people under ruins in case of landslides, earthquakes, etc.

Advanced Tracking

The system allows to locate and track humans inside the area of interest, both in free space and in a through-the-wall condition, with an improved resolution with respect to Global Positioning System based devices. Tracking is carried out by means of a two steps algorithm. The first one provides the spatial map of targets' position, the latter uses this map to perform tracking.

The processing is able to remove the presence of spurious objects that could be wrongly identified as persons.



TECHNICAL CHARACTERISTICS

Detection Range	Up to 15 m (in the presence of walls)
Angular Coverage	150° in azimuth
Display	2D color display, possible 3D display
Working Mode	Stepped Frequency, Continuous Wave
Bandwidth	[1.950 – 2.450] GHz
Resolution	300 mm
Size/weight	[600x320x120] mm/4kg
Output Power	14 dBm

