



A Leader in Intelligent Sensor & Analytic Software Technologies for IoT Applications

The new gen OleaVision™ Life Presence Detection development platform for IoT safety applications (OS-8005) features a design consisting of a FMCW 24GHz radar sensor that is compatible for indoor and outdoor applications. This powerful low-cost development platform hosts Olea's latest machine learning algorithms that enable the sensor to discriminate between animate and inanimate objects within milliseconds at up to 10-meter range in a variety of environments. The OleaVision™ development platform can be modified, optimized and integrated seamlessly into any industrial equipment safety systems.

The OS-8005 has an integrated assembly to provide optimal performance in a compact size. The sensor can be installed on an adjustable mechanical fixture that has a magnetic holder which can be quickly mounted on any equipment without requiring any mechanical modification or assembly in order to position it on the exterior of the equipment for optimal field of view. The OS-8005 prototype sensor can be ruggedized to handle vibration caused by motion in vehicle.



The OS-8005 has the ability to communicate data wirelessly via Bluetooth to tablet, mobile phone or PC. Finally, to the OS-8005 is also able to communicate to a Windows PC, Android or IOS platform for further analytics and data processing.

The software is architected to be user-friendly, to be modular, and to have intuitive user interfaces for sensor output presentation as well as for real-time alerts to a smart phone as appropriate or required. This is accomplished through the novel use of OLEA's human presence detection monitoring technologies. Below are the targeted features for the OS-8005 demo platform.

- Has up to 10 Meter Detection Zone in Total Darkness
- Has approximately 160 degrees field of view
- Discriminates Between Objects & Human Presence
- Scans for presence of humans in unwanted danger zones
- Has detection capability of human stationary targets
- Multiple sensors can be installed and integrated to expand the field of view
- Early warning system can be placed in vehicle's cabin to warn operator of humans present in danger zones
- Has the ability to see through vegetation in obstructed view scenarios
- Contactless, Transparent and Ubiquitous

OleaVision Technology

OleaVision™ is a novel human presence detection and ranging technology using FMCW radar sensor that operates at 24GHz. For indoor and outdoor scenarios, FMCW radar transmission is a promising technology, due to its high-resolution ranging and obstacle penetration capabilities. The system utilizes an FMCW micro Doppler radar sensor with advanced detection algorithms that does not require a training database of template waveforms. Instead, the method capitalizes on the fact that a human presence induces small low-frequency variations that stand out against the background signal, which is mainly affected by wideband noise. With advanced machine learning and human presence detection algorithms, the system is able to analyze the environment and adapt to enhance the detection probability for indoor and outdoor environments.

Microwave Doppler such as the OS-8005 radar has the capability of monitoring respiration at up to 5 meters detection range. Doppler radar achieves this by detecting mechanical displacements of the chest cavity on the order of millimeters resulting from shock waves due to heart motion. This is known as Radar Seismocardiogram (R-SCG). The OLEA system is based on two main components: the radar sensor and the signal-processing unit (SPU) that processes the sensor data in real time.

The basic principle of a FMCW Doppler radar sensor is that reflections from moving targets result in frequency shifts, while reflections from stationary clutter result only in DC offset. There are also inter-individual differences in the detection of physiological signals due to the inherent physiological differences in the magnitude of the mechanical displacements of the torso and the relative positioning of the sensor respect to the torso. A typical human torso's displacements due to respiration ranges from 0.1mm to several millimeters depending upon the subject (Singh & Rmachandran, 1991).

A key aspect of OLEA's technology is its ability to detect patterns using advanced algorithms that extract the key attributes or features of the signals to produce the relevant statistical data for accurate detection of life forms generated from people and animals.