

# S500 Geolocation System

## System Data Sheet

### Description

The Omnisense S500 Geolocation System is used to determine and track the positions and motion of assets within a local area. The devices form a Wireless Mesh Network in which each device periodically broadcasts messages to neighbours and by measuring the precise time of arrival (ToA) of messages transmitted by neighbours, the sophisticated Omnisense Joint Timing and Location Engine (JTLE) is able to compute the relative positions and motion of the nodes.

At the heart of the system is the Omnisense whereBox running the omniWhere software. The whereBox receives raw measurements from the devices in the network via USB, serial port or using a TCP/IP connection over Ethernet or Wi-Fi. A high level API based on industry standard Internet protocols allows end user applications to quickly and easily access localisation and motion information about devices of interest as and when needed.

The whereBox processes measurements from the Omnisense S500 geolocation tags as well as measurements from a growing number of 3<sup>rd</sup> party devices such as Nanotron swarm bee.

The ability to operate free of conventional rigid architectures based on traditional RTLS systems using expensive fixed anchors or access points, gives the Omnisense whereBox a unique competitive advantage.

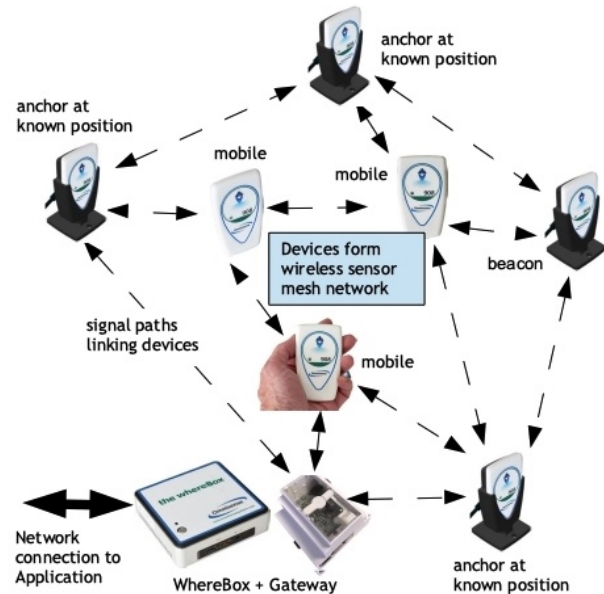
### Ordering

The product is usually sold as a system comprising:

- A whereBox;
- One or more GCN554 gateways;
- One or more GCN524 or GCN535 tag devices;
- Accessories for charging, mounting etc.

A single whereBox can accommodate large numbers of tags; multiple whereBox's can be clustered for solutions scaling to many thousands of tracked devices.

GCN524 (or GCN535 with added UWB PA) tags may be used as mobile tags; as fixed anchors or as beacons within the system - all configured simply through the GUI and tools provided on the whereBox.



### Example Applications

The whereBox + S500 system is optimised for position, motion and behaviour tracking in local areas, indoors and outdoors for groups or teams of objects:

- Locating people on site
- Worker protection, health and safety
- Personnel muster in maritime & industrial
- Healthcare, dementia, post-operative care
- Sport, real-time and training
- Leisure and event management
- Emergency services, fire, police, security
- Transport logistics, fleet, yard management
- Animal tracking and welfare monitoring
- Mining and industrial site asset monitoring

### Contact Information

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Specifications	
Accuracy (GCN524 & GCN535)	±50 cm 95%, ±20 cm CEP under good propagation conditions using UWB radio: line-of-sight or near-line-of-sight in a relatively uncluttered environment. CSS radio giving 1-2 m accuracy. Full 3D positioning. Full 10-axis inertial using accelerometer, gyroscope (not active), magnetometer and barometer,
Range (GCN524)	Up to 400 m under ideal radio path conditions, less in obstructed conditions. A typical outdoor working range is 200 m. UWB - up to 80m since PA added to product design in GCN535 (2021)
Radio (GCN524)	UWB -42 dBm - CSS +17 dBm - BLE +4 dBm Ultra WideBand - 6 RF bands from 3.5-6.5 GHz using IEEE802.15.4-2011 Chirp Spread Spectrum - 2.4 GHz ISM band using IEEE 802.15.4a Bluetooth Low Energy - 2.4 GHz ISM band (optional - not active)
Network Protocol (GCN524)	Cluster Tree and Mesh architectures, supporting mobility.
Device interface (GCN524)	Gateway: serial, USB or TCP/IP over Ethernet or Wi-Fi to whereBox
Update rate	Typically 0.5 s to 60 s interval between updates.
Number of devices	Up to 500 per whereBox, up to 50k per network, 32-bit unique tag IDs
System Interface (whereBox)	TCP/IP over Ethernet or Wi-Fi. Web server and tools for network configuration and management. Log management for raw and computed data logs. omniWhere GUI tools for managing and configuring the system.
Application API (whereBox)	JSON formatted messaging over raw TCP/IP or using HTTP (See Omnisense reference manual RM007 for details) Application software not provided.
Management	Remote access hooks for server maintenance and updates Secure, user and device authentication.
Installation	No special access points or anchor nodes required Device functions entirely configurable using whereBox GUI tools
Location format	Real-time position reporting: X,Y, Z (full 3D), plus zones and occupancy Position quality and error ellipse metrics generated Node attitude reporting (heading, pitch, roll) - if device supported Output coordinates: Cartesian, UTM, WGS84; user configurable Zoning and zone change reporting Special behavioural features as supported by devices

