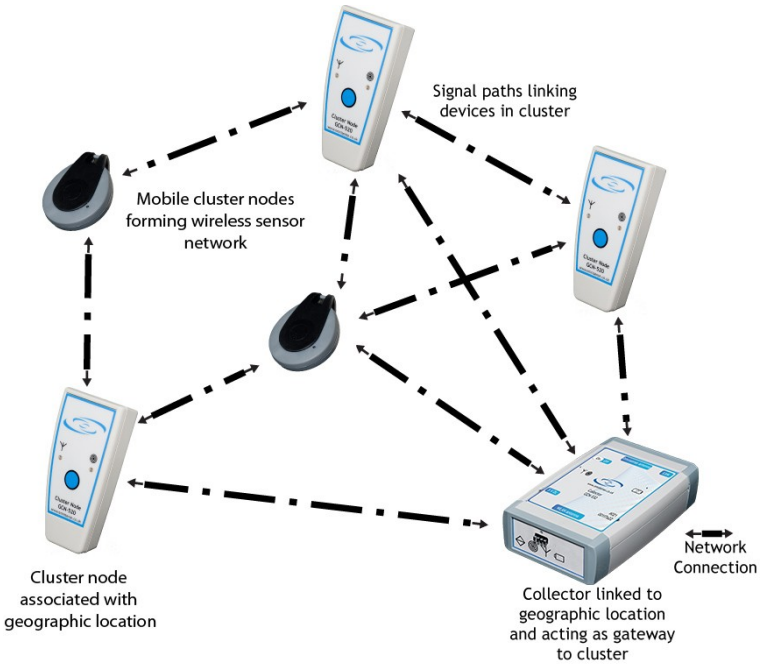
Cluster Geolocation System: Series 500

Building on the success of the prototype Series 400 system from 2010, the Omnisense Series 500 Geolocation system provides a unique fusion of technologies including relative positioning of neighbouring devices which enables the system to be deployed without the need to install any infrastructure. Devices within a neighbourhood form an adhoc mesh network which is used for both communications and relative positioning.

Assets to be monitored (people or things) are provided with Cluster Nodes and one or more Collector devices is used to feed position, velocity and orientation data from each unit via a network connection to the application software.

Series 500 devices are optionally equipped (refer to Table 1 below) with GPS and Inertial sensors which are used in conjunction with the radio cluster communications to provide seamless geolocation capability across mixed environments including indoors and outdoors.

The Series 500 Cluster Geolocation system is unique in its ability to provide high accuracy continuous location data about assets across **indoor-outdoor** environments in a flexible instantaneously deployable architecture without the need for any permanent infrastructure.



Unit	High performance ranging	Inertial	GPS	Advanced Location Engine	Ethernet	Outdoor Sealed	Wall-mounted	Rechargeable Battery	Primary Battery	Wi-Fi (w)	GPRS mobile (m)	Alarm button (a)	Available	Suitable for
Fob							Options							
GCN 513		✓					✓	✓				a	Now	Personnel; e.g. Healthcare users
Belt														
GCN 522	✓	✓					✓	✓	✓			a	Now	Monitoring: e.g. Livestock, Assets, Personnel, Vehicles
Smart-Box														
GCN 531	✓	✓				✓	✓	✓	✓				Now	Blue Force, Automotive, Mining, Transport
GCN 532	✓	✓	✓			✓	✓	✓	✓	w	m		Now	As above with Wide-area lone item capability
Collector														
GCLU 453				✓	✓		✓	✓					Now	Standard Collector with Ethernet (IP) connectivity

Key:	Default:	Rechargeable, No GPS, Belt-worn
	Options:	Wall mounted, GPS, Primary-cell
		WiFi (w), GPRS (m), Alarm (a)

Table 1: Series 500 Product Family Feature Chart

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System	
Technology	802.15.4 with true radio ranging 802.15.4a high performance ranging Inertial: accelerometer & gyroscope Magnetometer (on some devices)
Accuracy	1-2 m dependent on configuration
Start-up	< 1 minute typically
Output	Position, speed and orientation
Update rate	1 second to 1 hour configurable
Frequency	2.4 GHz licence-exempt band
Range	50 m to 500 m
Sensors	Up to 50 depending on update rate
Collector	At least 1 to provide connectivity
Interconnect	Ethernet 10/100 Base-T (IP)

Application Data Feed	
Interface	Ethernet Wi-Fi on request GPRS/3G on request
Protocol	TCP/IP
Data Stream	JSON formatted data feed NMEA-like option available
Content	Position, Speed, Context, Sensor Payload
Position	Cartesian X, Y, Z (metres) Optional WGS84
Update Rate	Configurable: 1 second to 1 hour

Cluster Node	
Size	Comes in three forms: 95 x 45 x 25 mm Belt/Beacon (std) 45 mm (diam) x 14 mm Fob (small) 120 x 90 x 50 mm Smart Box (IP67)
Weight	~22g (fob), ~70g (std), ~350g (box)
Battery life	8 hr to 4 weeks rechargeable up to 6 months primary Dependent on configuration
Battery	Rechargeable Lithium Ion or NiMH Primary alkaline (replaceable)
Antenna	Internal
Radio approval	EN 300 440, European SRD
RF Power	100 mW peak (2.4 GHz band)
User Interface	LED indicators soft-mapped push button

Collector	
Size	120 x 75 x 20 mm plus antenna
Processor	Embedded for advanced location
OS	Embedded Linux
Location	Omnisense Joint Timing & Location Engine (JTLE) providing advanced hybrid speed and location calculations
Mounting	Completely mobile Can be fixed if required
Interface	Ethernet, Serial (WiFi, 3G on request)
UI	LEDs Remote via Ethernet or serial port
Throughput	Up to 10 positions per second
Data Logging	Flash storage for local recording
Diagnostics	Extensive system health monitoring

Description

A typical application will comprise one or more Collectors and a number of Cluster Nodes associated with the assets being monitored. Any combination of devices within the Series 500 range can be used in a system.

At least one Collector is used to provide a data connection to the application. Multiple collectors can be used to provide redundancy and increased data throughput if required.

For longer range applications the GCN-522 and 53x Series Sensor Nodes provide up to 500 m range. It is not necessary for all Nodes to be within range of one another provided that interconnectivity across the group can be established via multiple radio hops. For applications where Nodes move completely out-of-range an optional GPS may provide wide area coverage.

View of Cluster Node Board

Customisation

Omnisense is willing to undertake customisation to the specific needs of an application beyond the functionality of the core product, e.g. to flag specific inertial behaviours, addition of wide area connectivity, enhanced GPS. Prices and availability of equipment supplied on request, info@omnisense.co.uk.

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