⊕nav Galaxy Navigation Corp.

LNS-200® GPS/DR

High Precision 6-axis Car Navigation Module

LNS-200® is a **L**and **N**avigation **S**ystem which combines ultra-low noise MEMS 3-axis gyros, 3-axis accelerometer, barometer, odometer and GPS receiver on a single, compact board. When GPS signals are limited or not available, such as in urban canyons and tunnels, **LNS-200®** module provides reliable and accurate navigation information. All sensors are calibrated over their temperature and compensated for axis alignment in order to make them ideal for demanding applications.

LNS-200® sophisticated GPS/DR (Dead Reckoning) algorithm auto calibrates and optimally blends the sensors inputs with kalman filter to generate optimal and accurate position outputs in the most hostile GPS environments. DR estimates position based on distance traveled since the last known position from GPS. It is an ideal solution for system integrators who are adding location capabilities to vehicle navigation, fleet management and asset tracking systems. For car navigation system on market, **LNS-200®** is the only one that provides 6-axis, 3D navigation position output and its DR error is 6m/km(0.6%)

Application：

- The field which wants knowing the more accurate location of the vehicle in telemetric.
- Navigation function improvement in personal vehicle navigation system.
- Vehicle location tracking which is accurate in vehicle control system such as the taxi, the bus, fleet management and freight transportation.
- Improvement of vehicle location tracking function in insurance company, commercial bank when it occurs vehicle breakdown or vehicle robbery.
- Autonomous vehicles

Feature：

- System integrates ultra-low noise MEMS sensors, odometer and GPS module.
- All sensors individually have temperature compensation and axis alignment calibration.
- Time synchronization between GPS and DR.
- Auto self-calibrate attitude when system fixed and power on.
- The newest and high precision 3D GPS/DR modules on market.
- DR error is only 12m of 2km distance traveled(0.6%).
- Low cost and high C/P value.
- Lead free / RoHS compliant.
- 3 years warranty
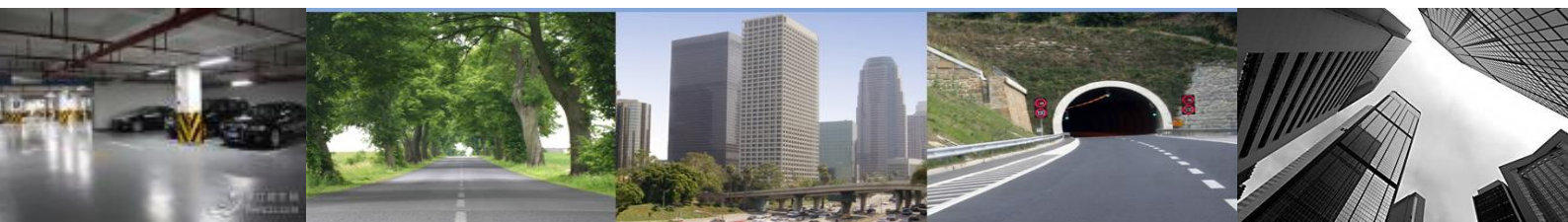
Specification

Sensors	
Angular rate (x,y,z)	±100°/s
● Noise density(yaw axis)	0.004°/s√Hz
● Non linearity(yaw axis)	±0.5% of FS
● Noise density(pitch/roll axis)	0.014°/s√Hz
● Non linearity(pitch/roll axis)	±1.0% of FS
Acceleration (x,y,z)	±2 g/±6 g
● Noise density	50 µg√Hz
● Non linearity	±0.5% of FS

Barometer		
● Pressure range	300 ~1,100hPa(9,000m~-500m)	
● Resolution of output data	Pressure	0.01 hPa
	Temperature	0.1°C

Protocols	
Configurable	NMEA or UBX binary
NMEA messages	GGA,GSA,GSV,RMC,VTG,TXT
Receive type	50 channels,
	L1 frequency, C/A code

Accuracy	
Horizontal	< 2.5 m (CEP)
	< 2.0 m (SBAS)
Altitude	< 3.5 m (CEP)
Velocity	< 0.1 m/s
Heading	0.5 deg
1 PPS	30 ns (RMS)

Time-to-first-fix (TTFF)	
Hot start	< 3 sec
Cold start	32 sec

Warm start	32 sec
Reacquisition	< 1 sec

Update rate	
GPS Navigation	1 Hz
DR Navigation	2 Hz

Power	
Prime power	5±5%V DC
Antenna power	3~3.3V DC
Power consumption	< 0.5 W

Interface and Connector	
Interface	UART
Antenna connector	SMA female
Power connector	12 pin male (6 x 2; 2.0 mm)

Dynamics	
Velocity limit	515 m/s
Altitude limit	18,000 m

DR error	
Horizontal position error	6m/km (0.6%)
12m DR error of 2km distance traveled	
Altitude error	<0.5m (2.5%)
<0.5m of 20m height parking house traveled	

Environmental	
Compensated temperature	− 10°C to +70°C
Operating temperature	− 40°C to +85°C

Physical	
Dimension	70 mm x 50 mm x 11.5 mm
	(without RF connector)
Weight	<25 grams

Car speed : 20~60 Km/hr
DR horizontal error : 12m (0.6%)
(2.0km road distance traveled)
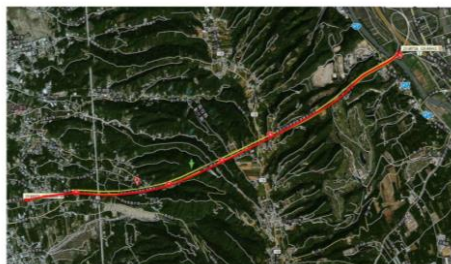
Car speed : 70 Km/hr
DR horizontal error : 28m (0.6%)
(4.9km tunnel distance traveled)
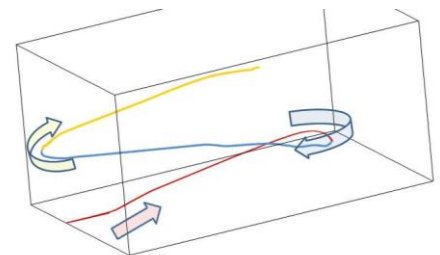
Car speed : 20 Km/hr
DR altitude error : <0.5m (2.5%)
(20m high parking house traveled)

Specification subject to change without notice