

## LandMark™ 70 INS/GPS

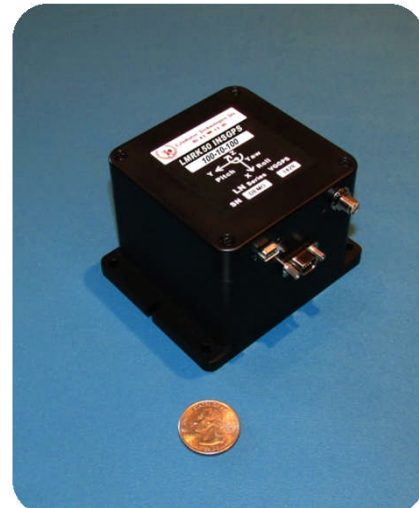


**LandMark™ 70 INS/GPS**  
*GPS-Aided Inertial NAV System*

**CANBUS Output**

*5nm/hr short-term NAV  
1°/hr In-Run Bias*

- High Performance NON-ITAR Commercial MEMS GPS-Aided INS with CAN BUS
- 4 NMPH Free Inertial (*Short-Term GPS Outages*)
- 72 Channel GNSS: GPS, GLONASS, BeiDou, QZSS & SBAS (Galileo Ready\*)
- SBAS: WAAS, EGNOS & MSAS
- Up to 18 Hz Navigation Update Rate *GPS*
- GPS Velocity Accuracy *0.05 m/s*
- GPS Heading Accuracy *0.3 degrees*
- GPS Horizontal Accuracy *±2.0m CEP w/SBAS*
- Pitch & Roll Angles *±0.1° stationary*
- Ultra Low Noise Gyros *0.0009°/sec/√Hz*
- Low Noise Accels *0.02mg/√Hz (2g)*
- In-Run Gyro Bias *1°/hour 1σ*
- Fully Compensated Bias & Scale Factor Over Temperature *-40°C to +85°C*
- RS422/RS485/CAN 2.0B Serial Data Format
- Low Power *<1.2 W typical*
- Input Voltage *+6V to 36V*
- Light Weight *<550 grams*
- Small Size *<360cm³/21.8in³*



### Applications

Platform Stabilization  
EO/IR Stabilization  
Antenna Stabilization & Pointing  
Railway Motion Monitoring  
Flight Control  
Navigation  
Automotive Testing  
Laboratory Use

**Export Classification:  
Commerce ECCN7A994 (NLR)**

***High Performance MEMS INS/GPS with  
Low Noise and Low Bias Performance***



**Gladiator Technologies**  
Division of LKD Aerospace  
High Performance Inertial MEMS

**Gladiator Technologies Division  
LKD Aerospace, Inc.**

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Rev. 16Apr01  
SN: 700

# LandMark™ 70 INS/GPS

## Specification

PARAMETER	RATE AXES			ACCEL AXES		
<b>Power Requirements</b>						
Input Voltage	<b>+6.0V to +36V Max. Input Voltage (Input Transient Protection to 80V)</b>					
Power	1.2W Typical (1.3W Max) at 12V					
<b>Inertial Performance</b>						
Standard Full Scale Ranges	±100°/sec	±175°/sec	±300°/sec	±2 g's	±6 g's	±10 g's
Bias (In Run Stability) 1σ	1°/hour	1.5°/hour	2°/hour	0.02mg	0.025mg	0.03mg
Angle Random Walk 1σ	0.0009°	0.0012°	0.0015°	0.02	0.05	0.055
		/sec/√Hz 1σ			mg/√Hz 1σ	
Bias Over Temp. 1σ	<0.01°/sec	<0.02°/sec		<1.0mg	<0.8mg	<1.0mg
Scale Factor Error %	≤0.06% (over temperature)					
Non-Linearity % of FS	<0.1		<0.5	<2	<.025	<0.05
Sensor Resolution	0.0005°/sec	0.0012°/sec	0.0015°/sec	0.02mg	0.03mg	0.03mg
Alignment	< 0.5 mrad 1σ					
G-Sensitivity	<0.002°/sec/g 1σ					
<b>INS/GPS System Performance</b>						
Free Inertial typical	4 NMPH			10 NMPH		<60 sec Duration
Channels				72 Channels		
GNSS Receiver	GPS L1C/A			GLONASS L1of BeiDou B1		GALILEO E1B/C
SBAS				WAAS EGNOS QZSS		
Max Navigation Update Rate (GPS)				Up to 18 Hz		
Concurrent GPS/GLONASS or GPS/BeiDou				Up to 10 Hz		
GPS Horizontal Position Accuracy				Autonomous 2.5 m		
SBAS - EGNOS WAAS MSAS				2.0 m		
Velocity Accuracy				0.05 m/s		
Heading Accuracy (GPS)				0.3 degrees		
Heading (sole inertial)				± 0.5° typical		
Pitch & Roll Angles (sole inertial)				± 0.1° typical		
Altitude (barometric)				± 3m typical		
Start-Up Time (inertial)				< 0.65 sec typical (alignment < 2 minutes)		
Time-To-First-Fix						
GPS Acquisition (Cold start)				29 sec		
GPS Reacquisition (Aided start)				2 sec		
GPS Reacquisition (Hot start)				1 sec		
Sensitivity						
Tracking				-166 dBm		
Reacquisition				-159 dBm		
Cold Start				-148 dBm		
Hot Start				-148 dBm		
Accuracy of time pulse signal				RMS 30ns 99% 60ns		
Update Rate (sync'd inertial) INS/GPS				100 Hz		
<b>Physical</b>						
Weight	< 550 grams					
Size	U.S.:			3.0 X 3.06 X 2.38 = 21.8 in <sup>3</sup>		
	Metric:			7.62 X 7.8 X 6.05 = 360 cm <sup>3</sup>		
Operating Life	10 Years typical					
<b>Environments</b>						
Operating Temperature	-40°C to +85°C					
Storage Temperature	-55°C to +100°C					
Dynamics (GPS)	≤ 4 g					
Altitude	50,000 m					
Velocity	500 m/s					
Vibration Operating (inertial)	6gRMS (20Hz to 2KHz ~ 10g accelerometers)					
Shock	500g's ½ sine 1 msec powered, any axis					

Specification subject to change without notice



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 Division of LKD Aerospace  
 High Performance Inertial MEMS

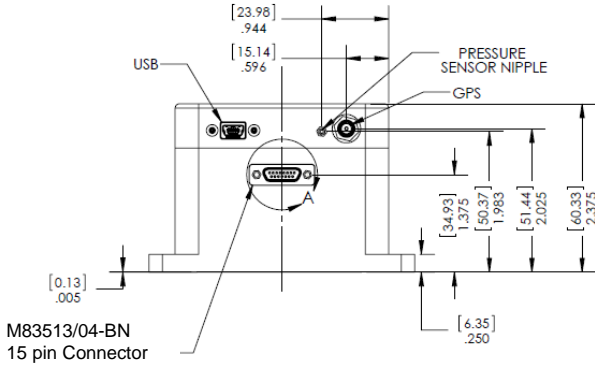
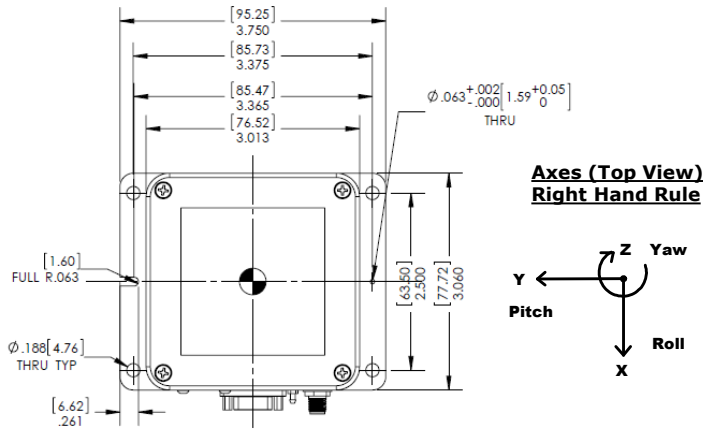


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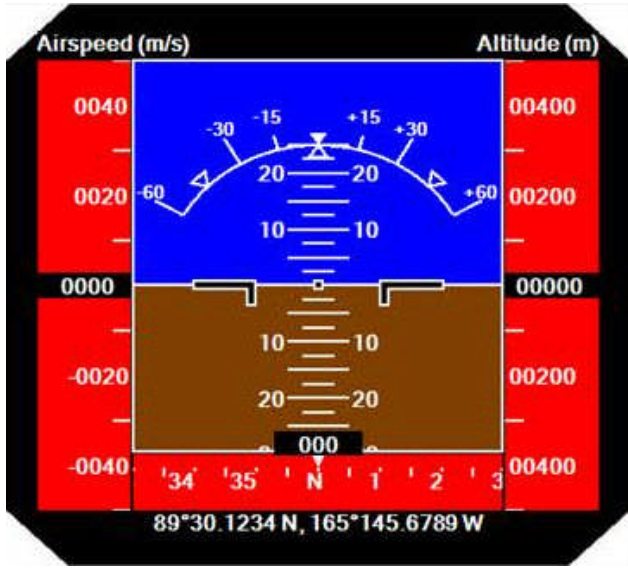
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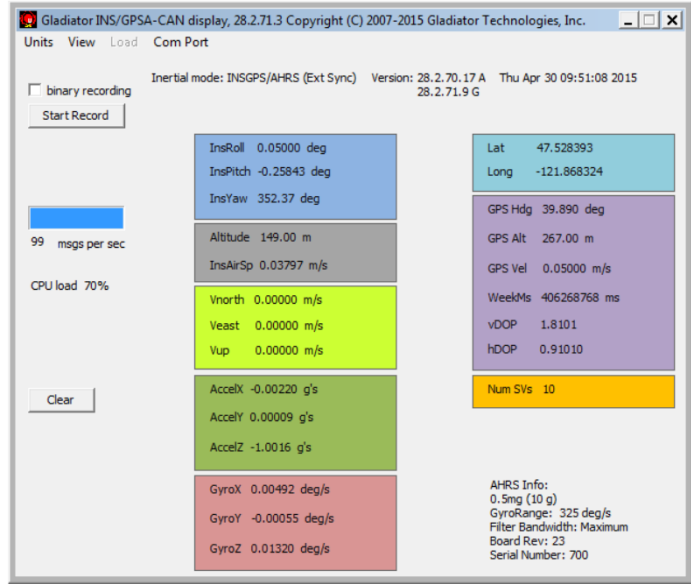
**LandMark™ 70 INS/GPS CAN P/N:**  
 LMRK70INSGPS-100-02-200 or -06 or -10  
 LMRK70INSGPS-175-02-200 or -06 or -10  
 LMRK70INSGPS-300-02-200 or -06 or -10

Pin No.	GPS/AHRS Assignment
1	RS-422/RS-485 A (+) AHRS
2	RS-422/RS-485 B (-) AHRS
3	Power Ground
4	RS-422/RS-485 A (+) Combined GPS/AHRS
5	<b>+6V to +36V Input Power</b>
6	RS-422/RS-485 B (-) Combined GPS/AHRS
7	1 PPS Output
8	Signal Ground
9	Self Test
10	CAN H
11	CAN L
12	CAN Gnd
13	NC
14	NC
15	Case

Outputs	Serial Sequence at 100Hz
1, 2, 3	Gyros: Roll (X), Pitch (Y), Yaw (Z)
4, 5, 6	Accels: Fwd (X), Right (Y), Down (Z)
7	Temperature
8, 9, 10	Angles: Roll (X), Pitch (Y), Yaw (Z)
11, 12, 13	Baro Altitude, Airspeed
13, 14	vDOP, hDOP
15, 16	Longitude, Latitude
17, 18	Time ms, Time Week
19, 20, 21	GPS: Altitude, Velocity, Heading
22	No. of SV's
23, 24	AHRS Status/ Status, Checksum



SDK Attitude Indicator Display



SDK Data Display & Recording Software



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