

# TRIMBLE APX-18 LAND

## SINGLE BOARD DUAL ANTENNA GNSS-INERTIAL SOLUTION

The Trimble APX-18 Land is an OEM GNSS-inertial solution with dual GNSS antenna input, that enables a new class of small, portable mobile mapping systems. Comprised of a small single OEM board containing a precision GNSS receiver with optional RTK, onboard IMU and two antenna heading, the Trimble APX-18 Land uses the new Applanix IN-Fusion+ firmware featuring Trimble ProPoint GNSS technology to achieve unsurpassed positioning and orientation accuracy and robustness.

### HIGH ACCURACY, EXTREMELY SMALL PACKAGE

Measuring just 100 x 60 mm and weighing only 62 grams, the APX-18 provides unparalleled performance in an extremely small package. With a compact footprint, ease of integration, and fast setup, the APX-18 Land uses on-board inertial sensor calibration with the Applanix SmartCal™ software compensation technology for superior performance to meet the needs of ground vehicle applications in rail, mobile mapping, pavement management, fleet management, and vehicle testing.

Easily integrated with many types of sensors, including optical, infrared, and LiDAR, the APX-18 Land delivers high accuracy positioning and orientation information in a small, lightweight form factor.

The APX-18 Land product uses state-of-the-art low noise multi-frequency Trimble Maxwell™ GNSS technology, and tracks all current satellite signals including GPS L1/L2/L2C/L5 and GLONASS L1/L2, QZSS, Beidou, IRNSS, and Galileo, and supporting SBAS, RTK, and Trimble CenterPoint® RTX™ positioning modes.

The Trimble APX-18 Land is fully supported by the industry-leading Applanix POSPac MMS post-processing software, featuring Post-processed Trimble CenterPoint RTX™ for centimeter position accuracy without base stations, making it the ultimate solution for integrators wishing to produce a highly efficient mobile mapping system. For LiDAR integrators, the APX-18 Land is also fully compatible with the POSPac MMS LiDAR QC Tools, which performs LiDAR to IMU boresighting and trajectory adjustment using the LiDAR point cloud.

### Key Features

- ▶ Compact single-board OEM module complete with survey-grade multifrequency GNSS receiver and MEMS inertial components
- ▶ Stable, reliable, and repeatable positioning solution for land-based applications
- ▶ Two antenna heading support
- ▶ Applanix SmartCal™ compensation technology for superior position and orientation performance
- ▶ Applanix POSPac MMS post-processing software for highest accuracy
- ▶ High accuracy orientation
- ▶ RTK option for real-time precision positioning
- ▶ Next generation Applanix In-Fusion+™ GNSS-aided inertial firmware featuring Trimble ProPoint™ GNSS Technology



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## TECHNICAL SPECIFICATIONS

- Applanix IN-Fusion+™ GNSS-inertial integration firmware featuring Trimble ProPoint™ GNSS Technology
- Onboard IMU with solid-state MEMS inertial sensors with Applanix SmartCal™ compensation technology
- Advanced Trimble GNSS survey technology
- Position antenna based on 336 Channels Maxwell 7 chip:
  - GPS: L1 C/A, L2E, L2C, L5
  - BeiDou B1, B1C, B2, B2A, B3<sup>1</sup>
  - GLONASS: L1 C/A, L2 C/A, L3 CDMA<sup>2</sup>
  - Galileo<sup>3</sup>: E1, E5A, E5B, E5AltBOC, E6<sup>2</sup>
  - IRNSS: L5
  - QZSS: L1 C/A, L1 SAIF, L1C, L2C, L5, LEX
  - SBAS: L1 C/A, L5
  - MSS L-Band: OmniSTAR, Trimble RTX
- Vector Antenna based on second 336 Channel Maxwell 7 chip:
  - GPS: L1 C/A, L2E, L2C, L5
  - BeiDou B1, B1C, B2, B2A, B3<sup>1</sup>
  - GLONASS: L1 C/A, L2 C/A, L3 CDMA<sup>2</sup>
  - Galileo<sup>3</sup>: E1, E5A, E5B, E5AltBOC, E6<sup>2</sup>
  - IRNSS L5
  - QZSS: L1 C/A, L1 SAIF, L1C, L2C, L5, LEX
- High precision multiple correlator for GNSS pseudorange measurements
- Advanced RF Spectrum Monitoring and Analysis
- Unfiltered, unsmoothed pseudorange measurements data for low noise, low multipath error, low time domain correlation and high dynamic response
- Very low noise GNSS carrier phase measurements with <1 mm precision in a 1 Hz bandwidth
- Proven Trimble low elevation tracking technology
- 100 Hz real-time position and orientation output
- IMU data rate 200 Hz
- Navigation output format: ASCII (NMEA-0183), Binary (Trimble GSOFF)
- Supported Reference input:
  - CMR, CMR+, sCMRx, RTCM 2.1, 2.2, 2.3, 3.0, 3.1, 3.2
- Support for POSPac MMS post-processing software (sold separately)
- Support for Distance Measurement Indicator (DMI) input (sold separately)
- No export permit required

## LAN INPUT/OUTPUT

All Ethernet functions are supported through dedicated IP address (Static or DNS) simultaneously.

TCP/IP and UDP	ASCII and Binary data streaming (Time tag, PPS sync, status, position, attitude, velocity, track and speed, dynamics, performance metrics, GNSS data)
HTTP	Web based Control software (GUI) for easy system configuration and low rate display. Support for all common browsers (IE, Safari, Mozilla, Google Chrome, Firefox)
LOGGING: Internal Logging External Logging Parameters	6 GByte Flash memory USB 2.0 Device port Time tag, status, position, attitude, velocity, track and speed, dynamics, performance metrics, raw IMU data (200 Hz), raw GNSS data (5 Hz).

## SERIAL INPUT/OUTPUT

2 x RS232 ports Parameters	ASCII and Binary data streaming (Time tag, PPS sync, status, position, attitude, velocity, track and speed, dynamics, performance metrics, GNSS data), reference input (CMR, CMR+, sCMRx, RTCM), configuration messages.
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## Other I/O

PPS (pulse-per-second) Event Input (2) DMI Input	Time Sync Pulse output Two time mark of external event Quadrature pulse with reference voltage
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## PERFORMANCE SPECIFICATIONS<sup>4</sup> (RMS ERROR)

No GNSS outages, standard road vehicle dynamics

	SPS	SBAS	RTK	Post-Processed <sup>9</sup>
Position (m)	1.5 H	0.1 H	0.02 H	0.02 H
	3.0 V	0.5 V	0.03 V	0.03 V
Velocity	0.01	0.01	0.01	0.005
Roll & Pitch (deg)	0.04	0.03	0.03	0.025
True Heading <sup>5</sup> (deg)	0.12	0.09	0.09	0.06

1 km or 1 minute GNSS outage, standard road vehicle dynamics<sup>6</sup>

	SPS	SBAS	RTK	Post-Processed <sup>9</sup>
Position (m)	2.0 H	2.0 H	1.0 H	0.80 H
	5.0 V	3.0 V	2.0 V	0.20 V
Roll & Pitch (deg)	0.09	0.09	0.09	0.05
True Heading <sup>5</sup> (deg)	0.35	0.35	0.30	0.20

## PHYSICAL CHARACTERISTICS

Size	100 L x 60 W x 12 H mm (nominal)
Weight	0.62 kg
Power	3.3 V DC +5%/-3%, typical power consumption of 4 W at room temperature
Connectors	I/O: 44 Pin Header Samtec TMM-122-03-S-S-MW (mating part FCI 90311-044LF) DMI: DE9
Antenna Port:	TConnector: 2 x MMCX receptacle Output Voltage: 3.3 V DC to 5 V DC Maximum Current: 400 mA
LNA gain:	32 dB (> 35 dB Recommended)

## ENVIRONMENTAL CHARACTERISTICS

Temperature	-40 deg C to +75 deg C (Operational) -55 deg C to +85 deg C (Storage)
Measurement Range	+/- 6g <sup>7</sup> , +/- 350 dps
Mechanical Shock	+/- 75g Survival
Operating Humidity	5% to 95% R.H. non-condensing at +60 deg C
Maximum Operating Limits	.515 m/sec 18,000 m alt

## ADDITIONAL ACCESSORIES

Evaluation Kit:	Includes development board and power supply
DMI:	External wheel-mounted DMI and cable
GNSS Antennas:	Survey-grade GNSS antennas and cables

(1) The hardware of this product is designed for Beidou B3 compatibility (trial version) and its firmware will be enhanced to fully support such new signals as soon as the officially published signal interface control documentation (ICD) becomes available

(2) There is no public GLONASS L3 CDMA or Galileo E6 ICD. The current capability in the receivers is based on publicly available information. As such, Trimble cannot guarantee that these receivers will be fully compatible.

(3) Developed under a License of the European Union and the European Space Agency

(4) Typical performance over all dynamic conditions, actual performance can be better depending on usage. Results also dependent upon satellite configuration, atmospheric conditions and other environmental effects.

(5) Using GAMS option and two metre antenna baseline

(6) With DMI option (DMI sold separately)

(7) Sensor bandwidth (-3 dB amplitude) ~ 50 Hz

(8) POSPac MMS, Single Base station or SmartBase

Specifications subject to change without notice.

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