



# APX-15 UAV

## KEY FEATURES

High-performance Direct Georeferencing solution for improved efficiency and accuracy of mapping from small Unmanned Aerial Vehicles

- Reduce/eliminate GCP's
- Reduce Sidelap
- Accurate LIDAR georeferencing

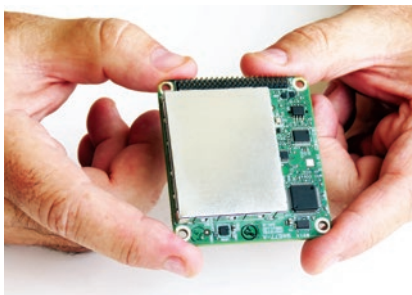
Compact Single-Board OEM module complete with survey-grade multi-frequency GNSS receiver and MEMS inertial components

Applanix IN-Fusion™ GNSS-Inertial and SmartCal™ compensation technology for superior position and orientation performance

POSPac UAV Differential GNSS-Inertial post-processing Software for highest accuracy

RTK real-time position for precision landing applications

High-accuracy real-time orientation

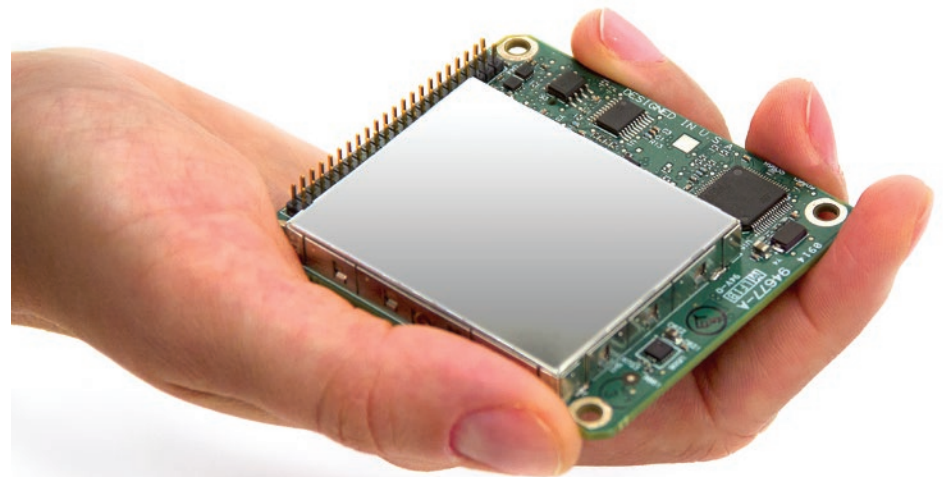


APX-15 UAV BOARD

## SINGLE BOARD GNSS-INERTIAL SOLUTION FOR EFFICIENT, HIGH-ACCURACY MAPPING FROM SMALL UNMANNED AERIAL VEHICLES

The Applanix APX-15 UAV is a GNSS-Inertial OEM solution designed to reduce the cost and improve the efficiency of mapping from small Unmanned Aerial Vehicles. Comprised of a small single OEM board containing a precision GNSS receiver and inertial sensor components plus post-mission Differential GNSS-Inertial office software, the Applanix APX-15 UAV eliminates the need to survey extensive Ground Control Points (GCP's), and reduces the amount of sidelap to be flown, thus increasing the area flown per mission.

*capture everything. precisely.*



**applanix**  
A TRIMBLE COMPANY

*capture everything. precisely.*

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**היפר-טק**  
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# APX-15 UAV

## TECHNICAL SPECIFICATIONS

- Advanced Applanix IN-Fusion™ GNSS-Inertial integration technology
- Solid-state MEMS inertial sensors with Applanix SmartCal™ compensation technology
- Advanced Trimble Maxwell Custom GNSS survey technology
- 220 Channels
  - GPS: L1 C/A, L2C, L2E (Trimble method for tracking unencrypted L2P), L5
  - GLONASS: L1 C/A, L2 C/A, L3 CDMA
  - BeiDou: B1, B2
  - Galileo<sup>1</sup>: E1, E5A, E5B, E5AltBOC
  - QZSS: L1 C/A, L1 SAIF, L2C, L5
  - SBAS: L1 C/A, L5
- High precision multiple correlator for GNSS pseudorange measurements
- 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
- 5 Hz real-time position and orientation output
- IMU data rate 200 Hz
- Navigation output format: ASCII (NMEA-0183), Binary (Trimble GSOF)
- Supported Reference input: CMR, CMR+, sCMRx, RTCM 2.1, 2.2, 2.3, 3.0, 3.1
- Support for POSpac UAV post-processing software (included)
- 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)

## SERIAL INPUT/OUTPUT

RS232 level port  
TTL level (3.3 V) port  
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.

## OTHER INPUT/OUTPUT

PPS (pulse-per-second) Time Sync Pulse output  
Event Input (2) Two time mark of external events six time mark of external events. TTL 3.3 V pulses, max rate 50 Hz.  
Digital I/O (3) LED drivers with dedicated functionality for systems integrators.

## LOGGING

Internal Logging 6 GByte Flash memory  
External Logging USB 2.0 Device port  
Parameters Time tag, status, position, attitude, velocity, track and speed, dynamics, performance metrics, raw IMU data (200 Hz), raw GNSS data (5 Hz).

## PERFORMANCE SPECIFICATIONS<sup>2</sup> (RMS ERROR) Unmanned Airborne Vehicle Applications

	SPS	DGPS	RTK <sup>4</sup>	Post-Processed <sup>5</sup>
Position (m)	1.5 - 3.0	0.5 - 2.0	0.02 - 0.05	0.02 - 0.05
Velocity (m/s)	0.05	0.05	0.02	0.015
Roll & Pitch (deg)	0.04	0.03	0.03	0.025
True Heading <sup>3</sup> (deg)	0.30	0.28	0.18	0.080

## PHYSICAL CHARACTERISTICS

### Board Set

Size: . . . . . 67 L x 60 W x 15 H mm (nominal)  
Weight: . . . . . 60 grams  
Power: . . . . . Wide range input 8-32 V DC, typical power consumption of 3.5W at room temperature  
Connectors: . . . . . I/O: 44 Pin Header Samtec TMM-122-03-S-S-MW (mating part FCI 90311-044LF)  
Antenna: MMCX receptacle  
Antenna LNA Power Input: Input Voltage: 3.3 V DC to 5 V DC  
Maximum Current: 400 mA  
Minimum Required LNA Gain: 28.5dB

## ENVIRONMENTAL CHARACTERISTICS

Temperature: . . . . . -40 deg C to +75 deg C (Operational)  
-55 deg C to +85 deg C (Storage)  
Measurement Range: . . . . . +/- 6g<sup>2</sup>, +/- 300 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

## ADDITIONAL ACCESSORIES<sup>7</sup>

Evaluation Kit (Development Board)  
Mounting option with test cable

## POSPAC UAV OFFICE SOFTWARE

- Post-processed Differential GNSS-Inertial SW for APX-15
- 200 Hz Navigation solution (Position, Velocity, Orientation, Rates, Accelerations)
- Applanix IN-Fusion GNSS-Integration technology
- Full support for UAV dynamic models
- Single Base Differential GNSS-Inertial processing
- Forward and reverse processing with optimal Smoother
- Support for Applanix SmartBase virtual reference station module<sup>7</sup>

<sup>1</sup> Developed under a License of the European Union and the European Space Agency

<sup>2</sup> Typical performance. Actual results are dependent upon satellite configuration, atmospheric conditions and other environmental effects

<sup>3</sup> Typical survey mission profile, max RMS error. Heading error will increase for low speed rotor applications and when hovering.

<sup>4</sup> Requires base station and radio link, sold separately

<sup>5</sup> POSpac UAV, short base line operation

<sup>6</sup> Sensor bandwidth (-3 dB amplitude) - 50 Hz

<sup>7</sup> Sold separately

Specifications subject to change without notice.

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