APX-15 UAV
VERSION 3, SINGLE BOARD GNSS-INERTIAL SOLUTION

The Trimble 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 (UAVs). 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 Trimble APX-15 UAV eliminates the need to survey extensive Ground Control Points (GCP’s), and reduces the amount of sidelap required to be flown, thus increasing the area flown per mission.

HIGH ACCURACY, EXTREMELY SMALL PACKAGE

Measuring just 60 x 67 mm and weighing only 60 grams, the Applanix APX-15 UAV provides unparalleled performance in an extremely small package. And with the included POSPac UAV post-mission software, it produces a highly accurate position and orientation solution for direct georeferencing of cameras, LiDARs and other UAS sensors.

THE APX-15 UAV BRINGS ALL THE BENEFITS OF DIRECT GEOREFERENCING TO UAV PLATFORMS:

- Turn your UAV into a professional mapping solution
- Ultra-fast image georeferencing for faster map production and delivery
- Reduced number of ground control points, saving time and money
- Consistent, reliable, highly accurate results
- Increased collection area per flight for greater productivity
- Redundant navigation solution to autopilot for enhanced safety

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 multifrequency GNSS receiver and MEMS inertial components
- Applanix IN-Fusion™ GNSS-Inertial and SmartCal™ compensation technology
- POSPac UAV Differential GNSS Inertial post-processing software for highest accuracy
- RTK real-time position for precision landing applications
- Supports all common RTK corrections such as CMR, CMR+, RTCM
DATASHEET

TECHNICAL SPECIFICATIONS

System Summary
- 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
- 336 Channels
  - GPS: L1 C/A, L2C, L2E, L5
  - GLONASS: L1 C/A, L2 C/A, L3 CDMA
  - BeiDou: B1, B2
  - Galileo: E1, E5A, E5B, E5A/B OC
  - QZSS: L1 C/A, L1S, L1C, L2C, L5, L5EX
  - SBAS: L1 C/A, L5
- MSS L-band: Trimble RTX, OmniSTAR
- 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
- 100 Hz position, roll, pitch and heading output
- Generic Gimbal and Autopilot support
- IMU data rate 200 Hz
- Navigation output format: ASCII (NMEA-0183), Binary (Trimble GSOF)
- Supported Reference input: CMR, CMRx, sCMRx, RTCM 2.1, 2.2, 2.3, 3.0, 3.1
- Support for PP-RTX 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, CMRx, sCMRx, RTCM, configuration messages, Gimbal Encoder and Autopilot input support.

OTHER INPUT/OUTPUT

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

PHYSICAL CHARACTERISTICS

- Measurement Range: +/- 6g
- Temperature: -40 deg C to +75 deg C (Operational)
- Operating Humidity: 5% to 95% RH non-condensing at +60 deg C
- Maximum Operating Limits: 515 m/sec 18,000 m
- Physical Characteristics:
  - Size: 67 L x 60 W x 15 H mm (nominal)
  - Weight: 60 grams
  - Power: Wide range input 9-30 V DC, typical power consumption 3.5W at room temperature
  - Connectors: 44 Pin Header Samtec TMM-122-03-S-S-MW
  - Antenna Port: MMCX receptacle
  - Maximum Current: 400 mA

ADDITIONAL ACCESSORIES

Evaluation Kit (Development Board)

UNMANNED AIRCRAFT VEHICLE APPLICATIONS

- Specifications subject to change without notice.

LOGGING

Internal Logging
- 6 GByte Flash memory

External Logging
- 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)

PERFORMANCE SPECIFICATIONS (RMS ERROR)

Unmanned Airborne Vehicle Applications

<table>
<thead>
<tr>
<th>Position (m)</th>
<th>1.5 - 3.0</th>
<th>0.02 - 0.05</th>
<th>0.03 - 0.06</th>
<th>0.02 - 0.05</th>
</tr>
</thead>
<tbody>
<tr>
<td>Velocity (m/s)</td>
<td>0.05</td>
<td>0.02</td>
<td>0.05</td>
<td>0.015</td>
</tr>
<tr>
<td>Roll &amp; Pitch (deg)</td>
<td>0.04</td>
<td>0.03</td>
<td>0.025</td>
<td>0.025</td>
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<tr>
<td>True Heading (deg)</td>
<td>0.30</td>
<td>0.18</td>
<td>0.08</td>
<td>0.080</td>
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</tbody>
</table>

ENVIRONMENTAL CHARACTERISTICS

- Temperature: -40 deg C to +75 deg C (Operational)
- Mechanical Shock: +/- 6g, +/- 300 dps
- Operating Humidity: 5% to 95% RH non-condensing at +60 deg C
- Maximum Operating Limits: 515 m/sec 18,000 m

POSTPAC 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
- Support for PP-RTX

Specifications subject to change without notice.

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