# TRIMBLE APX RTX

## Single board GNSS-inertial solution

The 4th generation Trimble APX RTX™ is a GNSS-inertial OEM solution designed to reduce costs and improve mapping efficiency from Uncrewed Aerial Vehicles (UAVs). The APX RTX is comprised of a small OEM board containing a precision GNSS receiver enabled with the Trimble CenterPoint® RTX correction service, onboard inertial sensors, a dedicated interface for external IMU models, plus post-mission GNSS-inertial software.  The APX RTX eliminates the need to use a base station or survey extensive Ground Control Points (GCPs), and reduces the amount of sidelap required to be flown, thus increasing the area flown per mission.

### High accuracy, extremely small package

Measuring just 67 x 60 x 15 mm and weighing only 56 grams, the APX RTX  provides unparalleled performance in an extremely small package. Also, with a dedicated remote IMU connector, the APX RTX offers a simple plug and play method of adding an external IMU for gimbal mount support or higher accuracy orientation where needed. The APX RTX includes a Centerpoint RTX Complete subscription which enables real-time and post-mission centimeter-level positioning without base stations and automatic processing via Applanix POSPac UAV without any additional licenses. Available with four different performance options, the APX RTX produces the highest accuracy position and orientation accuracy tailored for direct georeferencing of virtually any UAV payloads.



## 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 without the need for base stations
- 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

## The Trimble APX RTX brings it all

- Trimble CenterPoint RTX Complete: high accuracy real-time and post-processing GNSS correction service for mapping without base stations
- Trimble Applanix SmartCal™: IMU software compensation technology
- Applanix IN-Fusion+™: real-time and post-processed aided-inertial sensor fusion software, featuring Trimble ProPoint® GNSS technology
- Trimble Maxwell™: survey grade GNSS technology
- Trimble Store: Your Hub for Hassle-Free Subscription Management
- Applanix POSPac UAV Complete: GNSS-inertial post-processing software (PP-RTX, Single Base and Applanix SmartBase)

**www.applanix.com**

HYPER-TECH Systems

Trimble®

# TRIMBLE APX RTX

## TECHNICAL SPECIFICATIONS

### System Summary
- Advanced Applanix IN-Fusion+ GNSS-Inertial integration software with Trimble ProPoint GNSS technology
- Solid-state MEMS inertial sensors with Applanix SmartCal compensation technology
- Advanced Trimble Maxwell Custom GNSS survey technology
- 336 Channels
- .................................................................................................GPS: L1 C/A, L1C, L2C, L2E, L5
- ..............................................................GLONASS: L1 C/A, L1P, L2P, L2 C/A, L3 CDMA[7]
- ................................................................................. BeiDou: B1, B1C, B2, B2A, B2B
- ................................................................................... Galileo: E1, E5A, E5B, E5AltBOC
- ...................................................................................... QZSS: L1 C/A, L1S, L1C, L2C, L5
- ....................................................................................................... SBAS: L1 C/A, L5
- ..........................................................................................................NavIC: L5 C/A
- ..................................................................................... MSS L-band: Trimble RTX®
- High precision multiple correlator for GNSS pseudorange measurements
- Trimble Everest™ Plus multipath mitigation
- 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 support
- IMU data rate 200 Hz
- Navigation output format: ASCII (NMEA-0183), Binary (Trimble GSOF)
- Centerpoint RTX Complete[3] subscription, including real time CenterPoint RTX correction service and Applanix POSPac™ UAV Complete post-processing
- Dedicated onboard connector for remote IMU
- No export permit required

## LAN INPUT/OUTPUT
All Ethernet functions are supported through a 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 (Google Chrome recommended)

## 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, Gimbal Encoder and Autopilot input support.

## OTHER INPUT/OUTPUT
PPS (pulse-per-second) Time Sync Pulse output
Event Input (2) ................................................................Two 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
USB 2.0.......................................................................................................... Device/Host mode

## LOGGING
Internal Logging...................... 9 GByte Flash memory External LogginExternal Logging USB 2.0 Host port
Parameters . Time tag, status, position, attitude, velocity, track and speed, dynamics, performance metrics, raw IMU data (200 Hz), raw GNSS data (5 Hz)

1  Typical performance. Actual results depend on satellite configuration, atmospheric conditions, environmental effects, GNSS antenna
2  Typical survey mission profile, max RMS error. Heading error will increase for low speed rotor applications and when hovering.
3  Trimble CenterPoint RTX Complete, 1-year subscription including real-time CenterPoint RTX high accuracy correction service and POSPac Complete ( PP-RTX, Single Base and Applanix SmartBase processing)
4  Performance is subject to Applanix POSPac UAV processing mode
5  The accuracy is subject to regional coverage, data set duration and GNSS antenna
6  Sold separately
7  There is no official GLONASS L3CDMA. The current tracking capability is based on publicly available information. Full receiver compatibility cannot be guaranteed.

## PERFORMANCE SPECIFICATIONS[1] (RMS ERROR)

### Unmanned Airborne Vehicle Applications

| | APX-15[3] | | APX-20[3] | | APX-30[3] | | APX-50[3] | |
|---|---|---|---|---|---|---|---|---|
| | Trimble RTX[5] | Applanix POSPac UAV Complete[4] | Trimble RTX[5] | Applanix POSPac UAV Complete[4] | Trimble RTX[5] | Applanix POSPac UAV Complete[4] | Trimble RTX[5] | Applanix POSPac UAV Complete[4] |
| Position (m) | 0.03H 0.06V | 0.02H 0.03V-0.05V | 0.03H 0.06V | 0.02H 0.03V-0.05V | 0.03H 0.06V | 0.02H 0.03V-0.05V | 0.03H 0.06V | 0.02H 0.03V-0.05V |
| Velocity (m/s) | 0.020 | 0.015 | 0.015 | 0.010 | 0.015 | 0.010 | 0.010 | 0.005 |
| Roll & Pitch (deg) | 0.030 | 0.025 | 0.015 | 0.010 | 0.010 | 0.008 | 0.006 | 0.005 |
| True Heading[2] (deg) | 0.180 | 0.080 | 0.080 | 0.030 | 0.050 | 0.025 | 0.020 | 0.010 |

## INERTIAL MEASUREMENT UNITS (IMUs)

| Model | IMU Type | Range | Temp °C Optional | Power | Size mm (L×W×H) | Weight (kg) |
|---|---|---|---|---|---|---|
| APX-15 | Onboard IMU-103 | +/-15g +/- 300 dps | -40 to +75 | n/a | n/a | n/a |
| APX-20 | Onboard IMU-104 | +/-15g +/- 300 dps | -40 to +75 | n/a | n/a | n/a |
| APX-30 | Remote IMU-93 | +/-10g +/- 490 dps | -40 to +85 | 4.75-28VDC 3W max | 50×50×50 | 0.18 |
| APX-50 | Remote IMU-95 | +/-10g +/- 490 dps | -40 to +85 | 4.75-28VDC 3W max | 50×50×50 | 0.18 |

## PHYSICAL CHARACTERISTICS
Size ...............................................................67 mm x 60 mm x 15 mm (L×W×H) (nominal)
Weight................................................................................................................. 56 grams
Power ......................................Wide range input 9-30 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 Port:
Connector: ...............................................................................................MMCX receptacle
Output Voltage:...................................... 3.3 V DC to 5 V DC Maximum Current: 400 mA
Minimum Input Signal Strength:...................................... 32 dB (>35 dB Recommended)

## ENVIRONMENTAL CHARACTERISTICS
Temperature:......................................................................-40 °C to +75 °C (Operational)
-55 °C to +85 °C (Storage)
Mechanical Shock:.......................................................................................+/- 75g Survival
Operating Humidity: ................................... 5% to 95% R.H. non-condensing at +60 °C
Maximum Operating Limits...............................................................515 m/sec 18,000 m

## ADDITIONAL ACCESSORIES[6]
Evaluation Kit (Includes development board, power supply and short antenna cable)
Compact GNSS UAV Antenna - Multi-frequency, Multi-constellation, L-Band

## APPLANIX POSPac UAV SOFTWARE (INCLUDED)
- Post-processed GNSS-Inertial SW
- 200 Hz Navigation solution (Position, Velocity, Orientation, Rates, Accelerations)
- Applanix IN-Fusion+ GNSS-Integration technology
- Full support for UAV dynamic models
- Applanix POSPac UAV Complete: PP-RTX, Single Base and Applanix SmartBase post-processing
- Forward and reverse processing with optimal Smoother
- Processing enabled automatically as part of Centerpoint RTX Complete subscription, no additional licensing required

*Specifications subject to change without notice.*

## HYPER-TECH Systems

14 Odem ST. P.O.B. 7042 Petach Tikva 4917001, ISRAEL | Office: +972-3-924-3352
Fax: +972-3-9243385 | sales@hypertech.co.il | www.hypertech.co.il

**TRIMBLE APPLANIX**