The Trimble APX-20 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 small, low power, precision GNSS and inertial hardware components and POSPac UAV post-mission Differential GNSS-Inertial office software, the APX-20 UAV eliminates the need to survey extensive Ground Control Points (GCP’s), and reduces the amount of sidelap required to be flown per flight. The innovative APX-20 UAV features a precision, survey grade GNSS receiver and dual inertial measurement units; one embedded onto the GNSS-inertial board and one as an external unit mounted on the sensor to be georeferenced. With this feature the APX-20 UAV automatically supports integration on gimballed platforms without requiring an external interface to an autopilot or the mount itself.

**HIGH ACCURACY, EXTREMELY SMALL PACKAGE**

Weighing only 90 grams, and measuring just 60 x 67 x 34 mm for the GNSS-Inertial board, with different types of external IMU sensors, the APX-20 UAV provides unparalleled performance in an extremely small and lightweight package. The APX-20 UAV computes a real-time navigation solution at 100 Hz using its embedded IMU while simultaneously logging the raw IMU data from both the internal and external IMU at 200 Hz for post-processing in POSPac UAV. The highly accurate post-processed position and orientation solutions are used for direct georeferencing of cameras, LiDARs and other sensors.

**THE APX-20 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/Camera georeferencing
  - Seamless workflow with gimballed platforms
- Compact OEM module complete with survey-grade multi-frequency GNSS receiver and embedded and external IMU’s
- 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 georeferencing
- RTK real-time position for precision landing and real-time mapping applications
- Supports all common RTK corrections such as CMR, CMR+, RTCM
DATASHEET

INERTIAL MEASUREMENT UNITS (IMUS)

<table>
<thead>
<tr>
<th>IMU Type</th>
<th>Range</th>
<th>Temperature</th>
<th>Power</th>
<th>Size</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal onboard</td>
<td>IU59</td>
<td>+/-6g, +/-350dps</td>
<td>-40 to +75</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>External IMU</td>
<td>IU82</td>
<td>+/-10g, +/-490dps</td>
<td>-40 to +85</td>
<td>4.75 to 36 VDC (4W max)</td>
<td>61 x 68 x 65 (L x W x H)</td>
</tr>
<tr>
<td>External IMU</td>
<td>IU90</td>
<td>+/-40g, +/-490dps</td>
<td>-40 to +85</td>
<td>5 to 30 VDC (1.8W max)</td>
<td>39 x 42 x 22 (L x W x H)</td>
</tr>
</tbody>
</table>

PERFORMANCE SPECIFICATIONS\(^1\) (RMS ERROR)

Unmanned Airborne Vehicle Applications

<table>
<thead>
<tr>
<th>Position (m)</th>
<th>Velocity (m/s)</th>
<th>Roll &amp; Pitch (deg)</th>
<th>True Heading(^2) (deg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.5 - 3.0</td>
<td>0.02 - 0.05</td>
<td>0.03 - 0.05</td>
<td>0.10 - 0.15</td>
</tr>
</tbody>
</table>

PHYSICAL CHARACTERISTICS

Size\(^3\) | Width x Height x Depth | Weight\(^4\) | Power\(^5\) | Temperature | Shock | Humidity |
<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>67 L x 60 W x 34 H mm</td>
<td>90 grams</td>
<td>4W</td>
<td>-40 deg C to +75 deg C</td>
<td>+/-75g Survival</td>
<td>5% to 95% R.H.</td>
<td>18,000 m</td>
</tr>
</tbody>
</table>

ENVIRONMENTAL CHARACTERISTICS

Temperature: -40 deg C to +75 deg C (Operational)
-55 deg C to +85 deg C (Storage)

Mechanical Shock: +/-75g Survival

Operating Humidity: 5% to 95% R.H. non-condensing at -60 deg C

Maximum Operating Limits: .515 m/sec .513 m/sec

ADDITIONAL ACCESORIES\(^7\)

Evaluation Kit (Development Board)

POSPAC UAV OFFICE SOFTWARE

- Post-processed Differential GNSS-Inertial SW for APX-2D
- 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 with support for Applanix SmartBase virtual reference station module\(^8\)
- Support for PP-RTX\(^9\)

Specifications subject to change without notice.

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1. Developed under a License of the European Union and the European Space Agency
2. Typical performance. Actual results are dependent upon satellite configuration, atmospheric conditions and other environmental effects
3. Typical survey mission profile, max RMS error. Heading error will increase for low speed rotor applications and when hovering.
4. Requires base station and radio link, sold separately
5. POSPac UAV, short base line operation
6. Sensor bandwidth (-3 dB amplitude) - 50 Hz
7. POSPac UAV/MMS, Post-processed CenterPoint® RTX™
8. POSPac UAV post-processing software (included)
9. Support for PP-RTX