The Trimble AP60 GNSS-Inertial OEM System is an embedded GNSS-Inertial OEM board set plus Inertial Measurement Unit (IMU) in a compact form factor. It is designed to give system integrators the ability to harness the best in GNSS multi-frequency positioning technology, with the superior capabilities of inertial data for continuous mobile positioning in poor signal environments, and for the orientation of imaging sensors.

The Trimble AP60 features a high-performance precision GNSS receiver and the industry leading Applanix IN-Fusion™ GNSS-Inertial integration technology running on a powerful, dedicated Inertial Engine (IE) board. This flexible, modular design ensures the ability to perform full high-powered GNSS-inertial processing without sacrificing performance, and an upgrade path to next generation GNSS boards as they become available.

PERFORMANCE YOU CAN TRUST
Whether it be guiding autonomous vehicles to winning finishes in the DARPA Urban challenge, motion compensating multibeam sonar to meet IHO standards, or georeferencing airborne laser scanners to centimetre level accuracy from high in the sky, Trimble GNSS with Applanix inertial technology has a proven track record of performance without compromise. With Trimble AP products you know exactly what positioning performance you will get for your mobile application.
TRIMBLE AP60 GNSS-INERTIAL OEM SYSTEM

TECHNICAL SPECIFICATIONS

- Advanced Applanix IN-Fusion™ GNSS-inertial integration technology
- Advanced Trimble Maxwell® 6 Custom GNSS survey technology (two chipsets)
- 220 Channels: (per chipset)
  - GPS: L1 C/A, L2C, L2E (Trimble method for tracking unencrypted) L5
  - GLONASS: L1 C/A and unencrypted P code, L2 C/A and unencrypted P code, L3 CDMA
  - GALEO: L1 C/A, L1C, L1 SAIF, L2C, L5, LEX
  - SBAS: L1 C/A (EGNOS/MSAS), L1 C/A and L5 (WAAS)
  - L-Band: OmniSTAR VBS, HP, XP and G2
- 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
- Support for optional Distance Measurement Indicator (DMI) input
- Support for optional GNSS Azimuth Measurement System (GAMS™)
- Support for optional POSPac Mobile Mapping Suite post-processing software

INPUT/OUTPUT

LAN
- Parameters: Time tag, status, position, attitude, velocity, track and speed, dynamics, performance metrics, raw IMU data (200 Hz), raw GNSS data (5 Hz)
- Display Port: Low rate UDP protocol output (1 Hz)
- Control Port: TCP/IP input for system commands
- Primary Port: Real-time TCP/IP or UDP protocol output (1 – 200 Hz)
- Secondary Port: Buffered TCP/IP protocol output for data logging to external device (1 – 200 Hz)
- Internal Logging (1 – 200 Hz)
  - Parameters: Time tag, status, position, attitude, velocity, track and speed, dynamics, performance metrics, raw IMU data (200 Hz), raw GNSS data (5Hz)
- RS232 Input
  - Parameter: AUX GPS Input (RTK, SBAS), CMR, CMR+, RTCM v2.x, RTCM v3.x
- RS232 NMEA Output (1 – 50 Hz)
  - Parameter: Position ($INGGA), Heading ($INHDT), Track and Speed ($INVTG), Statistics ($INGST), Attitude ($PSCH), Time and Date ($INZDA), Events ($EVTH, $EVTV)
- Other I/O
  - 1 pulse-per-second
  - Event Input (2)
  - Time tag, status, position, attitude, velocity, track and speed, dynamics, performance metrics, raw IMU data (200 Hz), raw GNSS data (5Hz)

PERFORMANCE SPECIFICATIONS (RMS ERROR)

Airborne Applications

<table>
<thead>
<tr>
<th></th>
<th>SPS</th>
<th>DGPS</th>
<th>XP²</th>
<th>Post-Processed³</th>
</tr>
</thead>
<tbody>
<tr>
<td>Position (m)</td>
<td>1.5 – 3.0</td>
<td>0.5 – 2.0</td>
<td>0.1 – 0.5</td>
<td>0.05 – 0.30</td>
</tr>
<tr>
<td>Velocity (m/s)</td>
<td>0.030</td>
<td>0.020</td>
<td>0.010</td>
<td>0.005</td>
</tr>
<tr>
<td>Roll &amp; Pitch (deg)</td>
<td>0.005</td>
<td>0.005</td>
<td>0.005</td>
<td>0.0025</td>
</tr>
<tr>
<td>True Heading² (deg)</td>
<td>0.030</td>
<td>0.030</td>
<td>0.020</td>
<td>0.005</td>
</tr>
</tbody>
</table>

Marine Applications, No GNSS Outages

<table>
<thead>
<tr>
<th></th>
<th>SPS</th>
<th>DGPS</th>
<th>IARTK⁴</th>
<th>Post-Processed⁴</th>
</tr>
</thead>
<tbody>
<tr>
<td>Position (m)</td>
<td>1.5 – 3.0</td>
<td>0.5 – 2.0</td>
<td>0.02 – 0.30</td>
<td>0.02 – 0.65</td>
</tr>
<tr>
<td>Velocity (m/s)</td>
<td>0.030</td>
<td>0.020</td>
<td>0.010</td>
<td>0.005</td>
</tr>
<tr>
<td>Roll &amp; Pitch (deg)</td>
<td>0.005</td>
<td>0.005</td>
<td>0.005</td>
<td>0.005</td>
</tr>
<tr>
<td>True Heading² (deg)</td>
<td>0.020</td>
<td>0.020</td>
<td>0.020</td>
<td>0.015</td>
</tr>
</tbody>
</table>

Terrestrial Applications, No GNSS Outages

<table>
<thead>
<tr>
<th></th>
<th>SPS</th>
<th>VBS⁵</th>
<th>IARTK⁴</th>
<th>Post-Processed⁴</th>
</tr>
</thead>
<tbody>
<tr>
<td>Position (m)</td>
<td>1.5 – 3.0</td>
<td>0.1 – 0.5</td>
<td>0.02 – 0.05</td>
<td>0.02 – 0.05</td>
</tr>
<tr>
<td>Velocity (m/s)</td>
<td>0.030</td>
<td>0.010</td>
<td>0.010</td>
<td>0.005</td>
</tr>
<tr>
<td>Roll &amp; Pitch (deg)</td>
<td>0.005</td>
<td>0.005</td>
<td>0.005</td>
<td>0.005</td>
</tr>
<tr>
<td>True Heading² (deg)</td>
<td>0.020</td>
<td>0.020</td>
<td>0.020</td>
<td>0.015</td>
</tr>
</tbody>
</table>

Terrestrial Applications, 1 km or 1 minute GNSS Outages

<table>
<thead>
<tr>
<th></th>
<th>SPS</th>
<th>VBS⁵</th>
<th>IARTK⁴</th>
<th>Post-Processed⁴</th>
</tr>
</thead>
<tbody>
<tr>
<td>Position (m)</td>
<td>4.0</td>
<td>0.41 – 0.5</td>
<td>0.10 – 0.28</td>
<td>0.07 – 0.10</td>
</tr>
<tr>
<td>Roll &amp; Pitch (deg)</td>
<td>0.08</td>
<td>0.05</td>
<td>0.05</td>
<td>0.05</td>
</tr>
<tr>
<td>True Heading² (deg)</td>
<td>0.050</td>
<td>0.020</td>
<td>0.020</td>
<td>0.015</td>
</tr>
</tbody>
</table>

PHYSICAL CHARACTERISTICS

Board Set
- Size: 130 L x 100 W x 39 H mm (nominal)
- Weight: 0.28 kg (nominal)
- Power: 10 – 28 Volts DC, 20 Watts (max, with GAMS option)
- Connectors: I/O: Samtec QSH-060-01-L-D-D-P-A-RT1
- Power: Samtec TFM-105-12-S-D-LC
- Antenna: MMCX receptacle

ENVIRONMENTAL CHARACTERISTICS

- Temperature: -40 deg C to +75 deg C (Operational)
- -55 deg C to +85 deg C (Storage)
- Humidity: 5% to 90% non-condensing

Inertial Measurement Unit (IMU)

<table>
<thead>
<tr>
<th></th>
<th>Type</th>
<th>Class</th>
<th>Temperature</th>
<th>Power</th>
<th>Size (L x W x H) mm</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>IMU-21</td>
<td>COM</td>
<td>-40 deg C to +70 deg C</td>
<td>x42 Vdc, 42 W (max)</td>
<td>163 X 165 X 163</td>
<td>4.49 kg</td>
<td></td>
</tr>
</tbody>
</table>

Specifications subject to change without notice.

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