ADU5

Key Features

- **Precise heading, pitch and roll**
- **Instantaneous 3-D attitude information**
- **Embedded 2-channel 300-KHz beacon receiver**
- **Rugged design**

5 Hz Attitude and More

Ashtech once again raises the bar on GPS attitude determination and real-time positioning with the ADU5™. The ADU5 is built on the strength of its predecessors, the Ashtech® 3DF, ADU1 and ADU2 and delivers unsurpassed accuracy in a rugged, full-function system. ADU5 provides precise heading, pitch and roll along with three-dimensional position and velocities at a rate of up to 5 Hz for static and dynamic platforms, making it an ideal solution for a wide variety of airborne, marine and terrestrial applications. In addition, while the ADU5 has the same dimensions and interface as ADU2, it consumes much less power than ADU2.

Advanced Features

The ADU5 utilizes a 4-antenna x 14-channel receiver configuration for optimal satellite tracking and reliable positioning. The ADU5 also incorporates signals from Satellite Based Augmentation Systems (SBAS) such as WAAS, EGNOS, and MSAT and features an embedded 2-channel 300-kHz beacon receiver for easy DGPS operations.

The ADU5 employs "on-the-fly" integer ambiguity resolution techniques using carrier phase measurements from the 4 on-board GPS receivers to provide instantaneous 3-D attitude information. Attitude angular accuracies depend on the spatial separation between the four antennas. ADU5 can provide accuracies of 0.1 degree for heading and 0.2 degree for pitch and roll using a 2-meter antenna separation. ADU5 also features a unique Kalman filter with user-selectable dynamic modes such as ship, aircraft, adaptive, etc. to match operating conditions.

User-Friendly Operation Advanced Features

Windows®-based Evaluate™ and CalibADU™ software are provided along with the ADU5. Evaluate software communicates directly with the receiver for control and monitoring. It provides visual displays of satellite tracking information, position, velocities and attitude. It is also capable of data logging and statistical accuracy analysis. CalibADU software allows the user to determine the relative antenna vectors and calibrate the receiver with the click of a button.

Easy Integration

Packaged in a robust housing, the ADU5 can be integrated into existing navigation system racks. As with its predecessors, the ADU5 can be readily employed in a variety of precision GPS usages such as gyro compass calibration, dredge positioning, oceanographic acoustic doppler current profiling (ADCP), airborne videography and remote sensing, as well as many other terrestrial, marine and airborne weapons and antenna-pointing applications.

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Real-Time Position Accuracy[1]

Autonomous
- CEP: 3 m (9.843 ft)
- GPS and GLONASS L1 C/A,
- 95%: 5 m (16.404 ft)

Differential
- Local Base Station
  - CEP: 40 cm (15.75 in)
  - 95%: 90 cm (35.43 in)
- Beacon
  - CEP: 90 cm (35.43 in)
  - 95%: 1.6 m (5.25 ft)
- SBAS
  - CEP: 1 m (3.28 ft)
  - 95%: 3 m (9.84 ft)

Velocity Accuracy[1] (Knots)
- CEP: 1 m (3.28 ft)

Time to First Fix[1]
- Re-acquisition   3 sec
- Hot start   11 sec
- Warm start   35 sec
- Cold start   90 sec
  < 2 minute cold start to first attitude data

Real-Time Attitude Accuracy[2]

1-meter Antenna Separation
- Heading   0.2° rms
- Pitch/Roll   0.4° rms

3-meter Antenna Separation
- Heading   0.06° rms
- Pitch/Roll   0.12° rms

10-meter Antenna Separation
- Heading   0.02° rms
- Pitch/Roll   0.04° rms

ADU5 Features

56 GPS code and carrier channels. On the primary receiver, 2 channels can be configured to track SBAS signals. Also, the primary receiver has 2 additional channels to track 300-kHz differential beacon signals.

- Standard NMEA–0183 output
- 4 antenna input
- 5-Hz attitude and position update rate
- Raw data output (code & carrier)
- Event Marker
- 1 PPS (5V TTL)
  Precision: 200 ns (stand-alone)
              50 ns (differential)
- Edge Correlator™ multipath mitigation
- Differential remote RTCM v2.2, message types 1, 2, 3, 6, 9, 16
- Separate real-time differential position on antenna 1
- < 6 watt power consumption
- 10 to 29 VDC input
- 2 RS-232 serial ports
  -115,200 Baud (maximum)

Typical Antenna Setup

Environmental and Physical

Receiver
- Operating Temp: -20°C to +55°C
                   (-4°F to 131°F)
- Storage Temp: -30°C to +75°C
                   (-22°F to 167°F)
- Weight: 1.93 kg (4.125 lbs)
- Dimensions: 21.5 cm W x 9.5 cm H x 19.48 cm D
              (8.46 in W x 3.74 in H x 7.67 in D)
- Speed (max): 514 m/sec (1,000 knots)
- Altitude (max): 18287 m (60,000 feet)

Antenna
- Operating Temp: -40°C to +65°C
                   (-40°F to 149°F)
- Storage Temp: -55°C to +75°C
                   (-67°F to 167°F)
- Weight: 114 gr (0.25 lbs)

ADU5 Accessories
- Installation/calibration software
- 2 RS-232 interface cables
- Evaluate software-interface for set-up and monitoring
- Receiver operating and installation manual

Optional Accessories
- 10, 30 and 60-meter antenna cables
- In-line antenna cable amplifier
- Marine antenna kit
- Aircraft antenna kit
- TNC/Type N adapter
- Firmware available to remove the Altitude Limit

[1] Accuraccy and TTFF specs. based on tests conducted in SantaClara and Moscow. Tests at different locations under different conditions may produce different results. Position accuracy specifications are for horizontal positioning. Vertical error is typically <2 times horizontal error.

[2] Attitude accuracy increases with antenna separation; for example, doubling the antenna separation makes the accuracy twice as good.

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