



Technical specifications

Sentiboard

I/O ports: 10

- 3x UART
- 2x SPI interfaces
- 1x RS422
- 2x RS232
- 1x external trigger signal: PPS out
- 1x USB out
- Option for triggering of LIDARs and RGB/IR camera

Data throughput and storage

Maximum data throughput: 8 Mbit/s

Options: SD card or on-board computer

Power

SenTiBoard power: 5V DC. 0.7 W idle. Peak 5W.

SenTiBoard power GNSS, IMU, and magnetic sensors.

External sensors (LIDAR, camera, etc.) are powered separately.

INS Specifications (recommended sensors)

Accuracy

Position:

- 1.20 m RMS (standalone GNSS)
- 0.50 m RMS (differential)
- 0.02 m RMS (RTK)

Heave: 5cm or 5%

Velocity: 0.05 m/s RMS

Roll/pitch: 0.05 deg

Yaw: 0.3 deg

Accuracy without aiding (60 sec.)

Position: 5 m

Velocity: < 0.1 m/s

Roll/pitch: < 0.1 deg

Yaw: 0.3 deg

Software (SW) Options

INS SW running in ROS

Self contained application based on available source code

Recommended GNSS: Dual u-blox F9P

Accuracy

Position standalone: 1.5 m CEP

Position RTK: 0.01 m + 1 ppm CEP

Heading accuracy

Heading 1m baseline: 0.4° degrees

Heading 2m baseline: 0.3 degrees

RTK

RTK realtime

RTK correction online via NTRIP

interface via internet connection

GNSS systems

GPS: L1 C/A, L2C

GLONASS: L10F(G1),

L20F(G2) GALILEO:

E1B/C, E5b

Beidou: B1I, B2I

QZSS: L1 C/A, L2C

Startup time

Cold start 24s

Aided start 2s

Reacquisition 2s

Timing

Timing synchronization

accuracy: 0.03 μ s (1σ)

Time pulse: Configurable:

0.25 Hz to 10 MHz

Output rate: 1-20 Hz

Recommended IMU: ADIS16495-1

Gyro/Angular rate sensor

Dynamic range: ± 125 deg/s
In Run Bias Stability: 0.8 deg/h.
Angular Random Walk (ARW):
0.09 deg/ \sqrt{h} .

Accelerometer

Dynamic range: ± 8 g
In Run Bias Stability: 3.2 μ g
Velocity Random Walk (VRW):
0.008 m/s/ \sqrt{h}

Output rate

125/250/425/850 Hz or
external trigger

Interface: SPI

IMU Options

Other IMU choices are also possible

ADIS 16490

Gyro/Angular rate sensor

Dynamic range: ± 100 deg/s
In Run Bias Stability: 1.8 deg/h.
Angular Random Walk (ARW): 0.09 deg/ \sqrt{h}

Accelerometer

Dynamic range: ± 8 g
In Run Bias Stability: 3.6 μ g
Velocity Random Walk (VRW): 0.008 m/s/ \sqrt{h}

Output rate

125/250/425/850 Hz or
external trigger

Interface: SPI

ADIS 16495-1

Gyro/Angular rate sensor

Dynamic range: ± 125 deg/s
In Run Bias Stability: 0.8 deg/h.
Angular Random Walk (ARW): 0.09 deg/ \sqrt{h} .

Accelerometer

Dynamic range: ± 8 g
In Run Bias Stability: 3.2 μ g
Velocity Random Walk (VRW): 0.008 m/s/ \sqrt{h}

Output rate

125/250/425/850 Hz or
external trigger

Interface: SPI

STIM 300

Gyro/Angular rate sensor

Dynamic range: ± 400 deg/s
In Run Bias Stability: 0.3 deg/h.
Angular Random Walk (ARW): 0.15 deg/ \sqrt{h}

Accelerometer

Dynamic range: ± 5 g
In Run Bias Stability: 30 μ g
Velocity Random Walk (VRW): 0.04 m/s/ \sqrt{h}

Inclinometer

Dynamic range: ± 1.7 g
In Run Bias Stability: 50 μ g
Velocity Random Walk (VRW): 0.08 m/s/ \sqrt{h}

Output rate

125/250/500/1000/2000 Hz or external trigger

Interface: RS422

STIM 318

Gyro/Angular rate sensor

Dynamic range: ± 400 deg/s
In Run Bias Stability: 0.3 deg/h.
Angular Random Walk (ARW): 0.15 deg/ \sqrt{h} .

Accelerometer

Dynamic range: ± 10 g
In Run Bias Stability: 3.0 μ g
Velocity Random Walk (VRW): 0.015 m/s/ \sqrt{h}

Inclinometer

Dynamic range: ± 1.7 g
In Run Bias Stability: 50 μ g
Velocity Random Walk (VRW): 0.08 m/s/ \sqrt{h}

Output rate

125/250/500/1000/2000 Hz or external trigger

Interface: RS422

GNSS Options Other GNSS choices are also possible

Dual u-blox F9T

Accuracy

Position standalone: 2.5 m CEP

GNSS heading available postprocess

RTK

RTK postprocess

Output rate: 1-4 Hz

GNSS systems:

GPS: L1 C/A

GLONASS: L10F(G1)

GALILEO: E1B/C

Beidou: B1I QZSS L1 C/A

Startup time

Cold start 25s

Aided start 2s

Reacquisition 2s

Timing

Timing synchronization accuracy:

$\leq 0.02 \mu\text{s} (1\sigma)$

Time pulse: Configurable: 0.25 Hz to 10 MHz

Dual u-blox F9T

Accuracy

Position standalone: 2.0 m CEP

GNSS heading available postprocess

RTK

RTK postprocess

Output rate: 1-20 Hz

GNSS systems:

GPS: L1 C/A, L2C

GLONASS: L10F(G1), L20F(G2)

GALILEO: E1B/C, E5b

Beidou: B1I, B2I QZSS L1 C/A, L2C

Startup time

Cold start 24s

Aided start 2s

Reacquisition 2s

Timing

Timing synchronization accuracy:

$\leq 0.005 \mu\text{s} (1\sigma)$

Time pulse: Configurable: 0.25 Hz to 10 MHz

Recommended GNSS: Dual u-blox F9P

Accuracy

Position standalone: 1.5 m CEP

Position RTK: 0.01 m + 1 ppm CEP

Heading 1m baseline:

0.4 degrees

Heading 2m baseline:

0.3 degrees

RTK

RTK realtime

RTK correction online via NTRIP

interface via internet connection

Output rate: 1-20 Hz

GNSS systems:

GPS: L1 C/A, L2C

GLONASS: L10F(G1), L20F(G2)

GALILEO: E1B/C, E5b

Beidou: B1I, B2I QZSS L1 C/A, L2C

Startup time

Cold start 24s

Aided start 2s

Reacquisition 2s

Timing

Timing synchronization accuracy: $0.03 \mu\text{s} (1\sigma)$

Time pulse: Configurable: 0.25 Hz to 10 MHz