SoftSpot ORION

Real-Time Software GNSS Receiver

SYNTONY *gnss*

Locate & Be Located

Whether your business' domain is Aeronautics, Space, Automotive, or Rail, you are facing the need for performance, precision, versatility, and cost-effectiveness. These industries require solutions that meet operational challenges while adapting to future advancements.

The ORION receiver is designed for aerospace applications, including short-duration space missions like rocket launches. With its compact and robust design, ORION supports multi-constellation, multi-band capabilities to deliver accurate positioning in demanding conditions.

ORION addresses the aerospace industry's need for reliable and efficient GNSS technology while remaining cost-effective and versatile. Its features make it a practical choice for organizations seeking to improve performance, integrate advanced navigation systems, and meet evolving industry requirements.

Extensive options

- ✓ Embedded GNSS Receiver
- ✓ 1 or 2 RF stages for mono or bi-frequency
- ✓ High perfo rmance GNSS reception
- ✓ Robust to vibration
- ✓ Operating temperature from
- ✓ -40 to +85°C
- ✓ Full Post-delivery upgradability:
  - Fonctional & Performance improvement
  - Compatibility enhance
- ✓ ADC 2 bits I/Q
- ✓ 25MHz sampling rate
- ✓ From pure L1C/A up to Multi-GNSS
- ✓ Mono or multi-frequency
- ✓ Includes accelerometer & pressure sensors
- ✓ Important: Independant acquisition for all signals, allowing L5-only acquisition when L1 is not available or jammed

ORION hardware platform is based on the following design choices:
- MAXIM 2771 RF stage
- Xilinx ZU3EG or equivalent SoC
- Ruggerized design able to withstand most of the usual conditions (ground transportation, aircraft, launcher)
- Robust metal case
- Basic level of anti-jamming robustness
- In option: IMU support
- In option: Ethernet connectivity

ORION receiver embed the SDR GNSS receiver called SoftSpot which:
- Performs the cold and warm acquisition independently for each signal, constellation and frequency
- Computes the correlators
- Makes the tracking independently for all signals also
- Computes the pseudo ranges
- Computes the PVT (Position, Velocity, Time) taking into account the signals that are in visibility

The acquisition, tracking and PVT being done independently on all signals, there is no need for the receiver to acquire GPS L1C/A to be able to compute a PVT, whereas most of the existing chipsets on the market have this drawback.

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Specifications

Software

Signals

GPS	L1C/A, L5
GALILEO	E1OS, E5a
GLONASS, BEIDOU, IRNSS, SBAS, GBAS, QZSS	on demand

Performance

Channels	Up to 48 (default to 12/signals)
Dual Frequency	✓
Restart Fix (warm)	Typ. <10sec (<3sec with IMU)
Trajectories	Static, subsonic, supersonic, LEO, GEO, launchers
Antenna	Active antenna (powered by coax), typ. 3.3V DC
PVT update rate	1 or 10Hz, can be more if required

Real-Time Accuracy @95%	Ground (m)	LEO (m)
L1C/A	21.5	5.52
L1C/A, E1	11.5	2.50
L1C/A, E1, E5a	3.94	2.24
L1C/A, E1, L5, E5a	2.48	2.16

TTFF (independant)	Ground (s)	LEO (s)
L1C/A	38	42
E1	39	72
E5a	66	93
L5	42	71

Post-treatment Accuracy @95%	Ground (m)	LEO (m)
L1C/A	1.33	1.33
L1C/A, E1	0.44	0.44
L1C/A, E1, E5a	0.28	0.28
L1C/A, E1, L5, E5a	0.20	0.20

Hardware

RF Input

Frequency Range	1100MHz to 1610MHz
RF Bandwidth	20MHz

Connectors

Antenna	1 SMA
Power Supply	5V Jack 2.1
UART	SUB D 15 pin
USB	USB type C (USB3) or micro USB
1PPS Signal	Can be available on SUB D

Other Sensors

IMU	ASM330LHH
Pressure	MPL3115A2

Physical dimensions and characteristics

Board Dimensions	7cm x 5cm x 1.6cm
Overall (box)	Can be adapted to customers' needs and constraints
Consumption	Up to 5W; <1W in fractioned mode (LEO orbit)
Operating Temperature	From -40 to +85°C

Misc

Exportation Outside Europe	Can be delivered free of exportation license (<600m/s) or needs license

Options

DGPS	Avalaible on demand
RTK	Avalaible on demand
Ground	Speed <100m/s
Aero	Speed <600m/s
Space	Speed >=600m/s

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