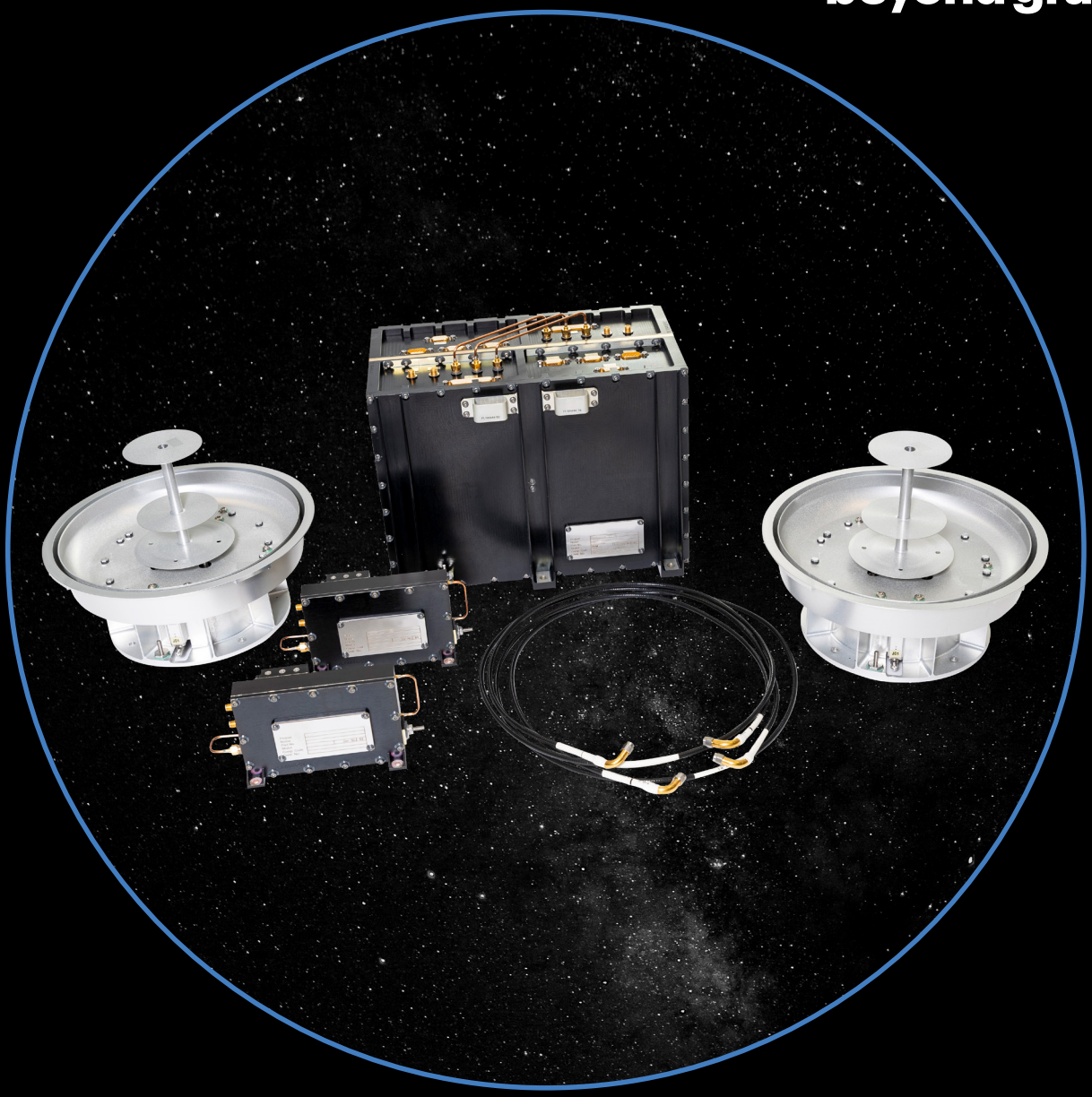
beyond gravity



GEORIX GNSS Receiver

Redundant, Multi-Constellation, Single-Frequency, GTO/GEO

GEORIX, the Beyond Gravity multi-constellation (GPS, GALILEO) single-frequency GNSS Receiver for GTO and GEO applications provides an excellent on-board realtime navigation solution accuracy of below 20 meter (in GEO).

Key features

- Antenna with gain pattern optimised for GEO
- Detached LNAs for improved performance figures
- GTO support, e.g. for electric propulsion satellites
- Support for cross-coupling of two non-redundant antenna/LNA sets to cold-redundant electronics box
- Accurate force model-based orbit propagator
- Advanced Kalman filtering allows high on-board navigation performance
- Flexible acquisition and tracking concept providing:
- Single frequency signal processing of up to 12 satellites
- Sliding search window for minimized acquisition times
- Doppler-based loop aiding
- Configurable data rate per measurement type
- Powerful parameter interface supports changes in standby and operational mode
- Additional data products provide excellent visibility of receiver internals
- Low mass and power consumption

Interfaces

- TC/TM: MIL-STD-1553B or UART (RS-422) or SpaceWire
- PPS output nom/red/test (RS-422)
- Primary power input 100 V regulated
- ON/OFF high level command interface
- Thermistor TM interfaces

Supported GNSS Signals

Based on dedicated RF- and Mixed-Signal ASICs as well as the AGGA-4 ASIC, GEORIX is able to use the following signals:

- GPS C/A on L1
- Galileo E1 B/C

Data products

- Navigation solution based on GPS/GALILEO constellations
- PPS signal synchronized to GPS/GALILEO second
- Carrier phase measurements for each tracked signal
- Code phase measurements for each tracked signal
- Support data:
  - Tracking state
  - GDOP
  - Carrier to noise (C/N) measurement of each tracked signal
  - Noise measurements of each RF down-conversion chain
  - Satellites in view status
  - Satellite navigation message

On-board navigation solution accuracy in GEO

- Position: 20.0 m 3D rms
- Velocity: 1 cm/s 3D rms
- Time offset 1PPS (1σ): < 0.5 µs

Physical / environment

LNA:

- Size: 168x54x80 mm; weight: 0.6 kg

Electronic box:

- Size: 286x201x226 mm; weight: 9.0 kg
- Operating temperature: -30°C to + 60°C (qualification level)
- Minimum switch-on temperature: -40°C (qualification level)
- Radiation: suitable for GTO (200 days) and GEO (15 years)
- Power consumption: 15 W avg.

Antenna (recommended for GEO):

- Patch Excited Cup antenna
- Size: 212 mm, h: 179 mm; weight: 548 g

Time to first fix

Warm start < 15 min (in GEO)

Programs / heritage

Beyond Gravity has delivered more than 90 flight models of GNSS receivers to customers in Europe, USA, Middle East and Asia. Some example missions:

- SWARM (ESA)
- Sentinel-1, Sentinel-2 and Sentinel-3 A/B satellites (Copernicus)
- Sentinel-1, Sentinel-2 and Sentinel-3 C/D
- Sentinel-6/Michael Freilich A/B (NASA/ESA)
- Earthcare (ESA/JAXA)
- ICESat-2 (NASA)
- PACE (NASA)
- OSAM-1 (NASA)
- Biomass (ESA)
- FLEX (ESA)
- KOMPSAT-6, -7 (KARI)
- CAS-500 (KARI/KAI)
- WSF-M (Ball Aerospace)

Beyond Gravity
electronics@beyondgravity.com