

DEFENCE AND SPACE
Spacecraft Equipment

LION GNSS SERIES

The best of decades of Airbus
GNSS receivers heritage
concentrated in
a strong product family



A v i o n i c s



P a y l o a d



36 parallel channels are available to track all satellites in view. The LION 1000 series is designed to demodulate the navigation data messages of the GNSS constellations navigation signals and to use this information for PVT determination through an instant point-solution as well as through a dynamic Kalman-filtered solution.

Based on Airbus DS Products' heritage in the development of HiRel space GNSS receivers, the LION 1000 generation navigation receiver series delivers high performance supporting both multiple frequency reception and multiple navigation constellation operation. The cutting-edge new series takes benefit from advances in navigation processing technology, as well as from upgrades of the GPS constellation - now providing more civil signals - and from Galileo entering its operational phase. Therefore, LION 1300, the first member of the Product family, is designed to make use of the GPS signals L1, L2C, and L5 and of the Galileo signals E1, E5a, as well as Glonass and Compass open signals*.

The LION 1000 series reaches a very high level of integration and performance thanks to the use of an ASIC as the core of the receiver. This ASIC (AGGA-4), developed by AIRBUS under ESA contract, gathers in a single chip a modern GNSS baseband processor, a LEON-FT as a fault-tolerant microprocessor with FPU, and digital interfaces (1553, UART, SpW).

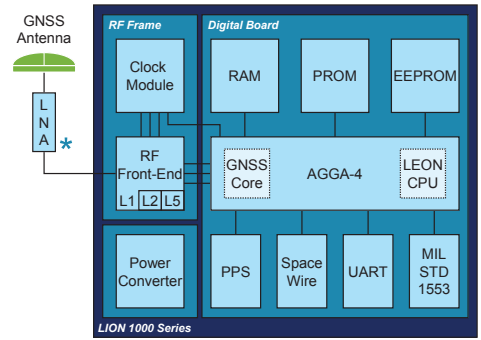
* on request for Glonass and Compass

FLIGHT PROVEN

LION 1000 architecture

LION 1000 is based on the AGGA-4, which comprises a complete GNSS core with 36 baseband channels, the LEON-FT as a fault-tolerant micro-processor together with a FPU, a FFT module and digital communication interfaces (MIL-STD-1553, UART, SpaceWire). On its digital board it is complemented with RAM, Boot Loader PROM, and an EEPROM to store the GNSS Application. The modular design of the RF frame provides for each GNSS frequency a RF front-end with filtering. A central OCXO provides the highly precise reference clock to all modules.

* For LION1000neo the LNA is integrated in the receiver



| LION 1000 SERIES - COMMON KEY FEATURES | |
|--|---|
| Multi-Constellation Receiver | Galileo / GPS / Glonass / Compass |
| Multi Use | Platform/Payload (scientific receiver) |
| High precision | <ul style="list-style-type: none"> Real-time performance using up to 36 Channels Centimeter post processing capability onground |
| Interfaces | <ul style="list-style-type: none"> Communication through MIL-STD 1553 bus, space wire, UART Up to 4 antennas capability 18-50V power supply |
| Power | <ul style="list-style-type: none"> Same footprint, same electrical interface, same SW for all LION series Products Operating : [-25°C ; 55°C] |
| Life time | 15 years |
| Radiation | TID > 50 kRad (Si) |
| Reliability | < 1500 fits |
| Application fields | LEO, MEO and GEO satellites |

| LION 1000 SERIES - COMMON KEY FEATURES | | | | |
|--|-----------------------------------|--|--|-------------------|
| | | LION 1300 | LION 1300Neo | LION 1100Neo |
| Budget | Mass | 6 Kg (without LNA, harness, Antenna) | 6.8 Kg (with LNA, without harness and Antenna) | |
| | Volume | 226 x 184 x 205 mm ³ | 226x229x205 mm ³ | |
| | Power | 20W | 18W | |
| Configuration | | Full redundancy in one box. LNA / Antenna external | Full redundancy in one box including LNA | |
| Performance | Frequency | Tri | | Mono |
| | | E1, L1, E5a, L2, L5 | | E1, L1 |
| | Position accuracy (3D-RMS) | 0.8 m (LEO) 30 m (GEO) | up to 1 m (LEO) 30 m (GEO) | up to 1.5 m (LEO) |
| | velocity accuracy | 0.001 m/s (LEO) 0.05 m/s (GEO) | 0.002 m/s (LEO) 0.05 m/s (GEO) | |
| | Time | 30 ns (LEO) 100 ns (GEO) | | |

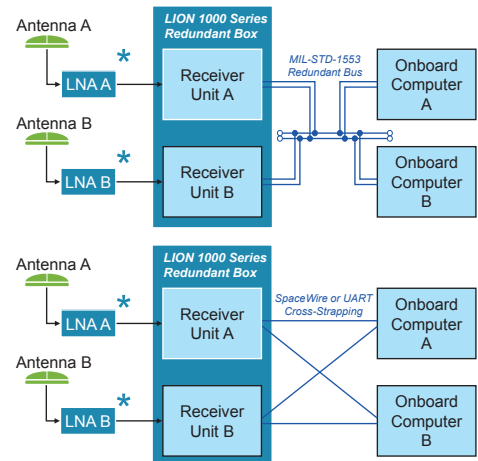
LION 1000 assembly

The typical complete redundant LION 1000 assembly is composed of:

- Two LION 1000 Units
- Two LNA Units
- Two GNSS Antennas
- Associated RF cables between above components

Up to four GNSS Antennas can be connected to each non-redundant LION 1000 Receiver Unit, e.g. for scientific applications. The communication options for the fully redundant connection with the onboard computers are:

- MIL-STD-1553 Bus
- Cross-strapped SpaceWire
- Cross-strapped UART



* For LION1000neo the LNA is integrated in the receiver

LION 1000Neo

LION1000neo is a derivate of the LION1000 series with integrated LNA & filter, implementing a complete single- (1100Neo) or multi- (1300Neo), constellation GNSS receiver. The main features are:

- Integrated LNA and cavity filters mounted to the receiver housing
- Same HW and SW interface as LION 1000 Series
- Architecture based on LION 1000 Series
- State-of-the-art design with AGGA-4 for GNSS signal processing
- Attractive price / performance relation
- Option for enhanced navigation algorithm using phase measurement for high accuracy orbit determination - increasing the navigation performance even further