

DEFENCE AND SPACE

Spacecraft Equipment

LEOPARD Navigation Unit

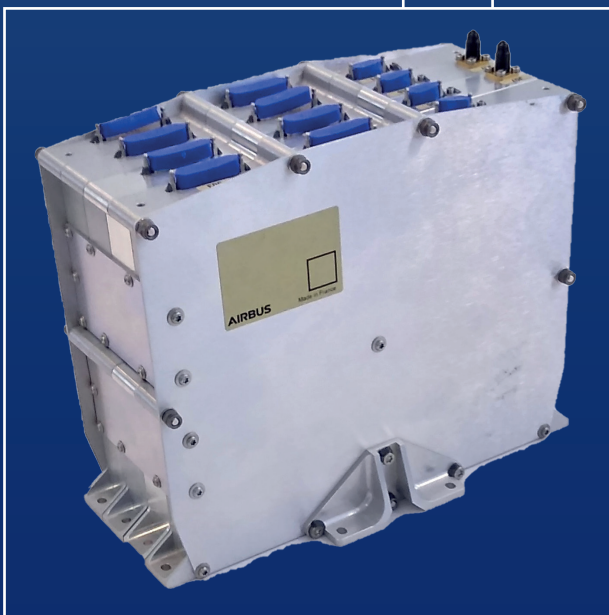
Single-frequency GNSS receiver
with optional star tracker



A v i o n i c s



P u r e L i n e



Airbus's LEOPARD Navigation Unit delivers position, velocity and time to Low Earth Orbit satellites. LEOPARD is a Global Navigation Satellite System (GNSS) Receiver also supporting an optional star tracker. This new navigation unit is fully based on flight-proven hardware, and takes advantage of previous GNSS receiver experience at Airbus, in particular with our MosaicGNSS and LION GNSS receiver products. Airbus GNSS receivers have over 15 years in-orbit heritage and more than 100 cumulated years in orbit on a global set of missions and orbits.

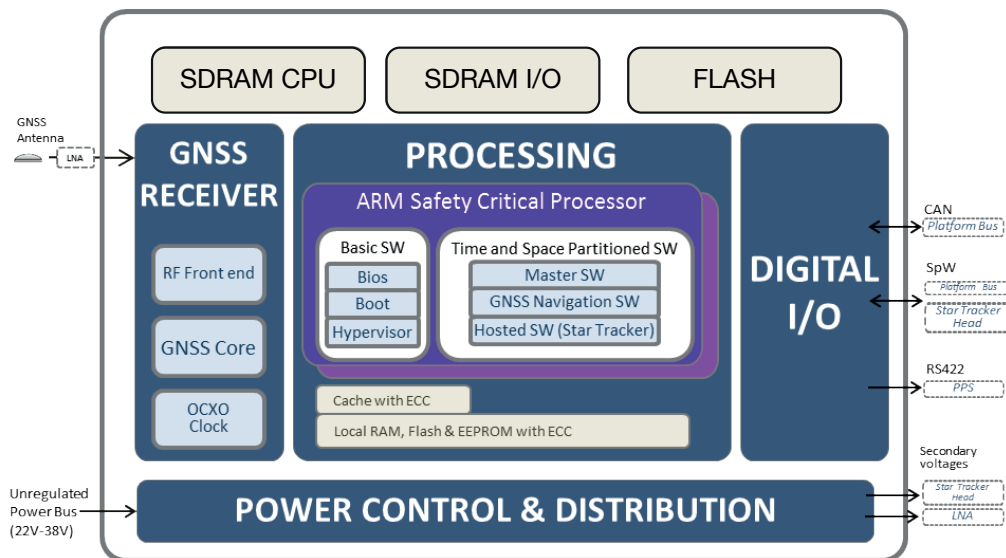
LEOPARD belongs to the Airbus New Space PureLine product family. PureLine was originally developed for mega-constellation applications, with first launch in early 2019. This cost-effective approach is based on Airbus technological heritage and batch procurement, utilizing mainly automotive COTS parts and processes.

LEOPARD is a standalone navigation unit, with two independent halves, integrating a single frequency GNSS receiver with an optional star tracker

Key features

- Hardware architecture using flight proven COTS
- GNSS receiver
- Optional star tracker
- Full cold redundancy with 2 boards in one unit
- ARM processor designed for safety critical mission:
 - Time & Space Partitioning hosting several application with RTEMS OS : Master SW, GNSS Navigation SW and optional hosted Star tracker SW
 - SEE mitigation
 - ARM Triple Core Lock-Step architecture
 - EDAC protected memory
 - Flight proven FDIR strategy with fast recovery
- GNSS signal processing :
 - RF Front end compatible for GPS L1 and Galileo E1 signal
 - Reloadable FPGA technology
 - Software stored and processed in SEE mitigated memory
 - OCXO clock

LEOPARD - specifications	
Lifetime	10 years
Interfaces	<ul style="list-style-type: none"> • RF interface • Communication through SpaceWire • PPS interface (RS422)
Weight	3.5 kg
Volume	110 x 240 x 170 mm ³
Power	10W
Radiation	Total Dose TID compatible with typical 10 years LEO
Frequency	GPS-L1, Galileo-E1
performance LEO	<ul style="list-style-type: none"> • Position: 10m • Velocity: 0.04m/s • Time: 50 ns • TTFF: 10 min



Options:

- Star tracker with SpaceWire interface
- Hosted application SW with SpaceWire connection using the available computing power of the ARM processor
- CAN interface
- Enhanced navigation algorithm using phase measurement for high accuracy orbit determination