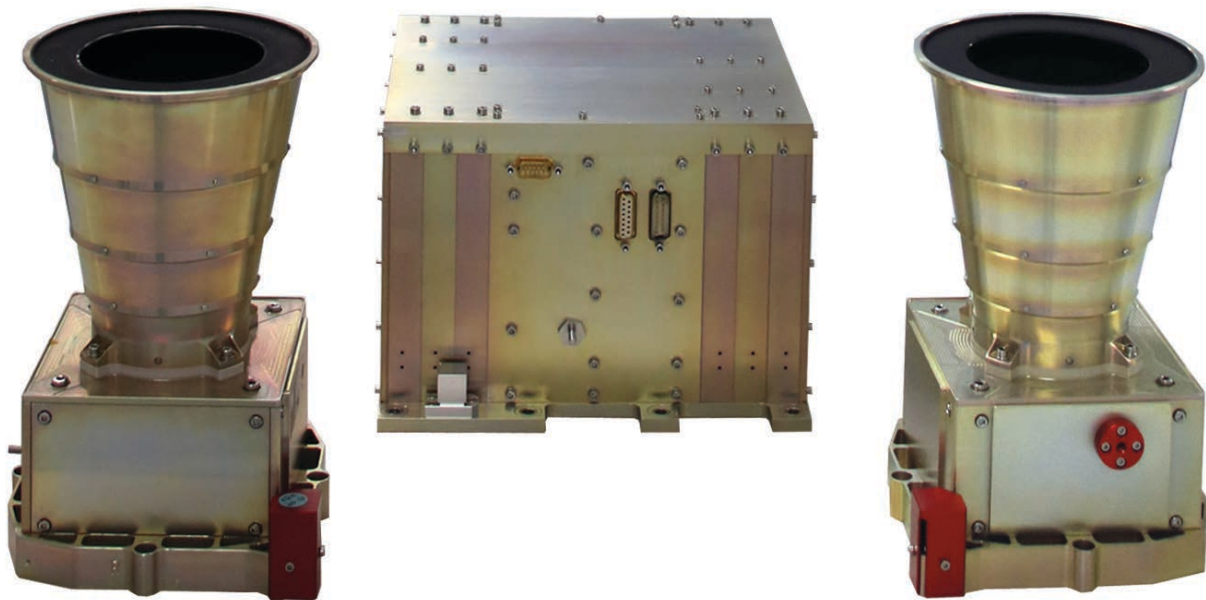


ASTROgyro™

The Jena-Optronik **ASTROgyro** unfolds the synergies of star trackers and gyroscopes.



Unfolding the synergies of star trackers and gyroscopes, **ASTROgyro™** establishes a reliable and performant attitude determination system by combining Jena-Optronik's successful **ASTRO** star tracker series, as source of absolute and drift-free attitude information based on star pattern recognition, with the broad dynamic range and low noise rate spectrum of inertial sensing technology.

ASTROgyro Performance

	ASTROgyro Star Sensor (AGS) ASTRO APS	ASTROgyro IRU (AGI) Inertial Reference Unit
System Design		
Technology	APS CMOS detector chip, radiation hard	Coriolis Vibratory Gyroscope (CVG)
System Concept		2 x AGS 1 x AGI (2 x 3-Axis Gyro Units) AGS and AGI cross-strapped
Output		Rate and attitude quaternions from AGS and AGI data
Interfaces & Operations		
Update Rate		30 Hz
Reliability		~ 0.981 (Probability of Success, 45°C, 15 years)
Data Interfaces		MIL-STD-1553B (other data interfaces on request)
Power Interface		28V nominal (customized versions on request)
Power Consumption	< 6 W (Peltier Cooler OFF) < 12 W (Peltier Cooler ON)	< 15 W (cold-redundant) < 30 W (hot-redundant) < 21 W (nominal min., system 1 x AGS & 1 x AGI cold-redundant) < 54 W (nominal max., system 2 x AGS & 1 x AGI hot-redundant)
Size & Mass		
Dimensions	154 mm x 154 mm x 237 mm (single unit)	~ 230 mm x 230 mm x 170 mm
Mass	approx. 2 kg (single unit)	approx. 7.8 kg
Temperature Range		
Operational / Performance	-30 °C ... +60 °C	-5 °C ... +65 °C
Non-operational	-35 °C ... +70 °C	-35 °C ... +85 °C
Gyro Performance Characteristics (typical)		
Full Scale Range		+/- 20 deg/sec (coarse), +/- 1 deg/sec (fine)
Angle Random Walk		< 0.005 deg/√hr, per axis
Noise Equivalent Angle		< 0.2 arcsec (1σ), per axis
Noise Equivalent Rate		< 2 deg/hr r.m.s (0.1 Hz ... 15 Hz), per axis
Bias Instability		< 0.05 deg/hr (1σ), per axis
Scale Factor Error		< 2500 ppm (1σ), per axis
Star Sensor Performance Characteristics (typical)		
Bias Error		< 5 arcsecs (full temperature range)
Noise Equivalent Angle		< 1 arc-sec (1σ, xy-axis) , < 8 arc-sec (1σ, z-axis)
Acquisition Time		< 10 sec (switch-on) < 5 sec (re-acquisition, lost-in-space)
Stray Light		Sun: 26 deg exclusion angle Earth: < 20 deg Moon: accepted in field of view