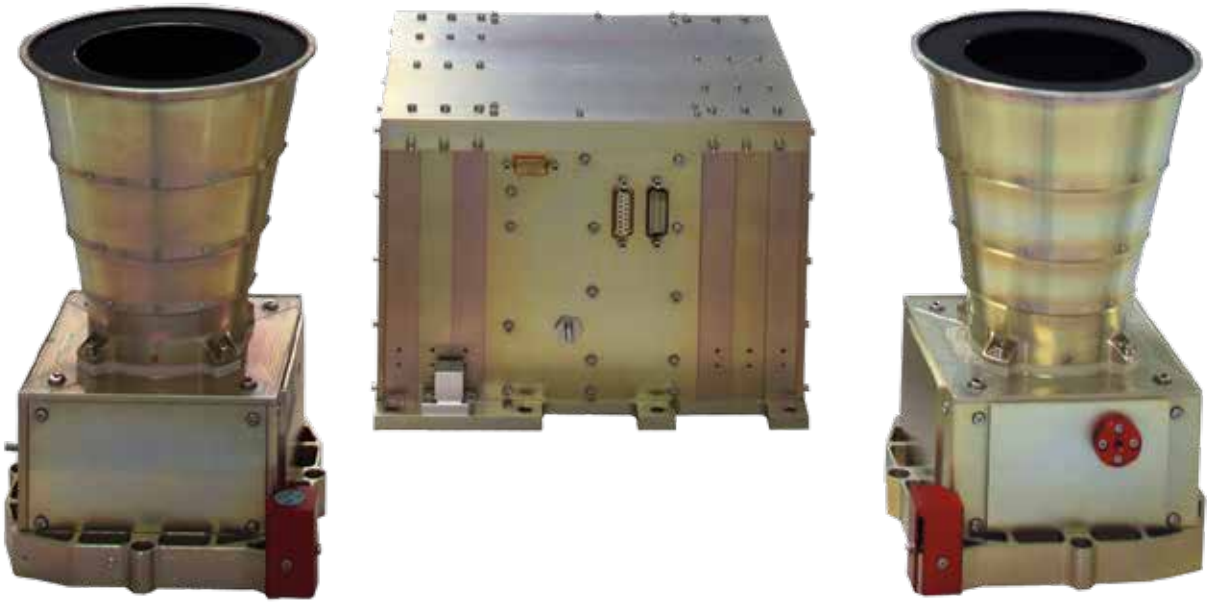
jenaoptronik

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.

jenaoptronik

ASTROgyro Performance

	ASTROgyro Star Sensor (AGS) ASTRO APS	ASTROgyro IRU (AGI) Inertial Reference Unit
System Design & Performance (typical)		
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 merged AGS and AGI data (raw data available)	
Random Attitude Error, typical	~ 1 arcsec (1σ), all axes	
Random Rate Error, typical	~ 4 arcsec/sec (1σ), all axes	
Gyro-Assisted Attitude Bridging (Star Tracker AGS denied, Earth Rate)	Typical 0.1 deg accuracy over a time period of 1000 sec	
Interfaces & Operations		
Update Rate	30 Hz (drift-free IRU data aided by 10 Hz STR updates)	
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	-30 °C ... +60 °C	-30 °C ... +65 °C (full performance)
Non-operational	-40 °C ... +70 °C	-55 °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 (Allan deviation)	
Scale Factor Error	< 3500 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 Sun Exclusion Angle Earth: 20 deg Earth Exclusion Angle Moon: accepted in FoV	

EN 9100 certified AIRCERT Certification of Management Systems

Jena-Optronik GmbH · Otto-Eppenstein-Straße 3 · 07745 Jena · Germany
Phone +49 3641 200-110 · **Fax** +49 3641 200-222
Email info@jena-optronik.de · **Web** www.jena-optronik.com