jenaoptronik

Autonomous Star Sensor ASTRO 15

ASTRO 15 of Jena-Optronik is a space proven Autonomous Star Sensor with more than 8 years of in-orbit heritage, for global customers on a large number of satellites for various applications.

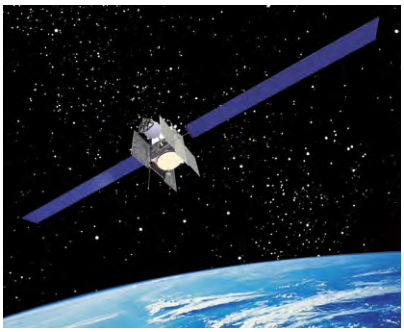
The ASTRO 15 is the most successful star sensor with over 150 Flight Models sold worldwide. With its high performance optics, highest grade components and the implemeted highly robust software it is the best choice for GEO missions.

Special Features

- Lifetime > 15 years
- Radiation design for 25 years GEO environment
- Modular design configurations
- Excellent thermal stability and shielding, e.g. applying Titanium
- Large optics' aperture for comfortable Signal to Noise Ratio under end of life conditions

Technology for Star Sensors

The requirements for the sensors are very demanding. In addition to measurement accuracy and efficiency, reliability and durability play a decisive role. All of our developments have proven this value under the conditions in space.



Spaceway communication satellite

ASTRO 15 Star Sensor Performance

Dimensions			
Sensor with 30° Baffle	192 mm Ø x 496 mm	[including Baffle]	
Sensor with 25° Baffle	192 mm Ø x 552 mm	[including Baffle]	
Mass			
Sensor without Baffle	< 4350 g for 5 years in LEO	< 4500 g for 15 years in GEO	
30° Baffle	< 1500 g		
25° Baffle	< 1650 g		
Optical Design			
Lens	refractive	focal length 55 mm	aperture 50 mm Ø
CCD Detector	resolution 1024 x 1024 pixels	pixel size 13.0 µm x 13.0 µm	active thermo-electric cooling
Temperature Range			
Operational	-30 °C...+55 °C		
Non-operational	-40 °C...+75 °C		
Performance			
Field of View	13.8° x 13.8° [physical]	13.25° x 13.25° [effective]	
Single Star Accuracy	bias < 10 arcsec xyz-axes	noise < 2.5 arcsec [1σ] for 6 m_i G_0-ref. star	
Attitude accuracy [LSFE, HSFE,TE]	< 1 arcsec [1σ] xy-axes	< 10 arcsec [1σ] z-axis	
Attitude re-acquisition	< 5 s [without a priori information]	< 0.5 s [with a priori information]	< 10 s after switch-on
Sensitivity	6.5 m_i G_0-ref. star [at t_i = 237 ms]		
SNR	≥ 35 for 6.0 m_i G_0-ref. star		
Slew rate	< 0.3°s^{-1} [full performance]	0.3...2°s^{-1} [reduced performance]	
Sampling time	250 ms [including tracking & attitude information]		
Power Consumption			
Peltier Cooling off	< 10 W [< 9.0 without autonomy module]		
Peltier Cooling	plus < 5 W [at max cooling power, $T_{I/F}$ = +55 °C]		
Operating Modes			
In-Orbit Modes for	stand-by attitude update self-test	attitude continuous initial attitude determination	acquisition & tracking upload
Data Interface			
	MIL-STD-1553B	RS 422	
Input Voltage Range			
	range 30 V - 52 V DC other voltages up to 100 V available		

EN 9100 certified AIRCERT Certification of Management Systems

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