

## High Accuracy Star Sensor **ASTRO XP**

The Jena-Optronik **ASTRO XP** is an Autonomous Star Sensor for high accuracy star tracking relying on a 45.000 guide stars catalogue.



**ASTRO XP has been developed to meet the specific requirements for high accuracy star tracking in science missions and high resolution Earth observation from GEO and LEO.**

The catoptric optics is made from a low expansion material only in order to achieve the highest level of stability over the space environment. The optics is free from any color aberration error and therefore suited for all star spectral classes.

The development has been made under contract of the European Space Agency.

### **ASTRO XP Highlights**

- Attitude error in-plane  $\leq 0.1$  arcsec
- Power consumption  $\leq 1.5$  W (optical head only)
- Mass  $\leq 2.5$  kg (optical head only)

## ASTRO XP Autonomous Star Sensor Performance

Specification	
<b>Field of view</b>	≤ 3.3 deg circular
<b>Optics</b>	170/2.0 catoptric axial FMA with central obscuration made from a low CTE material
<b>Image sensor</b>	FaintStar2
<b>Bias error</b>	≤ ± 0.5 arcsec
<b>Thermo-elastic error</b>	≤ 5 mas/K
<b>Attitude random error</b>	≤ 0.1/3.0 arcsec xy/z 1σ (5 stars, no filfiltering)
<b>Angular rate</b>	≤ 0.5 deg/sec, 100% acquisition & tracking ≤ 6 deg/sec, 100% acquisition & tracking, supported by Wide Field Optical Head
<b>Time tag accuracy</b>	≤ 0.1ms
<b>Lost in space</b>	≤ 500 ms at 8 Hz up to 0.5 deg/sec
<b>Update rates</b>	2, 4, 8 Hz
<b>Power consumption</b>	Optical Head: ≤ 1.5 W Electronics Unit: ≤ 5. W @ 28 VDC
<b>Mass / Envelope</b>	Optical Head: ≤ 2.5 kg, 172 mm x 172 mm, 100 mm height Baffle, SEA 30deg half-cone: ≤ 1.5 kg, 215 mm x 215 mm, 321 mm height Electronics Unit: ≤ 1.3 kg, 137 mm x 146 mm, 60 mm height
<b>Temperature range</b>	Operational: -55°C ... +30°C Non-operational: -65°C ... +60°C Start-up: -60°C ... +55°C
<b>Mechanical interface</b>	Optical Head: 3 x M6 to flat spacecraft interface Baffle, SEA 30deg half-cone: 3 x M6 to flat spacecraft interface Electronics Unit: 4 x M6 to flat spacecraft interface
<b>Operational interface</b>	SpaceWire, MIL1553 (option)
<b>Supply voltage</b>	28 VDC, others (option)
<b>Sun/Earth exclusion</b>	30deg / 26deg half-cone
<b>EEE-parts</b>	≥ 50 krad, SEL ≥ 65 MeVcm <sup>2</sup> /mg latch-up free, no SEB
<b>Life time:</b>	18 years, geo-synchronous orbit