ASTRO XP Cam

High performant camera in an extreme compact design

The ASTRO XP Cam, derived from the ASTRO XP (eXtreme Precision) star sensor, is a camera designed for high demanding navigation and observation scenarios. Thanks to its innovative optics ASTRO XP Cam combines an outstanding performance with a very low consumption of spacecraft resources to set a new standard for high performant space-applied cameras.

Core element of the ASTRO XP Cam is the 175/2.0 (focal length/f-number) optics as part of an optical head with an overall mass of only 2.6 kg. The consequent use of only one and low coefficient of thermal expansion (CTE) material for the catoptric optics ensures an excellent thermal stability due to the absence of any CTE mismatches.

Thanks to these features, ASTRO XP Cam is the best choice for missions demanding for a high performance with respect to radiometric (e.g. detection of a faint object for navigation or SSA) as well as line-of-sight stability (e.g. celestial body navigation) while saving of the spacecraft resources mass, envelope and power.

The following complementary design highlights enable the outstanding performance of the ASTRO XP Cam:

- An optical measurement system (the optical head) that is separated from the remaining electronics (the electronics unit) to ensure a minimum of mass, envelope and power consumption of the hardware close to the spacecraft main instrument bench.
- A FaintStar2 image sensor, which guarantees high radiometric performance and low power consumption thanks to a system on a chip architecture in a radiation hard design. The FaintStar2 was fully developed under ESA contract.
- Besides the avoidance of thermal-induced misalignment, the full catoptric design approach of the optics prevents any chromatic Errors.
- State-of-the-art algorithms for image background correction as well as for optional attitude acquisition and tracking.
- A high performance processing unit using state-of-the-art processing Hardware.
- The capability to connect up to three optical heads to one electronics unit

supports various redundancy concepts and configurations, whereat other Jena-Optronik products such as ASTRO CL, ASTRO APS3 or ASTROhead Cam can be involved.

Innovation and future: The ASTRO XP star sensor was rewarded with the “Thüringer Innovationspreis” in 2020. An ASTRO XP star sensor pre-qualification model passed the test-readiness review (TRR) in November 2022 whereat the production already involved all the demanding manufacturing technologies required to meet the specified Performance.