



TECHNOLOGY SOLUTION

Sensors

Miniaturized Astrometric Alignment Sensor

Advances miniature satellite capabilities for astrophysical measurements

BENEFITS

- Low power
- Miniaturized for various applications

Miniature satellites, sometimes called CubeSats, are mainly used for space research. These satellites are employed to demonstrate spacecraft technologies intended for small satellites or that present questionable feasibility and are unlikely to justify the cost of a larger satellite. Scientific experiments with unproven underlying theory may also find themselves aboard because their low cost can justify higher risks. There is a need for space-qualified pointing and alignment stellar sensor hardware. Alignment sensors can be used for virtual telescope demonstrations and other satellite experiments in heliophysics. Ultimately, dual spacecraft space telescopes capable of imaging solar flares in the x-ray band, high energy UV solar imaging, and gamma-ray imaging of galactic cores of stellar systems require alignment sensors to some degree. The Miniaturized Astrometric Alignment Sensor advances alignment stellar sensor hardware.



THE TECHNOLOGY

The Miniaturized Astrometric Alignment Sensor advances satellite capabilities for astrophysical measurements, necessary for formation flying, relative navigation, and virtual telescope capabilities. The sensor is a single assembly consisting of a small, low powered camera assembly. The sensor detects stellar objects from which both stellar and object tracking are performed. The sensor's components consist of a low power camera assembly, interchangeable lenses, camera power supply, and image processing software and algorithms. The system functions by searching and identifying objects in the camera's field of view and tracking the objects against a selected star pattern with a central body of interest in the sensor's field of view.

The Miniaturized Astrometric Alignment Sensor makes it possible to measure a spacecraft's altitude and orientation with respect to known stellar objects. The instrument takes an image of a patch of sky, identifies the stars in that field of view, and compares the field view with a stored star map. The data is processed with a dedicated processor attached to the instrument to spell out the attitude and orientation of a spacecraft.

APPLICATIONS

The technology has several potential applications:

- Formation flying technologies
- Relative navigation
- Virtual telescopes

PUBLICATIONS

Patent No: 10657371

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