



Optics

Active Pointing Monitor for a 2-axis Optical Control System

An in-line optical axis fast steering mirror (FSM) for unwanted tip and tilt mitigation

NASA Goddard Space Flight Center has developed a pointing measurement detection and control system that monitors the real-time optical axis motions (such as tip and tilt) that affect image quality in aerial platforms. To date there is no known real time optical image alignment and control system available that simultaneously accommodates the combined focal plane functions of science image collection and image stabilization control. Current monitoring techniques involve replicating the science image focal plane and a separate pointing monitor system that directly compete for the exact same focal plane real-estate thus making it a one-or-the-other measurement.

BENEFITS

- Eliminates the need for dedicated pointing monitor circuitry greatly reducing focal plane cost complexity
- Improved image quality due to reduced tip and tilt
- Operates in both the visible and IR spectral regions
- Can be adapted to different optical systems and platforms (space, aerial, ground)
- Does not require any special manufacturing processes or materials
- Can be modified to enable optical axis roll motion detection

technology solution



THE TECHNOLOGY

This technology enables correction of image degradation introduced by tip and tilt motions. This system operates in both the visible and IR spectral regions, can be adapted to different optical systems, and does not require any special manufacturing processes or materials.

This innovative measurement approach utilizes a single 2-D focal plane detector array to collect the necessary science measurement image data while at the same time collecting the engineering optical axis motion detection and image control information. The innovation utilizes a standardized 'windowing' electronic control function to readout out a single column (1-D array) within a 2-D spectrometer system while the readout and control of the remaining 2-D array columns are controlled by separate and independent control electronics.

APPLICATIONS

The technology has several potential applications:

- Intelligence, Surveillance, and Reconnaissance (ISR)
- Satellite Imaging
- Remote Sensing

PUBLICATIONS

Patent No: 10113908

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