

Georectification of the Airborne Multi-angle Imaging SpectroRadiometer

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Abstract—An Airborne Multi-angle Imaging SpectroRadiometer (AirMISR) has been developed to assist in validation of the Earth Observing System (EOS) MISR instrument currently flying on the Terra spacecraft. Unlike the EOS MISR, which contains nine individual cameras pointed at discrete look angles, AirMISR utilizes a single camera in a pivoting gimbal mount. A principal requirement for AirMISR is that it must image the same area on the ground from all nine angles. The NASA ER-2 is the preferred platform for AirMISR because its flight attitude of 20 km is above more than 90% of the Earth's atmosphere. Applications of cloud screening, cloud height retrieval, and cirrus detection algorithms require high-altitude operation. The normal variation in aircraft roll, pitch, and yaw on the ER-2 as well as changes in altitude, track direction and velocity, although small, must be measured. The measured values are used along with post-flight defined corrections in order to georectify and coregister the image data for all angle and spectral bands. This paper provides description of the algorithm and operational aspects of AirMISR georectification along with examples and results from a recent flight.

Keywords: Earth Science, Multi-angle, Rectification