THE ADVANTAGES OF BORESIGHT EFFECTS ON THE HYPERSPECTRAL DATA ANALYSIS

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ABSTRACT:

The Dual pushbroom line-based hyperspectral sensors combine two different instruments that are usually mount on the same optical bench. This configuration leads to problems such as co-registration of pixels and squint of the field of view known as boresight effect. Image orientation parameters and sensor boresight of any sensor during data acquisition became possible by a combination of an inertial measurement system (IMU) and GPS. The different position of the IMU, the GPS antenna and the imaging sensors, causes an orientation and boresight effect. Any small change in the correction of internal orientation affects the co-registration between VNIR and SWIR region of hyperspectral images. Correcting the boresight effect is an almost automatically key mission taken by all Dual system users. This is because the boresight effect is considered as a noise in the system and a problem that needs to be corrected prior to any data analysis. We propose to use the boresight effect as a vehicle to monitor and detect some spectral phenomena in the image that can't be obtained in corrected images. The advantage of the sensors orientation and boresight effect was investigated based on the AISA-Dual sensor that combines EAGLE for the VIS-NIR (400-970nm) and HAWK for the SWIR (980-2450nm). We have found that the boresight effect have some positive outcomes on the analysis results of the hyperspectral data. This led us to generate an HRS processing protocol where this effect is examined for gaining the most from the data. Three applications were investigated as follow: 1) enhancing shadowing effect, 2) generating a 3-D view, and 3) performing a better detection of boarder anomaly. We will demonstrate these three options and suggest a possible use of this idea from orbit.

TOPIC: Multi-spectral and hyperspectral remote sensing
ALTERNATIVE TOPIC: Remote sensing applications

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