# AIRBORNE HYPERSPECTRAL IMAGE GEOREFERENCING AIDED BY HIGH-RESOLUTION SATELLITE IMAGES

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**ABSTRACT:**

Over the past decade, airborne hyperspectral systems have shown good efficiency to identify and classify numerous ground objects, such as differentiating between minerals, vegetations, artificial materials, water, etc. The hyperspectral imaging market is still relatively small, though, it is steadily growing. The various airborne hyperspectral systems available on the market can be primarily classified based on camera model used. Currently, most of the high performance systems are of the pushbroom camera type, and consequently, the geo-referencing of these systems heavily relies on the integrated GPS (Global Positioning System) /INS (Inertial Navigation System) based direct geo-referencing. In this study, an indirect geo-referencing method is proposed utilizing robust image matching to high-resolution satellite imagery that can be used in circumstances where GPS/INS-based geo-referencing is not feasible due to GPS signal loss, and/or the lack of GPS infra-structure,. The proposed method is motivated by the attractive properties of high-resolution satellite imagery, including large swath width, high spatial and temporal resolution, and high positional accuracy. The combination of SURF (Speeded-Up Robust Features) and RANSAC (RANdom SAmple Consensus) is utilized for robust image matching, and the trajectory modeling of the airborne pushbroom camera is based on the collinearity equation camera model with the Gauss-Markov stochastic error model. Tests performed for a strip of CASI-1500 data (ITRES Research) showed encouraging preliminary results for the proposed approach.

**TOPIC:** Multi-spectral and hyperspectral remote sensing
**ALTERNATIVE TOPIC:** Geometric modeling