

### **Suggested topics**

4. New Generation Sensor and Applications

5. Data Processing

6. GPS & Photogrammetry

## **A GENERIC LINE BASED MODEL FOR GEOREFERENCING OF HIGH RESOLUTION SATELLITE IMAGERY**

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### **Oral Presentation**

For various satellite imagery applications, geo-referencing through rectification is a common operation. Rigorous mathematical models with the aid of satellite ephemeris data can present the relationship between the image space and object space. With government funded satellites, access to calibration and ephemeris data allowed the development of these models. However, for commercial high-resolution satellites, these data have been withheld from users, and therefore alternative empirical rectification models have been developed. In general, most of these models are based on the use of control points. The lack of control points in some remote areas such as deserts, forests and mountainous areas provides a catalyst for the development of algorithms based on other image features. One of the alternatives is to use linear features obtained from scanning/digitizing hardcopy maps, from terrestrial mobile mapping systems or from digital images.

In this work, a new model named the Line Based Transformation Model (LBTM) is established for satellite imagery rectification. The model has the flexibility to either solely use linear features or use linear features and a number of control points to define the image transformation parameters. As with other empirical models, the LBTM does not require any sensor calibration or satellite ephemeris data. The underlying principle of the model is that the relationship between line segments of straight lines in the image space and the object space can be expressed by affine or conformal relationships. Synthetic as well as real data have been used to check the validity and fidelity of the model, and the results show that the LBTM performs to a level comparable with existing point based transformation models