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Conformal Analysis of Spatial Shift in High Resolution Satellite Data (HRSD)

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ABSTRACT

Advent of High Resolution Satellite Data (HRSD) with development of high spatial resolution sensors have revolutionized the generation of large scale maps. Generation of large scale digital utility maps using HRSD involves different methodologies and includes several steps wherein errors or spatial shift may be induced at any stage of data generation. It may be interesting to note that the characteristics of the spatial shift vary with methodologies adopted in its processing and has unique implications with respect to the data usage along with its application. Spatial shifts of points on a satellite data is result of unexpected translation and rotation of pixel with respect to the original location. Present study analyzes the spatial shift generated in satellite data with reference to the change in area and orientation of a group of pixels i.e. conformal and equal area properties of the rectified satellite data. This study aims to establish a relationship between the spatial resolutions of the satellite image used for digital map generation with the spatial accuracy achieved. In this study, Ground Control Points (GCP ' s) identified on satellite data for a sample study area were validated using Differential Global Positioning System. Five different high resolution satellite images were analyzed to verify changes in area and shape with reference to the GCP ' s. The results indicate that with improvement in the spatial resolution, higher precision in the digital maps is accomplished in terms of spatial shift of the points.

KEYWORDS

Spatial Shift; Ground Control Points; Rectification; Map Projection System; Transformation

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