ACCURACY ASSESSMENT OF DSM AND DTM USING MAXAR IMAGERY (15 CM)

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Abstract

High-resolution satellite data generate constructive conditions for creating a digital terrain model/ digital surface model. HD technology intelligently increases the number of pixels through a complex mathematical model that is tuned to the specific requirements of the imagery, resulting in a superior visual experience. In this study we have generated gridded data, which is a regular arrangement of elevations derived from original point cloud using interpolation and generated 30cm and 50cm grid spacing products. Fifteen centimetres (15 cm) HD imagery significantly expand the level of detail, maximizing the ability to see smaller features. This research includes the ultra-high resolution 15cm HD imagery as input and involves the creation of the most demanding and significant 3D terrain models DSM and DTM.

As our aim is to achieve the highest level of accuracy and so we have included both the system based and manual photogrammetry approach that results in Horizontal Accuracy at 95% confidence level (CE95): 0.32cm and Vertical Accuracy at 95% confidence level (LE95): 0.38cm. We have generated the 30cm and 50cm grid spacing terrain models using 15cm imagery. The checking of the accuracy of the product was carried out by comparing it with reference value. Reference values were determined in the field by geodetic method that is global navigation satellite system (GNSS) with very high accuracy. The accuracy of the checkpoints depends on the sensor altitude from which the images are taken and the quality of the sensor. To improve the DTM, we have done the measurements of checkpoints (photogrammetric approach) in order to remove systematic errors and blunders for large areas. The results of the study are highly accurate because of which such models are very much useful and significant in engineering projects.

Keywords: Ultra high-resolution satellite data, digital terrain model, digital surface model, GNSS