High Accuracy Mosaic Generation Using KOMPSAT-3A Data

In this study we demonstrate how to generate high accuracy mosaic using KOMPSAT-3A data. The city of Ottawa, Canada, was chosen as the study area. SI Imaging Services (SIIS) provided nine KOMPSAT-3A L1O data with overlaps acquired between April and June of 2017. L1O data was chosen because it is supplied with RPC data, which enables use of the RPC geometric modeling method. PCI OrthoEngine software was used to perform the entire process. The following figure shows the nine images before correction.

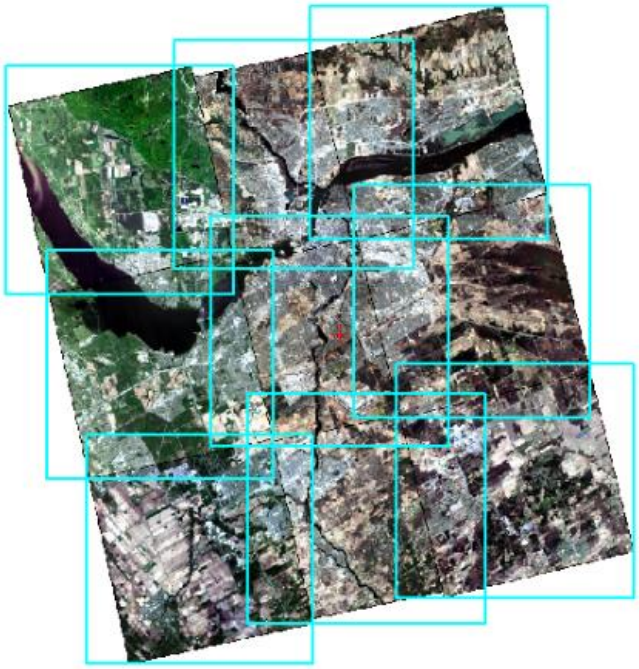

Figure 1. Nine KOMPSAT-3A images before correction

To generate the mosaic, the following steps were used:

(1) Pansharpening. This step generates high resolution multispectral data utilizing the original panchromatic and multispectral data. Since KOMPSAT-3A L1O panchromatic and multispectral data are aligned, the pansharpening can be performed directly using the raw data. The following figures show the original panchromatic and multispectral data, and pansharpened result, respectively.

Figure 2. Original panchromatic, multispectral, and pansharpened data in a row

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PCI Geomatics, founded in 1982, is the world leader in geo-imaging products and solutions. PCI Geomatics has set the standard in remote sensing and image processing tools offering customized solutions to the geomatics community in over 135 countries.

PCI Geomatics is the developer of Geomatica® - a complete and integrated desktop software that features tools for remote sensing, digital photogrammetry, geospatial analysis, map production, mosaicking and more. Geomatica® software enables users to apply imagery in support of a wide range of applications such as the environment, agriculture, security and intelligence, defense, as well as in the oil and gas industries.

PCI Geomatics is also the developer of the GeoImaging Accelerator (GXL), an automated, high performance, Graphics Processor (GPU) system for processing terabytes of imagery data. PCI Geomatics is a privately held Canadian corporation headquartered in Toronto, Ontario.

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PRODUCTS USED

- KOMPSAT-3A
  - 0.55m resolution
  - EO satellite
  - Level 1O

(2) GCP/TP collection. 20 GCPs were collected using 20cm, airphotos and 129 TPs were collected automatically. The following table shows the GCP residuals/errors. It can be seen that with GCP collection, the RMS error of the check points is near one (1) pixel.

GCP	Check Points	Residuals / Errors		
			X(m)	Y(m)
0	20	RMS	0.81	3.98
		Max	1.95	4.95
5	15	RMS	0.39	0.57
		Max	0.86	1.13
20	0	RMS	0.31	0.39
		Max	0.81	0.81

Table 1. GCP residuals/errors

(3) Ortho-mosaic generation. PCI mosaicking with automatic cutline generation and color balancing was used to generate the mosaic. The following figure shows the result of the mosaic.

Figure 3. Ortho-mosaic image

Conclusion

This study shows the steps used to generate high accuracy mosaic using KOMPSAT-3A images. When GCPs are used, the RMS error of the geometric model is approximately within 1 pixel.

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