

Koreksi Geometrik pada Citra *Raw Data Spacecam* Satelit Lapan-A2 untuk Tujuan Interpretasi Visual

Geometric Correction on Raw Data Image of Spacecam LAPAN-A2 Satellite for Visual Interpretation

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ABSTRAK - Pada September 2016, Lembaga Penerbangan dan Antariksa Nasional (LAPAN) meluncurkan satelit buatan Indonesia pertama yang diberi nama satelit LAPAN-A2/ORARI. Satelit LAPAN-A2 membawa kamera *SpaceCam* untuk misi pengamatan bumi (*surveillance*). Kamera *SpaceCam* hanya memiliki sensor optik-elektronik tunggal, yang dilapisi dengan sebuah *Color Filter Array* (CFA) untuk memberi informasi warna. *Raw data* citra hasil rekaman kamera *SpaceCam* perlu dikoreksi agar dapat digunakan untuk interpretasi citra yang lebih akurat. Algoritma *Demosaicing Bayer* (*Debayer*) dengan pola B-G-G-R yang tambahkan operator *adaptive smoothing* citra paling optimal digunakan untuk menghasilkan citra berwarna (RGB) natural color. Program *open source* seperti *ImageJ* menyediakan algoritma *Debayer* tersebut. Sedangkan koreksi geometrik menggunakan model persamaan proyektif dengan 4 parameter sudah memadai. Program *open source* seperti *Quantum GIS* menyediakan fitur koreksi geometrik tersebut. Nilai rase hasil proses koreksi geometrik dengan memanfaatkan Peta Rupabumi Indonesia 1/25.000 sebagai titik kontrol tanah menghasilkan nilai dibawah 1 piksel. Sedangkan nilai kesalahan pada titik cek point menghasilkan penyimpangan dibawah 3m. Overlay antara citra *SpaceCam* terkoreksi dengan Peta RBI secara visual menunjukkan geometrik yang tersambung dengan baik. Secara visual citra *SpaceCam* terkoreksi lebih tajam dibandingkan citra *Landsat 8* sebab memiliki resolusi spasial yang lebih baik. Dimasa mendatang operator perbaikan kualitas radiometrik citra hasil koreksi masih perlu ditingkatkan dengan algoritma koreksi atmosferis agar diperoleh resolusi radiometrik yang maksimal.

Kata kunci LAPAN-A2/ORARI satellite, koreksi geometrik, *demosaicing bayer*

ABSTRACT - In September 2016, National Institute of Aeronautics and Space (LAPAN) launched the first Indonesian scientist satellite named LAPAN-A2 / ORARI satellite. The LAPAN-A2 satellite carries the *SpaceCam* camera for Earth observation missions (*surveillance*). The *SpaceCam* camera has only a single optical-electrical sensor, which is coated with a *Color Filter Array* (CFA) to provide color information. The *raw data* image from *SpaceCam* camera recording needs to be corrected in order to be used for more accurate image interpretation. The *Demosaicing Bayer* (*Debayer*) algorithm with the B-G-G-R pattern in addition with *adaptive smoothing* image operator is used to produce natural color images (RGB). Open source programs such as *ImageJ* provide the *Debayer* algorithm. While geometric correction using the projective equation model with 4 parameters is sufficient. Open source programs such as *Quantum GIS* provide such geometric correction features. The *rase* value from geometric correction process by utilizing the Indonesian Topographic Map 1 / 25,000 as the ground control point yields a value below 1 pixel. While the error value at the independent check points result in deviation below 3m. The overlay between the corrected *SpaceCam* imagery with the RBI Map shows a well-connected geometric feature. The *SpaceCam*'s corrected image is more sharply than *Landsat 8* image because it has better spatial resolution. In the future, the radiometric image correction operator still needs to be improved with atmospheric correction algorithm in order to obtain maximum radiometric resolution.

Keywords LAPAN-A2/ORARI satellite, geometric correction, *demosaicing bayer*

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