

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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Table of Contents Hasil Interpretasi Citra Lapan

1. Understanding the eBook Hasil Interpretasi Citra Lapan
 - The Rise of Digital Reading Hasil Interpretasi Citra Lapan
 - Advantages of eBooks Over Traditional Books
2. Identifying Hasil Interpretasi Citra Lapan
 - Exploring Different Genres
 - Considering Fiction vs. Non-Fiction
 - Determining Your Reading Goals
3. Choosing the Right eBook Platform
 - Popular eBook Platforms
 - Features to Look for in an Hasil Interpretasi Citra Lapan
 - User-Friendly Interface

4. Exploring eBook Recommendations from Hasil Interpretasi Citra Lapan
 - Personalized Recommendations
 - Hasil Interpretasi Citra Lapan User Reviews and Ratings
 - Hasil Interpretasi Citra Lapan and Bestseller Lists
5. Accessing Hasil Interpretasi Citra Lapan Free and Paid eBooks
 - Hasil Interpretasi Citra Lapan Public Domain eBooks
 - Hasil Interpretasi Citra Lapan eBook Subscription Services
 - Hasil Interpretasi Citra Lapan Budget-Friendly Options
6. Navigating Hasil Interpretasi Citra Lapan eBook Formats
 - ePub, PDF, MOBI, and More
 - Hasil Interpretasi Citra Lapan Compatibility with Devices
 - Hasil Interpretasi Citra Lapan Enhanced eBook Features
7. Enhancing Your Reading Experience
 - Adjustable Fonts and Text Sizes of Hasil Interpretasi Citra Lapan
 - Highlighting and Note-Taking Hasil Interpretasi Citra Lapan
 - Interactive Elements Hasil Interpretasi Citra Lapan
8. Staying Engaged with Hasil Interpretasi Citra Lapan
 - Joining Online Reading Communities
 - Participating in Virtual Book Clubs
 - Following Authors and Publishers Hasil Interpretasi Citra Lapan
9. Balancing eBooks and Physical Books Hasil Interpretasi Citra Lapan
 - Benefits of a Digital Library
 - Creating a Diverse Reading Collection Hasil Interpretasi Citra Lapan
10. Overcoming Reading Challenges
 - Dealing with Digital Eye Strain
 - Minimizing Distractions
 - Managing Screen Time
11. Cultivating a Reading Routine Hasil Interpretasi Citra Lapan
 - Setting Reading Goals Hasil Interpretasi Citra Lapan
 - Carving Out Dedicated Reading Time

12. Sourcing Reliable Information of Hasil Interpretasi Citra Lapan
 - Fact-Checking eBook Content of Hasil Interpretasi Citra Lapan
 - Distinguishing Credible Sources
13. Promoting Lifelong Learning
 - Utilizing eBooks for Skill Development
 - Exploring Educational eBooks
14. Embracing eBook Trends
 - Integration of Multimedia Elements
 - Interactive and Gamified eBooks

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web 01 start by carefully reading the questions or prompts provided on the answer key 02 refer to the corresponding assessment or test to identify the correct answers for each question 03 use a pen or pencil to write down the correct answer next to the respective question number on the answer key 04

sherlock bones activity for the skeletal system or halloween - Sep 21 2022

web product description the remains of a skeleton have been found and it is up to your students to determine who they belong to even if you have not covered any forensic science this activity comes with resources to help guide them it is a great way to learn more about bones as well as encourage high level thinking skills

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web forens are there indicators that are used to determine sex yes why is it nearly impossible to determine the sex of a pre adolescent skeleton little sexual dimorphism what is the best bone used to estimate sex pelvis why is the female s pelvis larger and wider than the male s to allow for the passage of a child