Image and database browser for TIR on Hayabusa2

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1
Introduction: Hayabusa2 was launched to an asteroid, Ryugu. The spacecraft will arrive at the asteroid in 2018 [1]. Hayabusa2 TIR (Thermal Infrared Imager) [2] science team should complete preparations of analysis. The preparations include development of TIR image viewer and establishment of TIR calibration procedures. Those should be ready until the rendezvous for analyzing observation data. This study is categorized into fields of computer graphics and big data analysis in computer science. This study develop image and database browser. This study has developed two sub systems. One is thermal image viewer. Another is thermal image database for calibration. Thermal calibrations exist 2 ways that using calibration curve and using interpolation based on near parameters by calibration database. Although thermal image viewer exists such as ParaView [3], those viewers don't have calibration system. The former way uses calibration formula such as Arai (2015) [4]. The way converts easily digital number to temperature. On the other hands, lacking precision of the way depends on a calibration formula, because the way based on an approximation. The latter way uses same method such as big data analysis. The way finds matching data or near parameters data from a large amount of data. The way needs a database function. That is thought able to calibrate precisely, but the way requires high calculation costs. The way is a key to develop new type of viewer. Therefore, this study has development of a system of involving viewer and a database for calibration. The system is developed from scratch. Goal of this study is development of software that visualizing TIR exploration data and getting TIR ground test data for calibration. TIR data consists of TIR image and ancillary data. The ancillary data has target information, optical information and environment information.
2
Requirements: Required functions were decided based on hearing with Hayabusa2 TIR science team. The requirements were divided into 4 items.
-Loading TIR data
-Displaying TIR image and 3D model
-Getting TIR data for a calibration
-Database for ground test of TIR
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Development Environments: The environments can develop by open source.
4
System Design: The system has 6 modules. Those modules are built into 4 components.
Components
-User Interface
-Processing
-Database
-Converting
Modules
-Loading TIR data

-Displaying TIR image
-Converting
-Database browser
-Displaying Visualization Toolkit file
-Display 3D model.
5
Calibration database: Calibration database stores TIR data. The database consists thermal image table and pixel information table. This data is obtained by ground test of TIR in JAXA. This study refers to Kuwano (2016) about pixel information table [5].
6
Results: This study considered Trade-off and User feedback.
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Demonstration: We have a demonstration of this system in this presentation.
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Discussion: It is developed in this study that the system suitable for analyze. The system should be improved on.
9
Conclusions: This study has developed the system. The system displays TIR image and ancillary data. This system satisfies all requirements.
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References:

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