

Development of ground pipeline system for high-level scientific data products of the Hisaki satellite mission and its application to planetary space weather

*Tomoki Kimura¹, Atsushi Yamazaki², Kazuo Yoshioka³, Go Murakami², Fuminori Tsuchiya⁴, Hajime Kita², Chihiro Tao⁵, Ichiro Yoshikawa³, Atsushi Kumamoto⁶, Yamauchi Chisato⁷

1. Frontier Research Institute for Interdisciplinary Sciences, Tohoku University, 2. Institute of Space and Astronautical Science, Japan Aerospace Exploration Agency, 3. Department of Complexity Science and Engineering, University of Tokyo, 4. Planetary Plasma and Atmospheric Research Center, Tohoku University, 5. National Institute of Information and Communications Technology, 6. Space and Terrestrial Plasma Physics Laboratory, Tohoku University, 7. Misato Observatory

The Hisaki satellite is the first-ever space telescope mission that is dedicated to planetary sciences. Atmospheres and magnetospheres of our solar system planets are continuously monitored by the extreme ultraviolet (EUV) spectrometer onboard Hisaki. Here we describe a data pipeline system developed for processing high-level scientific and ancillary data products of the Hisaki mission. The telemetry data downlinked from the satellite is stored in a ground telemetry database, processed to imaging spectral data with a 1-min temporal resolution and ancillary data products in the pipeline, and archived in a public database. The imaging spectra are further reduced to higher-level data products for practical scientific use. For example, light curves of the power emitted from Jupiter's aurora and plasma torus with a temporal resolution of 10 minutes are reduced from the imaging spectral data. The reduced light curve revealed transport process of energy and mass in Jupiter's magnetosphere and associated interplanetary solar wind conditions. The continuous monitoring with Hisaki largely contributes to understanding of space weather the planets in our solar system.

Keywords: Planetary Space Weather, Hisaki