

HARMONICS2 for camera operations on Hayabusa2 as a visualization tool

UENO, Wataru^{1*} ; HIRATA, Naru² ; DEMURA, Hirohide²

¹Univ. of Aizu, ²CAIST/ARC-Space, Univ. of Aizu

We had developed HARMONICS (HAYabusa Remote MONitoring and Commanding System) as a visualization tool of camera's FOV and spatial geometry of the spacecraft Hayabusa and the targeted asteroid, Itokawa for camera operations. This tool was used for evaluating the shape model of the asteroid, optical navigations. Now we have Hayabusa2 as the successor of Hayabusa. The tool has been also updated to HARMONICS2. This updated tool also has following functions: to visualize FOV, to show geometry of the spacecraft and target body, to comparison a simulated image and an obtained one. These functions are calculated with following items: positions and attitudes of the spacecraft, pointing vectors of instruments, shape model of target and ephemeris of the asteroid, etc. GUI of the previous HARMONICS was adopted GTK, but on the other hand HARMONICS2 is done Qt, which is available for cross-platform environments such as Windows, LINUX, and MacOS. We have added new function of interactive operations where users change positions and attitudes of the spacecraft, then variations are reflect in FOV. HARMONICS2 exports SPICE kernels as time sequential data sets of spacecraft positions and attitudes. We'll also add another function of visualizing footprint for scientific observations based on 3-D GIS interface. Users find whether the they imaged an area or not if the tool visualizes footprint. We'll demonstrate current version of HARMONICS2 and hear feedbacks from users.

Keywords: Hayabusa2, Visualization, CG, Exploration, asteroids, SPICE