

IAF SPACE PROPULSION SYMPOSIUM (C4)  
Electric Propulsion (4)

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IN-FLIGHT OPERATION OF THE HAYABUSA2 ION ENGINE SYSTEM ON ITS WAY TO  
RENDEZVOUS WITH ASTEROID 162173 RYUGU**Abstract**

Japan's second asteroid explorer Hayabusa2 was successfully launched on Dec 3, 2014 for sample return from Asteroid 162173 Ryugu by 2020. Four xenon ion thrusters using electron cyclotron resonance discharge propelled the spacecraft for 600 hours during the first year in space. Hayabusa2 completed an Earth gravity assist on Dec 3, 2015 followed by 800 hours and 2800 hours of ion thruster operations called the first- and second- term transfer delta-V. The spacecraft is now in the third-term transfer delta-V period between January of 2018 and June of 2018 in which the final 2700-hour ion thruster operation will be executed before the rendezvous with Ryugu. This paper will summarize the approximately 7000-hour operation of the ion engine system including thruster performance change trend, spacecraft surface erosion histories measured by two quartz crystal microbalances located in the vicinity of the thrusters, and roll torques generated during different combinations of ion thrusters operated.