

SPACE PROPULSION SYMPOSIUM (C4)
Electric Propulsion (4)

Author: Dr. Tony Schönherr
University of Tokyo, Japan, schoenherr@al.t.u-tokyo.ac.jp

Mr. Yuki Ito
University of Tokyo, Japan, y.ito@al.t.u-tokyo.ac.jp
Mr. Daiki Fujita
University of Tokyo, Japan, d.fujita@al.t.u-tokyo.ac.jp
Mr. Rei Kawashima
University of Tokyo, Japan, kawashima@al.t.u-tokyo.ac.jp
Prof. Hiroyuki Koizumi
University of Tokyo, Japan, koizumi@al.t.u-tokyo.ac.jp
Dr. Kimiya Komurasaki
Japan, komurasaki@k.u-tokyo.ac.jp

TAL THRUSTER DEVELOPMENT FOR THE JAPANESE HIGH-POWER IN-SPACE PROPULSION
PROJECT RAIJIN**Abstract**

For the next generation of space missions, more powerful and efficient propulsion systems are necessary and aimed for by JAXA to concur with its endeavours within ISECG. Hall thruster technology has proven to be a reliable candidate for such in-space propulsion purposes, especially as scaling and lifetime issues are well understood. For the high-power project RAIJIN, a Hall Thruster with Anode Layer (TAL) was selected to be scaled in two steps to a high-power system suitable to propel larger space vehicles. Details on the mission requirements and scenarios are shown within this work. As scaling implies increased procurement issues for the common xenon propellant, feasibility and performance characteristics of alternative propellants like argon are discussed. Concurrently, numerical models are improved to simulate high-power TAL plasma flows. As a cluster configuration is envisaged to obtain the eventual high power level of 100 kW, interactions of the plasma flows is modelled and studied. Probe diagnostic measurements are applied to verify the numerical results. Methods and results are shown and discussed, and conclusions for design and operation conditions of the eventual thruster drawn.