

九州工業大学宇宙環境技術ラボラトリーの活動報告

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Activity report of Kyushu Institute of Technology, Laboratory of Spacecraft
Environment Interaction Engineering (LaSEINE)

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Laboratory of Space Environment Interaction Engineering (LaSEINE) in Kyushu Institute of Technology (Kyutech) was established in 2005. Research objects of LaSEINE were Spacecraft charging/arcng, Material degradation, Space debris and Nano satellite testing. The director of LaSEINE is Prof. Mengu Cho. 14 staffs are working on each object.

The main object of LaSEINE from the beginning to 2010 was the charging/arcng on a solar array of large satellites. The central theme of this research was the clarification of the arcng mechanism and the suppression of the arcng leading to catastrophic failure. In these studies, LaSEINE, NASA, CNES and many satellite vendors discussed about the charging/arcng and testing method. The knowledge obtained in this activity and discussion was established as the ISO-11221, Space Systems -Space Solar Panels- Spacecraft Charging Induced Electrostatic Discharge Test Methods.

Since 2010, we have focused on the small satellite testing and development. Kyutech participated as a member of Hodoyoshi project promoted by Prof. Nakasuka in the University of Tokyo. Testing machines for the small satellite as vibration machine, shock machine and thermal vacuum chamber were installed. These testing machines are opened to outside users and we support the testing for small satellite and its component by a new player.

In 2012, we launched our first satellite "Horyu-2", which demonstrates a high voltage solar array of 300 V on orbit. 18 satellites were developed in Kyutech from 2012. These 18 satellites include 11 CubeSats of BIRDS project for the purpose of capacity building. Satellites for the technology demonstration are Horyu series for high voltage experiment on orbit, 2U CubeSat "SPATIUM", mounting a chip scale atomic clock (CSAC) and 2 U CubeSat "AOBA Velox IV" for PPT (Pulsed Plasma Thruster) demonstration.

In this presentation, we will introduce the activity of LaSEINE for space environmental measurement using small satellites developed in Kyutech.