

## Laboratory / Center profile

### Space System Laboratory

**Representative:** Associate Professor Naohiko Kohtake, Associate Professor Seiko Shirasaka

**Members:** Professor Hidekazu Nishimura, Project Associate Professor Nobuaki Minato, Guest Associate Professor Hajime Yano, Executive Advisors Yoshiaki Ohkami and Taketoshi Hibiya of the SDM Research Institute and others



### The Activities of the Laboratory

The Space System Laboratory aims to solve problems concerning space systems by using methodologies and methods based on system thinking, design thinking, and management thinking, which have been fostered through the studies of system design management. In brief, the laboratory: (1) designs and develops spacecraft systems, such as rockets, satellites, and space stations (2) studies the application of space system to other fields, including collaboration with other systems; and (3) explores business and policy that enable the practical application of each space system as a sustainable social infrastructure.

Many of the faculty members have had hands-on experience in the space industry in Japan and overseas as well. In addition, the researchers who belong to this laboratory are currently working in industry, the government, or academia dealing with space systems. Discussions among these laboratory members have led to a number of positive results in various forms.

In considering that the members have diversified expertise, the laboratory is also active in space-related education. We proactively recruit students from abroad and organize lectures and seminars through collaboration among laboratory members. As a part of this effort, we are planning to hold an omnibus-style extension lecture on space for higher education this year in collaboration with the Japan Aerospace Exploration Agency (JAXA) and various media outlets. The lecture will include real-time communication with Astronaut Hoshide, who will begin his extended stay at the international space station (ISS) some time in July.

Additionally, the laboratory places an importance on international collaboration. The laboratory receives exchange students from the Massachusetts Institute of Technology (US), Purdue University (US), and Delft University of Technology (Netherlands). We are also carrying out various joint projects with other international partners.

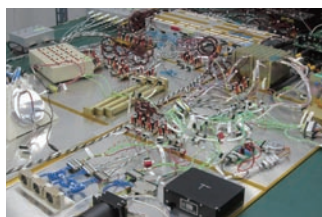
### Examples of Research and Educational Projects

#### Research on Manned Space Plane Which Horizontally Takes off and Lands Offshore (Leader: Ohkami)



Aiming to realize manned space flight, we pursue the concept of a space plane that horizontally takes off and lands offshore, capitalizing on the topographical particularities of Japan. We also conduct demonstration experiments, and design business models.

#### Research on Micro/Nano-Satellite Development Methodology (Leader: Shirasaka)



In the course of developing 50kg-class satellites such as “Hodoyoshi” and “UNI FORM”, by collaborating with the University of Tokyo, Wakayama University, and others, we conduct research on methodologies for developing new micro/nano-satellites.

#### Research on Thermophysical Property Measurement of Metallic Melt in Space (Leader: Hibiya)



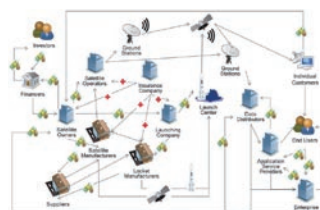
An experiment will be conducted in 2014 on thermophysical property measurement of semiconductor melt by utilizing an electromagnetic floating device loaded in the European experiment module on ISS. (The photo is the semiconductor melt that is electromagnetically floating.)

#### Research on Real-Time Disaster-Prevention Message Delivery System Using Quasi-Zenith Satellites (Leader: Kohtake)



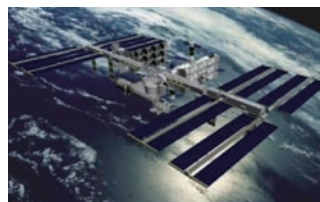
Utilizing the Japanese positioning satellites—quasi-zenith satellites—we are conducting research into a real-time disaster-prevention message delivery system using the terminals with GPS receivers without having any communication infrastructures on earth.

#### Research on Financial Scheme for Satellites Based on Public-Private Partnership (Leader: Minato)



Aiming to establish a new model for procuring satellites without relying on public funds, we conduct research on satellite-specific financial schemes based on public-private partnership.

#### Extension Lecture on Space for Higher Education, Including Communication with the ISS (Leader: Kohtake)



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Working jointly with Astronaut Hoshide who will be staying at the international space station, we will organize a series of extension lectures covering various topics concerning space for an audience made up of undergraduates to adults.

#### Related articles:

Call for Proposals on Real-Time Communication Event and Video Recording Plan for Astronaut Hoshide Staying in Space (Press Release by JAXA on November 1, 2011)  
 ▶ [http://www.jaxa.jp/press/2011/11/20111101\\_hoshide\\_j.html](http://www.jaxa.jp/press/2011/11/20111101_hoshide_j.html) (in Japanese)



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