Report on ISU SSP 2003

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Introduction

The sixteenth-annual Summer Session Program (SSP03) sponsored by the International Space University (ISU) was held at the main campus of ISU in Strasbourg, France from 4 July to 8 October. I feel fortunate to have been given the opportunity to participate in the SSP03 this year. In this report, I would like to write about my experience at the SSP03 as well as introduce the ISU and SSP03. I hope my report will help illuminate the activities of the ISU.

Fig. 1. New ISU campus.

International Space University

The ISU was founded in 1987 by three undergraduate students at Massachusetts Institute of Technology (MIT). Since 1988, the SSP has been held every summer in different countries around the world. The Master of

Space Studies (MSS) has been held on the main campus of ISU since 1995. In 2002, a new ISU main campus was newly completed in Strasbourg through the support of leading space-related organizations around the world. A photograph of the new main campus is shown in Figure 1. The main auditorium on the ISU campus can hold 200 people, and the secondary auditorium has a capacity of 100 people. In addition, there is a library, computer labs, teaching staff rooms, and many other meeting rooms. The teaching faculty of ISU is comprised of 38 professors and 94 visiting lecturers who are specialists in each field. Together, they provide an extensive wide-ranging education related to space. However, most of the professors and lecturers at ISU are not full-time. The majority of the faculty is composed of visiting professors from other universities, and developers/researchers of space-related organizations such as NASA.

The Credo of ISU is to explore and develop space for the benefit of all humanity, based on a vision of a peaceful, prosperous, and boundless future. To achieve this goal, ISU promotes the education of talented young people capable of becoming the managing staff and project planners who will take the future lead in space development in industry, academia, and government. ISU has developed 3I's as the basis of its educational program.

(1) Interdisciplinary — Learning to balance and integrate all aspects of programs in order to gain a global perspective on problem solving
(2) International—Learning to work with others on projects in an international, team-oriented atmosphere to build social networks, enhance collaborative abilities, and increase competitiveness
(3) Intercultural—Learning to understand and adjust to diverse and cultural, environmental, and economic backgrounds to prepare for careers in a multi-cultural world.

The ISU offers two programs: the MSS (11 months) which corresponds to traditional graduate programs and runs from September-August and the SSP (3 months) that takes place during ISU's summer term. As a matter of fact, although the term *university* is used in the name, it is not a formal university that offers undergraduate programs. And, although it offers an MSS, it is not an accredited program, and therefore is placed on a kind of an advanced educational facility associated with graduate school. Thus, even if an MSS is completed, many institutions will not recognize it as a Master's degree. ISU is

currently applying to the necessary organizations so that the MSS may be officially recognized as a Master's degree. ISU is still a developing organization, and it is expected that the Master's at ISU will take a great leap forward.

The Alumni Conference, where ISU alumni gather and present individual research, has been traditionally held during SSP. By exchanging information with the ISU, alumni actually involved in space-related development further the mission of the ISU and strengthen the connection among alumni and between alumni and the ISU. With each passing year, a circle of the ISU alumni is spreading around the world. The importance of such a circle goes without saying because the space development projects in the future will likely be carried out with the cooperation of many countries.

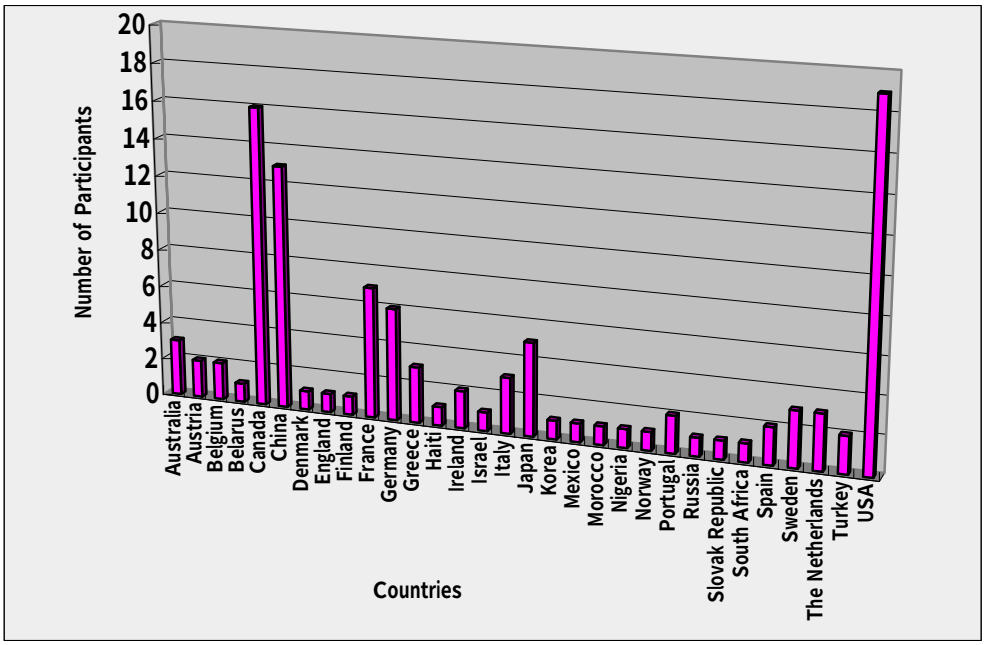

Fig. 2. Number of participants from each country, 2003 ISU Summer Session Program.

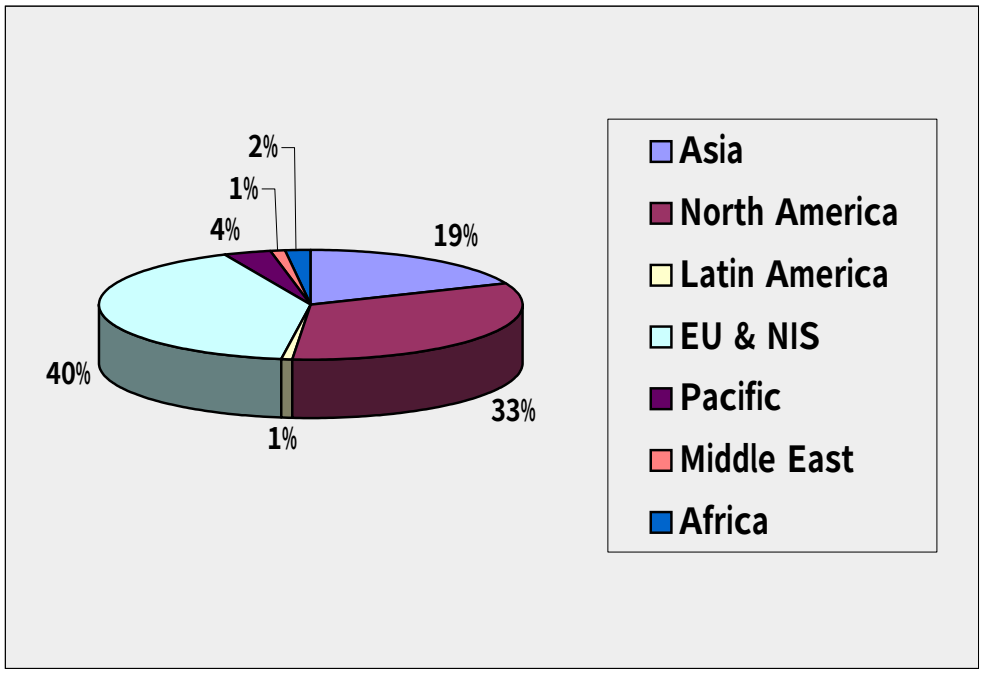

Fig. 3. Regional participant, 2003 ISU Summer Session Program.

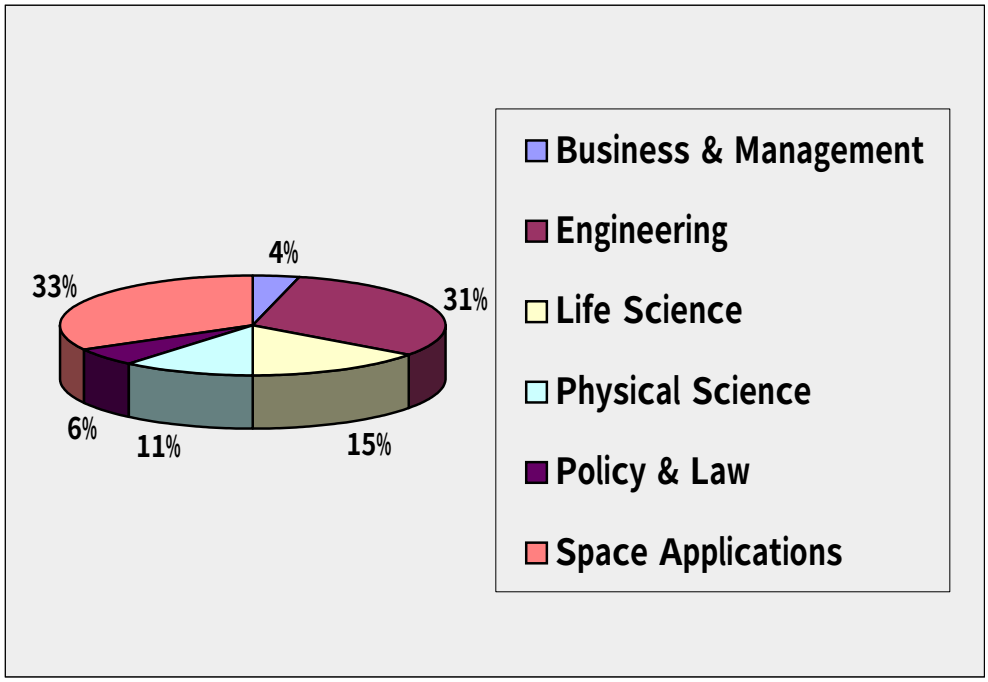

Fig. 4. Research fields of participants, 2003 ISU Summer Session Program.

Summer Session Program

During this year's SSP03, there were 107 participants from 31 countries all over the world. There were five Japanese participants: two participants from JAXA/NASDA, one participant from JSAT, one person from Tohoku University, and one from Communications Research Laboratory (CRL).

This year's participant data is shown in Figures 2－4. Figure 2 shows the number of participants from each country, Figure 3 shows the ratio of regional participants to the total participants, and Fig. 4 shows the ratio of participants' specialties to the total participants. You can see in Fig. 2 that there were a large number of participants from three counties (USA, Canada, and China), and that the participants from Asia and North America comprised the majority of total participants, exclusive of the participants from EU and the NIS. As far as China is concerned, the number of participants for 2003 was equal that of 2002 and 2003 because China could not take part in SSP02 last year because of a VISA-related problem. Figure 4 shows that the participants' specialty is not solely focused on engineering, but extends over management, life science, policy, law, and so on. This clearly shows that ISU is attracting young specialists who have the actual abilities that will ensure the success of a typical international project such as an International Space Station (ISS), and is offering them a practical, specialized education to assist them in future space-related development projects.

The SSP03 activities mainly include a core lecture series in the first half of the program, and individual and team projects in the second half. In the core lecture series, using a text and supplementary material, SSP03 participants study a variety of space-related topics extensively including the principles behind and structures of rockets, satellites and spacecrafts, space physical sciences, space telecommunications, remote sensing, space robotics, international space law, space policy, international radio law, space business, financial issues and techniques, risk management, space mission design and analysis, project management, business structure and planning, cross cultural negotiations, crisis communication and media, presentation skills, report writing skills, and physiology under micro-gravity. These classes were held in the main auditorium, where each professor or lecture conducted a 60-minute lecture on their specialty using PowerPoint.

During this first half, there were 5 or 6 lectures per day, which were repeated from Monday through Saturday. As a matter of course, since all the lectures were given in English, mental and physical exhaustion was far beyond

my imagination. At the end of this first half, a written examination was held, and our understanding of the core lecture series was tested.

On the other hand, regarding individual study in the second half of the program, each SSP03 participant selected one topic from among several space-related topics based on one of the topics presented in the core lecture series in the first half. There was also a team study component. For the team study in the second half, the SSP03 participants were divided into three groups, and learned problem solving skills through team and individual investigations into a grand theme related to space development. This team study was completed as a final assignment by submitting a report of more than 100 pages and giving a 60-minute presentation to the faculty and other participants. Through this work, the SSP03 participants learned how to proceed with projects cooperatively while understanding and working through interdisciplinary, international, and intercultural differences.

The following three themes of team study for this year were as follows:

(1) Space Contributions to Climate Modeling and Monitoring
(2) Lunar Missions using ISS Capabilities
(3) Technology Mapping of Major Space Power

Participants were allowed to select which theme they wished to study. I selected theme (1) since I was interested in remote sensing techniques and Earth environment monitoring. There were 28 participants working on theme (1). This was out of a total participant number of 107 participants. I was the only Japanese SSP03 member. Incidentally, about 50 members worked on theme (2). It seemed that most of the participants avoided our theme because our theme needs a good knowledge of science and technology as well as creativity to tackle the technical problem throughout the project. Despite the smaller number of participants and the increased workload, our group was able to complete the project successfully and with a high standard of excellence.

Our team named our project Earth Climate Systems for Promoting Human Ecological Research and Education (ECOSPHERE), and framed a recommendation on reducing the impact of Abrupt Climate Changes in the North Atlantic Region on our society from social, political, economic and technical points of view. If you are interested in learning more about this project, you may download the report from the ISU website at

http://www.isunet.edu/. Our team also submitted our recommendation as contained in the report to the Global Monitoring for Environment and Security (GMES) Project, which is a joint initiative of the European Commission and the European Space Agency. The GMES was designed to establish a European entity for the provision and use of operational information for Global Monitoring of Environment and Security. The ECOSPHERE made a recommendation to the GMES on the rapid development of systematic countermeasures against abrupt climate changes in the North Atlantic Region.

Of course, we were confronted with various difficulties in writing the report. It can be easily imagined that it is difficult to write a consistent report that is completed by 28 people from various countries. Furthermore, it was tough work for non-native speakers of English to follow the ever-changing ideas of the team. Nonetheless, we completed the project and I learned a great deal about how to work with others in a multicultural atmosphere. In addition to the above activities, SSP03 participants visited space-related organizations nearby France as a part of workshop activities, and had practical experiences in using remote sensing software. The site visits I did were to the European Space Operations (ESOC) in France, European Metrological Satellite Organization (EUMETSAT) in Germany and METEOFRANCE in France. As a yet more peculiar experience, I dissected the heart of a pig as part of the space surgical skill learning. While dissecting the actual heart of the pig, I realized that I could not ever be a surgeon. Furthermore, there were a variety of events held, such as Culture Night that introduces the participants' respective countries, a Robot Contest in which the participants contend with each other for a creativity and technique prize in a simulated Mars Mission, and Space Masquerade in which participants dressed up in Space costumes. Through these events, cultural exchanges were greatly promoted.

Promotion of International exchange

As shown, ISU SSP03 is a unique place where participants gather from various countries to learn about space-related issues and also, about each other. We came through successfully amidst competition with other applicants, and throughout team studies I was frequently surprised at their creativity, industriousness, and intelligence. It was an invaluable experience, living and working with the SSP03 participants for the 9-week course, appreciating the difference among the interdisciplinary, international, and intercultural aspects of the program. It is unlikely that I will have such a precious experience again.

Furthermore, the age distribution of the participants was between 22 and over 50. Irrespective of age, I found the opportunity to discuss various things with men and women of diverse occupations to be priceless. Additionally, I forged what I hope will be lifelong personal and professional relationships with other participants from around the world. I hope that international space projects in the future will make rapid progress as a result of ISU activities and that these activities are more widely recognized, thereby promoting more international exchanges.

Conclusions

It is a great pleasure to acknowledge the assistance received from many individuals before and during my participation in SSP03. First of all, I am much obliged to the staff at Japan Space Forum for their help in preparing my application for SSP03, and they also made arrangements with ISU about my application. I also appreciate all that the staff at ISU did to provide me with a wonderful study environment at ISU during SSP03. In particular, I am greatly indebted to the Japanese faculty, Prof. Tetsuichi Ito, Prof. Yasunori Matogawa, Dr. Chiaki Mukai, Prof. Kazuya Yoshida, Dr. Yukio Haruyama, and Prof. Ichiro Nakatani for the help they provided to me in Strasbourg. I obtained substantial financial aid from CRL, and I greatly appreciate the generous support from Dr. Yoshiaki Suzuki who is the head of the Wireless Communications Division at CRL, Dr. Taizou Yoshino who is the director of Kashima Space Research Center at CRL, and Dr. Shin-ichi Taira who is the leader of Mobile Satellite Communications Group at CRL. Special thanks are also due to several Japanese participants (Kuni, Hide, Ken, and Satoko) for their invaluable help in preparing for mid-term examinations and everything in Strasbourg. Last but by no means least, I would like to express my intention to make good use of the knowledge I cultivated during SSP03 to advance peace and prosperity in our world.