SDM
System Design and Management
NEWS

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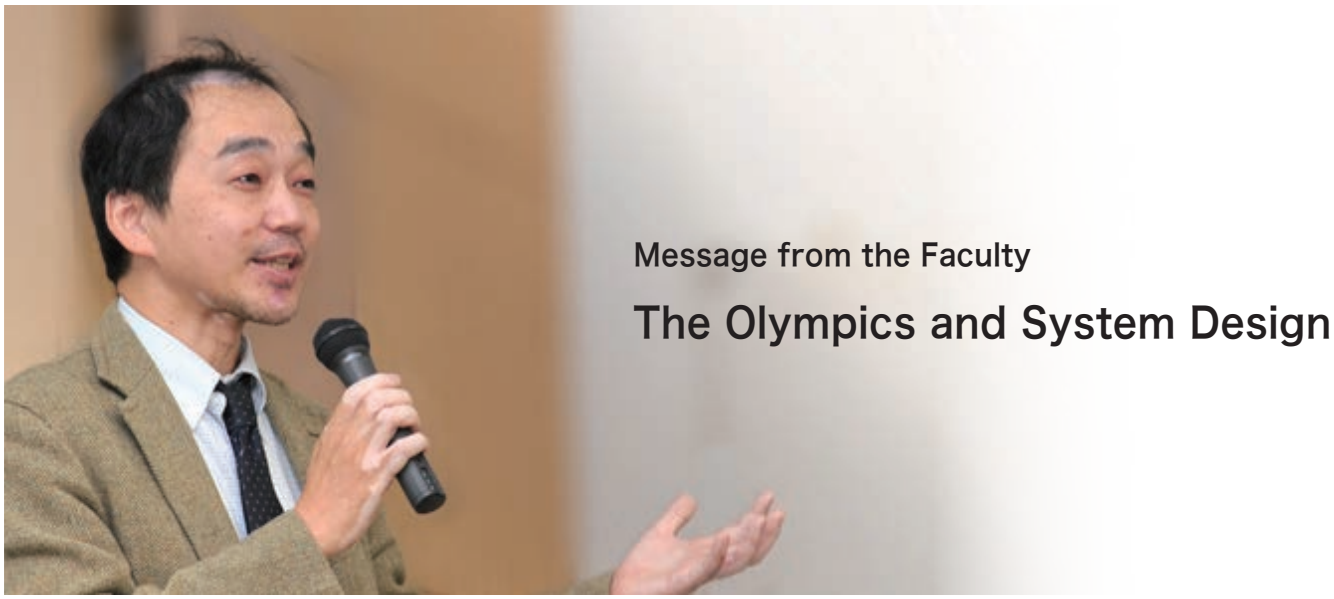
Mr. Yuki Takahashi reporting on this year's activities of the Inter-University International Education Program: Human Resource Development for the Utilization of Space Infrastructure



Message from the Faculty

The Olympics and System Design

I am writing this article as the Sochi Olympics begin. When I watch the Olympic Games live on TV, I tend to look for the various new technologies and systems that are behind the stage while I cheer for Japanese athletes. For speed skating, for example, a new system has been introduced to display world-record lines. For bobsledding, a system is used to display real-time data sent from the speed sensor. Video feeds from wearable cameras show what athletes see, making the competition even more appealing to the audience.

In fact, a number of large-scale and complex systems operate during the Olympics, such as video systems relaying the opening ceremony, results systems transmitting real-time game results on TV and the internet, information delivery systems for smart phones and ticket sales management systems. These systems operate for only a few weeks during the Olympics. Nevertheless, no error or failure is tolerated, as the entire world is watching. The reliability of the systems is, therefore, an extremely critical issue. In order for the Olympics to be successful, there are other systems, besides information systems, that are equally critical, such as facilities and infrastructures supporting the transportation as well as accommodation and guidance for the audience.

When the Tokyo Olympics were held in 1964, a number of new technologies and systems were introduced: transportation infrastructures like *shinkansen* ("bullet trains") and highways, televisions for homes and newly-developed real-time computer systems. Although it is not widely known, the pictograms which are commonly used for toilet signs today were first introduced to guide foreigners at the time of the Tokyo Olympics. It has been decided that Tokyo will host the 2020 Olympics. As part of the preparations, different systems of new technologies are being explored, including cloud computing, 8K imaging and augmented reality (AR). While I hope to see the development of athletes for the upcoming Tokyo Olympics, I also look forward to the development of various *Omotenashi* ("spirit of Japanese hospitality") systems that are particular to Japan.

Tetsuro Ogi, Professor
Graduate School of System Design and Management

TOPIC 1

Heated Dialogue: "Public Philosophy x System Design and Management—Design Peace for the 21st Century"

On Sunday, February 9th, 2014, a dialogue was organized between Keio SDM Dean and Professor Takashi Maeno and Chiba University Professor Masaya Kobayashi (Keio SDM's Guest Professor). The title of the dialogue was "Heated Discussion: Public Philosophy x System Design and Management—Design Peace for the 21st Century." The lecture series was started in August 2013 and this session marked the finale of the year. It was a heated discussion on "happiness and peace." The topic was chosen as a fitting way to conclude this year's lecture series.

Professor Maeno argued that the worldview based on reductionism, which has been dominant since the modern era in the West, triggers conflicts among states, religions and people. He explained that a wide range of doctrines - from science to philosophy - present theories that can transcend such a modern fallacy, including elementary particles theory, the science of complex systems, Eastern thought and dialectics. He concluded by saying that a paradigm shift from *kyoso* ("competition") to *kyoso* ("collaborative creation") should become the standard for peace and happiness of the next generation. Professor Kobayashi, from the viewpoint of public philosophy, introduced a concept of "deep peace", which follows the increasingly popular idea of deep ecology. He argued that integration and further development of peace, happiness and communality are needed in the future. Dialogues were also held with the audience. The session was filled with "heated" discussions.

Keio SDM plans to continue hosting similar public discussion series in the next academic year.

Guest Professor Masaya Kobayashi speaking at the last session of the year

TOPIC 2

Symposium to Commemorate the Publication of the Japanese Version of *Engineering Systems*

Professor Olivier L. de Weck of MIT, who has been taking part in our Project Design every year since Keio SDM's foundation in 2008, published a book titled, *Engineering Systems* (MIT Press) in 2011. With the involvement of Keio SDM faculty members, his book was translated into Japanese and published by Keio University Press in February 2014. To celebrate the publication of the Japanese version of *Engineering Systems*, a symposium was held at the Collaboration Complex of Hiyoshi Campus on Monday, February 17th, 2014. Dr. Yoshiaki Ohkami (former Dean), Dean Takashi Maeno and Professor Shinichiro Haruyama spoke about the partnership between MIT and Keio SDM and introduced the Japanese version of the book. Then, Professor Olivier L. de Weck of MIT gave a lecture titled, "Engineering Systems." It was followed by Project Professor Takashi Iwamoto from Keio Business School, who spoke about "Business Government Relations for Creation of New Industry", explaining that the government's support plays an important role in creating new industry. Furthermore, Ms. Tomoyo Nonaka, a representative of Gaia Initiative (NPO), stressed that it is essential to think whenever one designs a system or product whether it would do good to the earth and human compassion.

panel discussion

The above speakers and Associate Professor Seiko Shirasaka of Keio SDM sat as panelists for the panel discussion, which was facilitated by Associate Professor Naohiko Kohtake. There were lively discussions on how to respond to complex social and technological systems.

TOPIC 3

Seminar to Report on "the Inter-University International Education Program: Human Resource Development for the Utilization of Space Infrastructure"

Since February 2013, Keio SDM has been collaborating with the Center for Spatial Information Science at the University of Tokyo and Tokyo University of Marine Science and Technology on an inter-university international education program. The program, "G-SPASE," aims to nurture human resources for the utilization of space infrastructures with the assistance of the Ministry of Education, Culture, Sports, Science and Technology. With the aim of reporting on this year's accomplishment, an international seminar was held at the Convention Hall of Tokyo University Komaba Research Campus on Tuesday, February 18th and Wednesday, February 19th, 2014. The program aims to nurture professionals who can establish and utilize various innovative social services by integrating space infrastructures (observation, positioning and communication by satellites), mobile phone land networks and digital map information. The program has periodic lectures in English both inside and outside Japan, and five "real projects" are being carried out by students targeting Indonesia, Thailand, Bangladesh and Japan. The seminar reporting on this year's accomplishment included lectures and discussions with relevant industries and government officials. From Keio SDM, Mr. Yuki Takahashi presented this year's activities and accomplishments. In addition, Mr. Shota Iino (Early Warning System Project) and Mr. Nariaki Konita (Location Information Service Project) were given outstanding performance awards for their contributions to their projects.

Seminar to report on the Inter-University International Education Program: Human Resource Development for the Utilization of Space Infrastructure

► http://gestiss.org/?lang=en

Associate Professor Naohiko Kohtake recommending measures for next year

Laboratory / Center profile

Model-Driven System Development Laboratory

Representative: Professor Hidekazu Nishimura

Model-Based Systems Engineering (MBSE) has been increasingly mentioned by the International Council on Systems Engineering (INCOSE) in recent years. According to Project Associate Professor Ishibashi, who attended the MBSE Workshop which was part of the INCOSE International Workshop 2014, Mr. David Long, Chairperson of INCOSE, is now focusing on making MBSE mainstream by moving towards digital systems engineering.

In particular, there is an increasing emphasis on SysML (one of the modeling languages) in the area of MBSE both domestically and globally. Since its founding in 2008, Keio SDM has been organizing lectures utilizing SysML every year together with Mr. Laurent Balmelli, who was with IBM at that time. At the same time, we have been conducting research related to SysML. In 2012, our laboratory played a key role in publishing a book titled, *Systems Modeling Language: SysML*. It is a Japanese version of a famous book by Sanford Friedenthal, *A Practical Guide to SysML*, *the* book on SysML. Recently in Japan, consultants have been receiving many inquiries and requests relating to SysML following the issuance of ISO26262, which is a functional safety standard for automobiles.

However, I would like to pose a simple yet fundamental question: "SysML exists for what purpose in the first place?" As MBSE Workshop reminds the participants every year, we shall not forget that MBSE is SE.

On Wednesday, February 5th, 2014, we organized a forum for the "SysML Utilization Consociation" established under the Object Management Group (OMG) Japan Branch. More than fifty professionals participated from different firms, which reaffirmed the popularity of SysML. I will be serving as chair of the SysML Utilization Consociation, and I would like to stress that if companies want to utilize SysML for development, operation and disposal of products and services, there must be a proper understanding of systems engineering across the organization to begin with. If companies merely use SysML without realizing this point, they cannot expect good results.

Panel discussion at a forum for the establishment of the SysML Utilization Consociation

Why is SysML based on four pillars (structure, behavior, requirements and parametrics)? What systems are targeted? What is the fundamental question? What is the overall purpose? Without having concrete answers to these questions, there is no use in promoting the utilization of SysML. In order to prevent people from confusing ends and means, our laboratory, together with the Systems Engineering Center and the SysML Utilization Consociation, plans to carry out activities consistently yet swiftly with the aim of spreading the proper use of system engineering, MBSE and SysML to a wider society.

▶ http://www.omgwiki.org/MBSE/doku.php?id=mbse:incose_mbse_iw_2014

Visible Light Communication Laboratory

Representative: Professor Shinichiro Haruyama

The Visible Light Communication Laboratory deals with themes relating to visible light communication technologies, including LED illumination and automobile LED lamps that have been becoming popular recently.

Inter-Vehicle Communication System Using In-Vehicle LED Lamp

Intelligent transport systems (ITS) have been actively researched recently. ITS can support safe driving based on various kinds of traffic information. Road-to-vehicle communications and inter-vehicle communications are crucial for gathering traffic information required by ITS. The Visible Light Communication Laboratory studies inter-vehicle visible light communications using LED lamps instead of radio communications. In the case of radio communication, it is difficult to identify the location of the communicating partner. The visible light communication, on the other hand, enables us to locate the communicating partner with accuracy using image sensors.

Figure 1 shows the concept of information exchange using visible light communications of LED break lamps. With visible light communication technology, it becomes possible to visualize which driver is transmitting what type of information.

Figure 2 is a prototype made by Keio SDM with the aim of putting the above concept into practice. The picture on the left is a prototype for an LED transmitter. The picture on the right is a display of the receiving side that shows which driver is sending what kind of information.

Figure 1: Information exchange by visible light communication between LED break lamps

Figure 2: A prototype of visual light communication between LED break lamps

Standardizing Visual Light Communication

The Visual Light Communication Consortium, composed of Keio SDM and private firms, has been advocating for the standardization of a visible light beacon system. The Japan Electronics and Information Technology Industries Association (JEITA) approved the proposal as "CP-1223" in May 2013. With the introduction of this standardized system, it will become possible to transmit ID information from LED illuminations in a uniform manner. The system can be applied to a wide range of goods and services, such as indoor location services and indoor shopping services. We also submitted a proposal to the International Electrotechnical Commission (IEC) last winter. The proposal has been accepted and the commencement of the standardization activities has been approved.

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