

INTERNATIONAL EXPERTS PANEL REPORT

Review Process

An International Experts Panel (IEP) attended the Dissemination Seminar for (i) the Infrastructure Maintenance, Renovation and Management (IMRM) and (ii) the Enhancement of Societal Resiliency against Natural Disaster (ESRNS) programs. Both of these programs are supported under the auspices of the SIP (Cross-Ministerial Strategic Innovation Promotion Program), a program created by the Cabinet Office in Japan to promote innovations in science and technology, transcending the traditional boundaries of sectors and government ministries. The Dissemination Seminar took place on 6-7 December 2018 at the Hongo Campus of the University of Tokyo. The five IEP members attending were Professor Kenichi Soga (University of California, Berkeley), Professor Billie F. Spencer Jr. (University of Illinois at Urbana-Champaign), Dr. Helmut Wenzel (Vienna Consulting Engineers), Dr. Zhongliang Wu (China Earthquake Administration), and Professor Bojidar S. Yanev (Columbia University and New York University).

The agenda for the meeting is included as an Appendix of this report. On the first day, an overview of the IMRM projects was presented by Professor Yozo Fujino (Yokohama National University), director for the IMRM program. Subsequently, reports on the progress for six of the over 60 projects were presented. A poster session was held during the lunch break, where the projects for both the IMRM and the ESRNS were discussed. In the afternoon, an overview of the ESRNS projects was presented by Professor Muneo Hori (University of Tokyo), director for the ESRNS program. The IEP provided verbal comments throughout the morning presentations, followed by more detailed remarks during an open discussion between the IEP and the members of the SIP projects that was held on the morning of the second day. Finally, research presentations by the IEP members were given in the afternoon of the second day at the Lecture Hall, Earthquake Research Institute (ERI), Yayoi Campus.

The IEP Chair, Bill Spencer, circulated a draft report with IEP members for comment and modifications. Draft report modifications and edits were made, and a final report draft was provided to IMRM/ESRNS program directors for a factual review. After the factual check, the EIP Final Report was submitted as a consensus review document.

SIP ESRNS Evaluation

The SIP Enhancement of Societal Resiliency against Natural Disaster (ESRNS) program was comprised of 7 projects that ranged from development of a framework for managing and sharing data across disaster response agencies, to disaster prevention support system for irrigation ponds, to development of multi-parameter phased array weather radar for torrential rain. The central focus of the ESRNS projects was to leverage advanced technologies to realize improved societal resiliency against natural disasters, going from basic research to societal implementation,

enabling collaboration among ministries (science & technology, industry & trade, telecommunication, infrastructure, agriculture, etc.), as well as collaboration among governmental institute, universities and industry. In terms of both depth and breadth, the SIP-ESRNS research is of the highest quality, having developed many innovative solutions and establishing a strong scientific basis. By all measures, the SIP-ESRNS is a clear success.

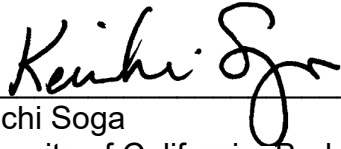
Recommendations

The IEP recommendations from the 6-7 December 2018 meeting are as follows:

- Many of the research outcomes have huge potential to produce a major impact on society resilience, producing safer and more secure societies in which we live. However, to realize the full benefits of SIP-ESRNS research achievements, efforts to work together with emergency response agencies and local governments must be continued, demonstrating to them the benefits of using these newly-developed technologies.
- Focus needs to be placed on developing appropriate standards of practice. Indeed, standards are the backbone of business. Owners are reluctant to issue contracts if no relevant standard can be presented. Moreover, the standardization of data acquisition, processing, storage, and application in actionable decisions ensures that different sectors can collaborate effectively. However, standardization of engineering data is possible only if applied to a similarly standardized inventory. Therefore, to maximize the impact of SIP-ESRNS research, developing standards of practice that are matched with the standardized infrastructure inventory is critical.
- Natural disasters are common worldwide. The achievements of the SIP-ESRNS program have the potential to be used to solve related problems in other countries, too. Efforts should be devoted to disseminate the SIP-ESRNS research results, not only throughout Japan, but also internationally.
- The future will require uniquely trained engineers to integrate innovations in emerging technologies, such as developed through SIP-ESRNS research, to provide more resilient societies. Efforts need to be devoted to preparation of this next generation of civil engineers, providing opportunities at universities and elsewhere (e.g., summer schools) for young students to formally learn about these new technologies.
- The SIP-ESRNS should be considered as a new model for the way that research should be conducted in the future. SIP-ESRNS brought together researchers from different disciplines, utilizing their respective talents to jointly address civil engineering-related problems. Critical to the success of this approach was to have a clearly-defined common goal and to ensure that all research team members understand the other's problems. The synergies achieved by this approach allow for research outcomes that are far beyond what researchers might have achieved working independently.

during the IEP visit. The IEP members are available for advice and additional clarifications regarding the contents of this report, and encourage the SIP- ESRNS management to contact us with any questions.

Respectfully submitted,



Kenichi Soga
University of California, Berkeley



Billie F. Spencer Jr. (Chair)
University of Illinois at Urbana-Champaign



Helmut Wenzel
Vienna Consulting Engineers



Zhongliang Wu
China Earthquake Administration



Bojidar S. Yanev
Columbia University/New York University

Day 1

Morning

December 6th, 2018 Koshiba Hall

9:00–9:05	Opening Remark. Akira Sudo (Cabinet Office)
9:05–9:15	Greetings from Seminar Organizers

SIP for Infrastructure Maintenance, Renovation, and Management (SIP IMRM)	
9:15–9:45	Overview presentation Program Director, Prof. Yozo Fujino (Yokohama National University)
9:45 – 10:25	Development of bridge inspection support system using two-wheeled multi-copter and 3D modeling technology Dr.Naoyuki Sawasaki (Fujitsu Limited)
10:25 – 11:10	Highly sensitive magnetic nondestructive testing for deterioration diagnosis of steel structures. Prof. Keiji Tsukada (Okayama University)
	Bridge slab damage detection by digital signal processing of fast measurable radar data. Dr. Tsukasa Mizutani (The University of Tokyo)
11:10 – 11:20	Coffee Break
11:20 – 12:00	Data Driven Analysis for Bridge Health Monitoring Prof. Atsuhiko Takasu (National Inst. of Informatics)
12:00 – 12:45	Computational and AI-based Life-cycle assessment coupled with site inspection technology for maintenance of concrete bridge decks Prof. Koichi Maekawa (Yokohama National University)
	Development of highly-durable concrete structure under harsh chloride environments and its application to Tohoku earthquake-damaged regions Prof. Ichiro Iwaki (Nihon University)
12:45 – 14:30	Lunch Break and poster session

Day 1
 Afternoon
December 6th, 2018 Koshiba Hall

SIP for Enhancement of Societal Resiliency against Natural Disaster (ESRNS)	
14:30 – 15:00	Overview presentation Program Director, Prof. Muneo Hori (University of Tokyo)
15:00 – 15:50	Building common situation awareness and implementing effective activities for disaster response organizations by information sharing Dr. Yuichiro Usuda (National Research Institute for Earth Science and Disaster Resilience) Development of logical integration technology and scalable high-speed distributed processing technology for handling damage information in suddenly occurred disaster in real time and realizing smooth inter-organizational cooperation Mr. Takashi Matusi (Hitachi, Ltd. Defense Systems Business Unit) Importance of sharing and analyzing information system for fast and efficient health and medical activities in disaster areas Dr. Manabu Ichikawa (Shibaura Institute of Technology) Disaster Prevention support System for Irrigation Pond (DPSIP) Dr. Toshikazu Hori (The National Agriculture and Food Research Organization (NARO))
15:50 – 16:30	Development of portable communication system for damage area Dr. H. Kumagai (NICT/Tohoku University)
16:30 – 16:40	Coffee Break
16:40 – 17:20	Integration of investigation, diagnosis, design and retrofitting techniques for liquefaction Dr. Takahiro Sugano (Port and Airport Research Institute)
17:20 – 18:00	Development of multi parameter phased array weather radar for torrential rain Dr. N. Takahashi (National Institute of Information and Communications Technology/ Nagoya University)
18:00 – 18:10	Closing Remark
18:10	Reception party with SIP project members and attendees

Day 2
 Morning
December 7th, 2018 Koshiba Hall

Discussion Panel with International expert panels and member of SIP Projects	
10:00 – 10:10	Opening Remark and introduction of International expert panel members
10:10 – 11:30	General comments, impression and feedbacks of international expert panel on SIP projects presentations (15-20 minutes for each panel member)
11:30 – 12:00	Discussion on future directions of post SIP research projects
12:00 – 13:00	Lunch Break
Lecture Hall, Earthquake Research Institute	

Day 2
 Afternoon
December 7th, 2018 Earthquake Research Institute Bldg. 2

Presentations from International Expert Members	
13:00 – 13:45	State-of-the-Art of Structural Health Monitoring in USA Prof. Billie F. Spencer Jr. (University of Illinois, Urbana Champaign)
13:45 – 14:30	The Value of Sensing to Realize Smart Infrastructure Prof. Kenichi Soga (University of California, Berkeley)
14:30 – 15:15	Scientific challenges of the Seismic Experiment Site Dr. Zhongliang Wu (Director of Institute of Earthquake Forecasting, China Earthquake Administration)
15:15 – 16:00	Recent Progress in the Standardization of Assessment and Management Process of Structures Dr. Helmut Wenzel (Managing Director, VCE Vienna Consulting Engineers ZT GmbH.)
16:00	Closing Remark