

## Abstract of Presentation

Presentation Title:

Intelligent Infrastructure

-An advanced interdisciplinary approach towards innovation

Abstract :

Infrastructure is a system to make people live happy lives. As population grows, human factors of the system increase exponentially because people interact. Artificial intelligence has been a tool to solve such non-polynomial order problems, thus the need for science of intelligent infrastructure. There are three types of intelligence which will innovate infrastructure. The first is "static intelligence" to optimize inefficient parts of the existing infrastructure while keeping the existing hardware as it is. The second is "dynamic intelligence" to optimize the infrastructure by equipping it with such new hardware as sensors, computers, and controllers. The third is "cumulative intelligence" to optimize the infrastructure over tens of years. The best solution at a moment will not necessarily be the best in a long run. In this workshop, we decompose the process to approach ultimate intelligent infrastructure into four steps: (1) observing both natural and societal status, (2) modeling and simulating the infrastructure in cyber world, (3) optimizing it by computers, (4) installing the solution in the real world. Whenever examples are needed, it is expected in this workshop to use water infrastructure to sustain lives, transportation to sustain communities of people, and energy infrastructure to sustain civilization of the humankind. I hope this holistic interdisciplinary approach will contribute to both innovating infrastructure in ASEAN countries as well as in Japan, and innovating science of infrastructure for the entire world.

Dr. Haruo Takeda is the program officer of "interdisciplinary approach towards innovation" in JST (Japan Science and Technology Agency). He is currently working also for Council of Science and Technology Policy in Cabinet Office of Prime Minister of Japan on three policies of energy, nano-technologies & materials, and information & communication technologies. He is a member of the technology advisory committee of Ministry of Agriculture, Forestry and Fisheries in Japan. He is a director of Transdisciplinary Science and Technology Initiative in Japan. He graduated from and got his PhD from the University of Tokyo. After joining Hitachi, he worked as a researcher and a manager in Systems Development Laboratory, the general manager of R&D Strategy Center, Chief Innovation Officer of R&D Group, and the general manger of

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Advanced Research Laboratory before working as Corporate Chief Engineer and the general manager of Technology Strategy Office of Hitachi. Hitachi Group is a multi national conglomerate having 360,000 employees with annual sales of about a hundred billion US dollars in eleven business segments including Social Infrastructure and Information & Telecommunication. In academia he was a visiting scientist at Stanford University in US, a visiting professor at the University of Tokyo in Japan, and is a member of the academic advisory council of University of Technology Petronas in Malaysia.