

This issue includes reports on participation in R10 SYWL Congress (Jeju Island, Korea), three technical tours to KDDI Yamata Transmitting Station, JAXA Institute of Space and Astronautical Science (Sagamihara), and ANA Airframe Maintenance Facility (Haneda), four Tokyo Section-sponsored lectures, MAW and SYWL (Tokushima), 19th IEEE TOWERS, R10 Reports on participation in LMAG Meet.

1. R10 SYWL Congress (Jeju Island, Korea)

R10 SYWL Congress 2022 was held at the Shinwha World Marriott Resort, Jeju, Korea, August 11-14, 2022. The Congress is organized by the IEEE Seoul Section and is a Region 10-wide conference for the four Affinity Groups (S: Student, Y: Young Professionals, W: Women in Engineering, and L: Life Members). While the 2020 conference was held online, this year's conference was based on a face-to-face format and consisted of a plenary session and four parallel sessions, with approximately 130 participants in total.

From Tokyo Section LMAG, Chair Imai and Vice Chair Ohta participated in the meeting. LMAG Coordinator Takano from JC participated as an invited speaker.

The meeting started with opening remarks by General Chair Cheon Won Choi, R10 Director Deepak Matur, and others, followed by a plenary lecture by Juho Lee of Samsung Electronics on Evolution of Mobile Communications towards 6G.

The second day, another plenary talk was given by Mr. Toshio Fukuda, former IEEE President, on AI Robot and Moonshot program.

In the session on LMAG, Chair Imai gave a talk on the IEEE Milestone Program and there was a discussion about the difficulty of applying for milestones from sections (LMAGs) with small members and the way things are done in Japan. In the LMAG-Meet session, Vice Chair Ohta gave a presentation on the activities of LMAG-Tokyo and shared the status of activities with other LMAGs, which led to fruitful discussions on future activities. In the Industry and Technology Track, JC Takano, LMAG Coordinator, gave an invited talk on "Space travel: fresh impact to engineering and humanity."

The 3rd LMAG Meet was held during the conference. There were reports from each participating LMAG. From Tokyo LMAG, Vice Chair Ohta gave a report. There was a discussion about the difficulty of applying for milestones from chapters (LMAGs) with small numbers and the way things are

done in Japan. The number of events was also discussed in the activity report.

Although the number of participants was small due to the new Corona virus, we were able to have a dense discussion face-to-face.



Fig.1 Imai Chair and Ohta Vice Chair at the entrance of the venue

2. Technical Tours hosted by LMAG-Tokyo

1) KDDI Yamata Transmitting Station

The technical tour was held from 13:00~16:00 on Aug. 24, 2022, at KDDI Yamata Transmitting Station in Koga city, Ibaraki, with 28 participants. The event was organized by LMAG-Tokyo and co-sponsored by the TPC of IEEE Tokyo Section. The KDDI Yamata transmitting station is only one facility in Japan that transmit overseas radio program (Radio Japan) that delivers information such as world news, Japanese life or culture all over the world in eighty languages on short-wave broadcasting. The tour started with a historical overview of Yamata transmitting station that started short-wave broadcasting from 1941. The participants next enjoyed to see the real systems in operation including high-performance antennas including fifteen curtain antennas and three LP antennas, as well as transmitting equipment consisting of five 300kW and two 100kW transmitters

to cover the world. In addition, the participants learned some practical issues for operating and maintaining facilities on a 24-hour basis. Finally, issues such as how to foster engineers for short-wave broadcast systems were shared and discussed actively.

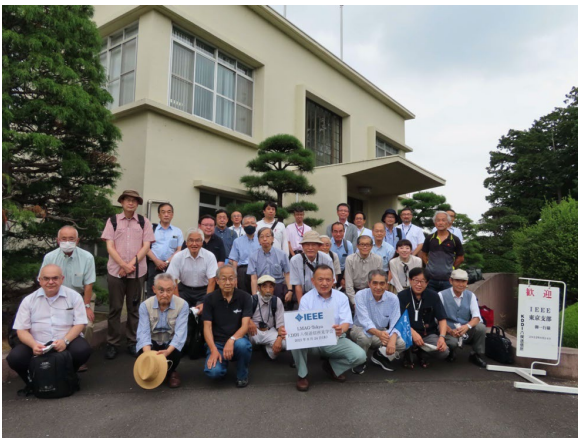


Fig.2 Tour participants and staff engineers of Yamata Transmitting Station (in front of the station building)



Fig.3 High-performance curtain antenna

2) Institute of Space and Astronautical Science, JAXA

A tour of JAXA's Institute of Space and Astronautical Science (Sagamihara Campus) and a lecture were held by LMAG-Tokyo, co-sponsored by Tokyo Section TPC, on Thursday, September 29, from 14:00 to 16:00. 29 people attended. The tour was led by Dr. Tadashi Takano, former LMAG-Tokyo Chair (Professor Emeritus at ISAS), who gave a clear and entertaining explanation on the history and cutting-edge achievements of Japanese space science. In addition, Associate Professor Tatsuaki Okada of ISAS gave a lecture on the latest results of the analysis of samples brought back from Ryugu by Hayabusa2. It was a very meaningful tour for us to learn about the history of space science in

Japan and to hear about the state-of-the-art of research.



Fig.4 Group photo of tour participants

3) ANA Aircraft Maintenance Facility

Organized by LMAG-Tokyo and co-sponsored by Tokyo Section TPC, the event was held at the ANA hangar at Haneda Airport to observe actual aircraft maintenance on October 26th. There were 35 participants (34 IEEE members, including 15 Life Members).

After an overview of the aircraft, we put on helmets and entered the maintenance shop floor, where we received a detailed explanation of the actual aircraft. The size of the fuselage, the shape of the main wings, the size of the vertical tail, and the shape of the main engine blades were all surprising. The use of CFRP (Carbon Fiber Reinforced Plastics) as a material for the fuselage and the use of optical fiber for information transmission inside the fuselage were also very different from what we had imagined, and it was a great learning experience.



Fig.5 Group photo of tour participant

3. Lecture Meetings hosted by Tokyo Section (co-hosted by LMAG)

1) “Research and development of on-chip power supply circuits”

This lecture was hosted by IEEE Tokyo Section TPC and co-hosted by Tokyo LMAG, and was held on Friday, August 26, from 3:30 p.m. in an online conference format via Zoom Webinar. The lecturer was Dr. Toru Tanzawa (Professor, Shizuoka University) and 80 participants (including 55 IEEE members) attended.

In his presentation, he introduced his ideas on on-chip power supply circuits, which he was involved in the research and development of, and how he tackled the circuit design challenges of the time to overcome them. The lecturer was in charge of on-chip voltage booster circuits for data rewriting of NAND flash, which is currently used in USB memory and SSD, at Toshiba ULSI R&D Laboratories, where he was affiliated. In his presentation, he first explained how the principle of NAND flash memory, "data retention even when power is turned off" and "electrical rewriting of data" can be compatible. He described the necessity of a high-voltage generation circuit for rewriting. Based on the circuit model, he explained how it was possible to generate a boost voltage twice as fast by simply changing its control without increasing the area of the boost circuit. He also demonstrated an operating method that reduces the overall circuit area of the voltage multiplier circuit by 40% and chip size by more than 1% without compromising performance. Finally, he introduced the idea of how the circuit area of the AC-DC booster circuit for reverse magneto-strictive vibration power generation could be reduced by three orders of magnitude.

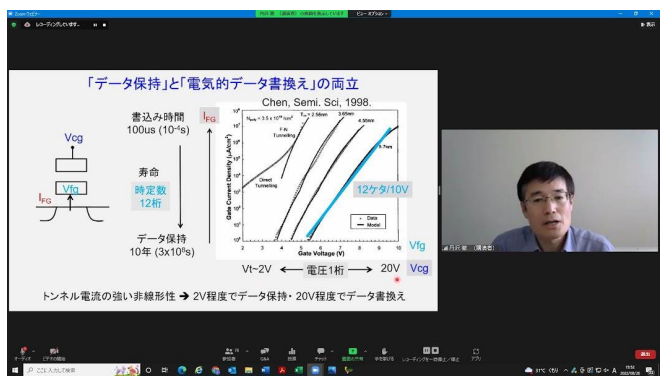


Fig.6 Dr. Tanzawa giving his talk (Zoom screenshot)

2) “Research on Green Multicore Architecture and Its Power Reducing Parallelizing Compiler”

The lecture meeting was held online from 15:30~17:00 on Oct. 6, 2022, using Zoom Webinar, hosted by the TPC and co-hosted by LMAG, both of

IEEE Tokyo Section. The lecturer was Dr. Hironori Kasahara, Professor, Dept. of Computer Sci. & Eng., Faculty of Science and Engineering, Waseda University.

He talked on his 40 years of research on parallel processing for achieving green (low-power dissipation) multi-core computer architecture and its power reducing parallelizing compiler and his dream for the future. Dr. Kasahara was awarded an IEEE Fellow in 2017 on the research. He developed technologies including parallel processing for robot control, co-design of software (compiler) and hardware (multicore processor architecture) that can be applied for supercomputers and information appliances. Dr. Kasahara’s dream is to realize and commercialize green supercomputers that work with solar panels. The number of participants was 55 (including 44 IEEE members).



Fig.7 Dr. Kasahara giving his talk (Zoom screenshot)

3) “Wireless AI:A New Sixth Sense to Deciphering our World”

This lecture was organized by IEEE Tokyo Section TPC and co-sponsored by Tokyo LMAG, and was held in the form of an online conference via Zoom Webinar on Tuesday, November 1, at 3:00 p.m. The lecturer was Mr. K. J. Ray Liu, IEEE 2022 President, and 126 participants (including 93 IEEE members) attended.

In his talk, Dr. Liu asked, "What smart impact will future 5G and IoT have on our lives? Many may wonder and even speculate, but do we really know? With more and more bandwidth available for next-generation wireless applications, it could enable more smart applications/services than we can even imagine today." He spoke.

This talk showed that with more bandwidth, many multipaths can be identified. This can serve as hundreds of virtual antennas that can be leveraged as new degrees of freedom for smart living. By combining the use of machine learning with the fundamental physical principles of time reversal to focus energy on specific locations, innovative

wireless AI platforms can be built to enable many cutting-edge IoT applications that have long been envisioned. There are many other magical smart applications enabled by the emerging field of wireless AI, allowing us to decode the world around us with a new "sixth sense." This was the content of the presentation.

After the lecture, many questions were raised and a lively Q&A session took place, which lasted well beyond the scheduled time.



Fig.8 Dr. Liu giving his talk

4) “Involved in research and development of video coding”

The lecture meeting was held online from 15:00~16:30 on Nov. 2, 2022, using Zoom Webinar, hosted by the TPC, IEEE Tokyo Section, and co-hosted by LMAG-Tokyo. The lecturer was Dr. Seishi Takamura, Professor, Dept. of Digital Media, Faculty of Computer and Information Sciences, Hosei University. Dr. Takamura was awarded an IEEE Fellow in 2019 on video coding. First, he introduced an overview of his activities including both R&D and IEEE-related academic work. Then, Dr. Takamura explained several coding schemes developed by him for improving video coding efficiency. For example, an intra prediction algorithm using multiple reference lines was adopted as a required patent in the standard H.266/VVC.

He predicted that the future video coding still has room to be improved with AI technology, sophisticated motion compensation algorithms and a scheme to refresh important information at the encoder. Finally, Dr. Takamura shared his experience of Fellow nomination with members who aim at Fellow grade.

The number of participants was 39 (including 34 IEEE members).



Fig.9 Dr. Takamura giving his talk (Zoom screenshot)

4. IEEE Metro Area Workshop (MAW) 2022 in Tokushima

The IEEE MAW 2022 hosted by IEEE Shikoku Section and co-hosted by Japan Council was held in a hybrid manner on Oct. 7 (Fri) 2022, 13:00 - 18:00 in Josanjima Campus, Tokushima University. The participants were 129 in number (47 online and 82 on site). From LMAG-Tokyo, Dr. Imai, Chair, and Dr. Ohta, Vice Chair, participated in the event on site. The workshop focused on challenges in Shikoku on the research and development of next-generation optical devices and communication systems, as well as applications of optical devices. The following lectures were given by speakers from the industry and academia. The Q&A session was very active and the workshop went well.

- “Invisible Light Opens Up the Century of Light”
Takeshi Yasui, CRO, Institute of Post-LED Photonics, Tokushima University
- “Optical Communication Technology for Communication Infrastructure and the Operation and Maintenance Practice”
Atsushi Sakuragi, Chief, Communication System Head Office, STNet
- “LED Applications for Highway Driving Safety”
Mitsuharu Akeno, Manager, Shimanami Imabaru Operation Center, Honshu-Shikoku Bridge Expressway Company
- “R&D on Spatial Multiplexing Optical Network/Node Technology for Beyond 5G Ultra High-capacity Wireless Communication: PHUJIN Project”
Masahiko Jinno, Prof., Faculty of Engineering and Design, Kagawa University
- “Laser Beam Micromachining and Its Latest Examples”
Akira Donai, CEO, Laser System Corp.

5. Japan SYWL+Industry Workshop 2022 in Tokushima

The event, sponsored by the workshop organizing committee and co-sponsored by Japan Council and others, was held in a hybrid manner in Josanjima Campus, Tokushima University, on Oct. 8 (Sat), 2022, 9:00 – 12:30. The participants were 54 in number (including 9 online). From LMAG-Tokyo, Dr. Imai, Chair, and Dr. Ohta, Vice Chair, participated in the event on site, and interacted with students and other affinity group members.

As shown in the workshop title, “Industry” was a new challenge. The Industry Promotion Committee (IPC) supported the event by setting up an industry booth at the workshop. There were two plenary talks “Planned Happenstance” by Masayuki Shigematsu (Sumitomo Electric Industries) and “Entrepreneurship - Introduction to Startup” by LEO Hwa Chiang, (Director of Singapore Operations, IEEE). Those talks activated hot discussions among the participants. Then, participants were divided into small groups and each group discussed an assigned topic. Some selected groups presented summary of their discussions. Finally, the result of Manga Project was reported, and the award winners were officially announced.



Fig.10 Group photo

6. R10 LMAG Meet

The 4th LMAG Meet was held online on Sunday, October 16, 2022, at 14:30 (CST). The participants were Mr. Rajendra Asthana, R10 LMC Chair, R10 LMC Chair, R10 LMC members, LMAG Chairs, Vice Chairs and Secretaries, etc. From LMAG-Tokyo, Chair Imai and Vice The meeting was chaired by Mr. Ritvik Bansal, and Mr. Asthana presided over the proceedings. The main agenda items were as follows

- Continuing items from the 2nd LMAG Meet were introduced; 10th Anniversary Celebration is being planned at the Kansai LMAG; 5th Anniversary Celebration at LMAG, Delhi on September 14.

- Plans for 2023 activities were introduced: R10 TENSYP is planned for September 6-9 in Australia, R10 HTC for October 16-18 in Rajkot, and R10 TENCON for November 28-December 1 in Thailand.
- The LM Congress as a new initiative was introduced.
- He said that there will be a grace period for inactive LMAGs, and if there are still none, he will consider disbanding the group. The next LMAG Meet is scheduled for 2023.



Fig.11 Participants of R10 LMAG Meet (Screenshot)

7. 19th IEEE Towers

The 19th IEEE TOWERS (Transdisciplinary Oriented Workshop for Emerging Researchers) was held on Saturday, November 26, 2022, from 8:30 to 18:30 at Ellipse, the 140th Anniversary Hall of Tokyo University of Agriculture and Technology. TOWERS is mainly for students and young researchers, including junior high and high school students, and LMAG Tokyo also participated as a member of the judging committee and as an officer to support the IEEE Tokyo Section's booth.

As a new trial, Towers co-sponsored by Sendai and Kansai YP. Poster presentations and group discussions were held at each venue. This year's workshop in Tokyo YP attracted 92 presentations, 1.5 times more than last year, on a wide range of research results, with three sessions of poster presentations and group discussions. The theme of the group discussion was "From Academic Research to New Business," in which students and researchers from different fields discussed the creation of new businesses. Each group presented their results. Finally, awards were presented to the outstanding poster presentations, which were selected based on the judges' evaluations. The TOWERS Best Award was given to Mr. R. Sawahashi and the Outstanding Poster Award to Mr. S. Shimomai.

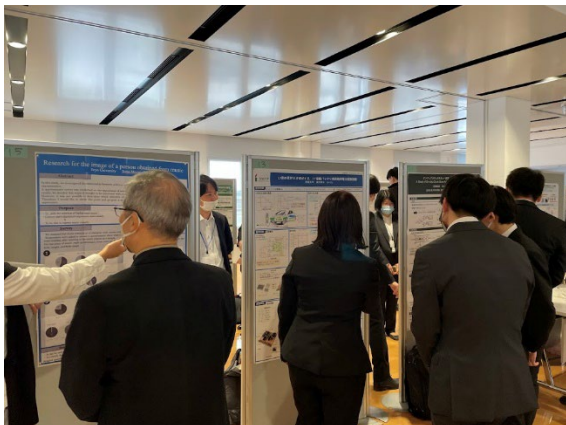


Fig.12 Poster session



Fig.13 Group discussion

8. LMAG-Tokyo supports educational activities of Young Professionals (YP), IEEE Tokyo Section

LMAG-Tokyo supports educational activities of Young Professionals Affinity Group (YP), IEEE Tokyo Section. In 2022, we co-sponsored educational Webinars as listed below.

- (1) March 12 (2022) 11:00 - 12:00
Webinar Title: "My Personal Journey with IEEE"
Speaker: Susan K. Land (Past IEEE President)
- (2) June 4 (2022) 11:00-12:00
Webinar Title: "IEEE Region 10 and You"
Speaker: Deepak Mathur, Director of IEEE Region 10

(3) Aug. 12 (2022) 17:30-18:30
Webinar Title: "Deviation from the standard – toward opening up 6G telecommunications"
Speaker: Muriel Médard, NEC Professor, MIT.

(4) Aug. 31 (2022) 17:30-18:30
Webinar Title: Voice, Speech, and AI
Speaker: Kong Aik Lee, Senior Scientist A*STAR, Singapore.

(5) Sept. 19 (2022) 16:00-17:30
Webinar Title: Technical Writing Workshop
Speaker: Dr. Akihiko (Ken) Sugiyama, Yahoo! Japan Research.

9. Determination of incoming board members

The following officers for the next term (2023-2024) of LMAG-Tokyo were approved at the Tokyo Section Board of Directors meeting on December 1, 2022.

Incoming Board Members

Chair: Dr. Naohisa Ohta (formerly with Keio University Graduate School)

Vice Chair: Dr. Hideki Hayashi (Yokohama National University, formerly with Sumitomo Electric Industries)

Secretary: Dr. Toshihiko Sugie (Hokkaido University*, formerly with NTT) *Tokyo Section Member

10. Future Events

We are planning to hold the following technical tour.

- JR East Railway Museum and Research & Development Center

Date: Wednesday, December 14, 2022

Location: Ohmiya

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