



This issue reports the Chair's greeting of 2017, the 2016 LMAG-Tokyo General Assembly and the associated lecture, IEEE Japan Sections' 60th Anniversary Celebration, and two IEEE Milestone memorial lecture meetings.

1. Greetings of 2017 by Tetsuya Miki, Chair, LMAG-Tokyo

The new officers of LMAG-Tokyo in 2017 are following;

Chair: Tetsuya Miki, Prof Emeritus, UEC

Vice Chair: Tadashi Takano, Prof Emeritus, JAXA

Secretary: Hajime Imai, Prof Emeritus, JWU

Thank you in advance for your cooperation.



New officers (from left): Prof Tadashi Takano, Prof Tetsuya Miki, Prof Hajime Imai.

LMAG-Tokyo was over for six and a half years since it started in October, 2010, by the effort of Dr. Kohei Habara. Every year, it organizes lectures and technical tours by cooperation with the Section's TPC, and publishes LMAG Newsletters which report these events.

Our activities have been evaluated highly in IEEE Region 10. It was the proof that Life Member Outstanding Volunteer Award founded in Region 10 was conferred on Prof. Kunio Tada, who was the second Chair of LMAG-Tokyo.

By the way, LM is 65 years old or more and is to be given when age and the total of the IEEE member period reach 100. Therefore, many members leave the front line and have a time space. LMAG is the group which consisted of such a member, and aimed for the friendship between members, the information exchange with not only LMs but also young people. Thus, LMAG is intended to contribute to the society.

This year, LMAG-Tokyo got newly 71 members and became 580 members (as of March 31) in all. It is a predominantly big scale in IEEE Region10, but is too big to have a sense of belonging as a local community. In order to improve this situation, we are going to plan a small event based on local interest.

Myself as Chair, Prof. Takano, Vice Chair, and Prof. Imai, Secretary want to have your opinion as well as your kind support for the steering of LMAG-Tokyo.

2. The 2016 LMAG-Tokyo General Assembly

The general assembly of LMAG-Tokyo was held at the room 66, 6th floor, Kikaishinko-Kaikan, from 14:20 to 14:45 on March 29, 2017. The attendants were 28 in number. After the address by Prof. Miki, Chair, the activity report of 2016 was presented by Prof. Takano, Vice Chair. Then, the activity plans for 2017 were proposed by Prof. Imai, which include more than 4 times of lecture meetings, a technical tour, exchange meetings with SB, YP, and WiE and newsletter publications.

. It was also presented to make opportunities to cooperate with other Section's LMAGs in this year. Then, every agenda has been approved.

2. IEEE Milestone memorial lecture meeting for "Honda Electro Gyrocat"

The world's first map-based car navigation system, "Honda Electro Gyrocat" was recognized as an IEEE Milestone. On March 2 (Thursday), 2017, a nameplate presentation ceremony was held in commemoration of this recognition in the large hall on the second floor of Honda Aoyama Building. Two commemorative lectures were delivered after the ceremony to an audience of 90 persons in the same hall.

First, Isao Shirakawa (Professor Emeritus of Oaska University), the Chair of the IEEE Japan Council History Committee, explained the outline of IEEE Milestones and the requirements for recognition, and introduced the milestones recognized in the past in Japan and other countries. Next, two lectures were delivered by key persons in the development.



Honda Electro Gyrocat at the time of development.

Lecture 1

Mr. Tsuneo Takahashi gave a lecture entitled "Development of the World's First Car Navigation System: Honda Electro Gyrocom." He was the project leader of the development team at the time and is currently the President and Representative Director of NF Corporation. He started his speech with words of gratitude to all the people who supported such a big project and went on to look back on the development.

In 1974, Honda started the development of an inertial navigation system for automobiles using gyrosensors and microcomputers. The development was proceeded with a strong will to create new features beyond improving run/turn/stop basis to add new values to automobiles such as the information system capability. Struggling with immature element technologies at that time, they came up with an idea to combine 16-bit arithmetic processors, 10-kilobyte memory and "manual map matching" between maps printed on transparent sheets and running paths. They managed to work out a system in the end that showed the car's position on a map and navigated the car to a selected destination.



Mr. Takahashi giving his talk.

This world's first map-based car navigation system was mounted on the Honda Accord series in 1981. At present, information from car navigation systems is more and more utilized and applied widely such as Big Data to conserve the environment and ensure safety/security. The navigation system in the future car concept "Car X" using the current position information as the basic information of a mobile unit, provides not only geographical navigation to a destination but also navigation in virtual traveling space where the system navigates the destination itself, or the purpose of traveling, to satisfy demands in the real space. Also, it can even allow you to set back the clock to display a past traveling environment from archive information. It is said that Honda obtained several dozens of related patents and applied for many U.S. patents.

In the Q&A session, the relevance to car sharing and the complementary relationship with the current GPS car navigation systems were discussed.

Lecture 2

Mr. Tatsuya Kyomitsu (Honda R&D Co., Ltd. - General Manager of Technology Development Division 8) delivered a lecture entitled "Honda's Connected Car Technology Development." The in-car information providing systems that started from car navigation systems have evolved dramatically in the last thirty years. In 1994, the Odyssey series gained voice navigation and the VICS feature was added later. Around 1997, the "Internavi" system was developed to utilize connectivity with the outside world. Consequently, they provided services such as identifying places where brakes are applied frequently to improve the traffic environment. In addition, AcuraLink that performs satellite communications using smartphones as well as some features that work with iPhone and Android have been put to practical use. These technologies have led to addition of wide-ranging values represented by telematics. Furthermore, their efforts for the future and their research and development organizations were introduced. Major development offices are located in Japan and Ohio, U.S. In 2011, Honda Silicon Valley



Mr. Kyomitsu giving his talk.

Lab was also established as an advanced research center for information technology in Silicon Valley. This center provides Honda Xcelerator, a place for collaboration between Honda and external innovators. In addition, Honda Developer Studio provides support to development of smartphone-based applications to be used in cars. Honda Innovation Lab Tokyo in Japan pursues open innovation as a venue for collaboration in place of a fixed organization.

In the Q&A session, the connectivity of motorcycles was discussed.

4. IEEE Japan Sections' 60th Anniversary Celebration

Japan Council, the former Tokyo Section, held SYWL workshop and memorial ceremony as 60th Anniversary Celebration events in New Narashino campus of Chiba Institute of Technologies.

4.1 SYWL workshop for the commemoration

The workshop was held at the lecture room 5303,

4.1 SYWL workshop for the commemoration

The workshop was held at the lecture room 5303, 5th building. Attendants were 79 in number. The main purposes of this workshop are to promote future activity, to propose the solutions to our common issues, and to discuss the role of IEEE for a better future and share ideas.



Chiba Institute of Technology; Venue of the event.

The workshop consisted of three topics: (1) Activation and collaboration, (2) Career Development and IEEE, (3) Toward the further evolution of IEEE. Each topic included 3 groups, respectively. All attendants were classified to one of the groups. Student members positively lead the discussions and summarized.

After the group discussion, the summarizing session was held including the following guests from R10 and IEEE Board of Directors:

Karen Bartleson, President & CEO
Jim Prendergast, Executive Director
Mary Ellen Randall, Vice-President
Cecelia Jankowski, Managing Director
James Jefferies, President Elect
Supavadee Aramith, Educational Activity
Kukjin Chun, Region10 Director
Nivas Ravichandran, Region10 YP Coordinator
Jing Dong, Region 10 WIE Coordinator
Rajesh Ingle, Region 10 SA Coordinator

Student members from each group presented their results fluently in English. Many questions and comments arose. Several points of opinions and proposals were: to communicate between sections in R10, to frequently organize the symposiums and workshop, to extend IEEE activities to children and high school students, and to organize the workshop



SB members of Meiji Univ. with IEEE President.

to ponder the future IEEE

Karen Bartleson, IEEE President & CEO, addressed in the closing remarks that this workshop was very interesting and she enjoyed discussion and many opinions. Finally, she presented the memorial plaque to the SB of Meiji University for the appreciation to their 10th anniversary.

4.2 IEEE Japan Sections' 60th Anniversary Celebration Ceremony

The celebration ceremony was held at the lecture room, 1st building. 230 people participated in the ceremony and reception. The ceremony began with the greeting speeches by JC Chair Prof. Toshitaka Tsuda and R10 Director Prof. Kukjin Chun.



JC Chair Prof. Toshitaka Tsuda giving his greeting speech.

There followed congratulatory speeches by distinguished guests, IEEE President & CEO Karen Bartleson and MIC Japan Director General Yasuhiko Taniwaki, Past R10 Director Takuo Sugano, and JC-SAC Chair Prof. Yasuhiro Ohgoe.



IEEE President & CEO Karen Bartleson giving her congratulatory speech.

It was introduced using a video that the Japan sections' activity succeeded over 60 years since establishment. IEEE sections in Japan started as the IRE Tokyo section with only 50 members in 1955. Tokyo Section first covered all IEEE members in Japan. At the beginning the fixed place of IEEE Tokyo Section's office did not exist, therefore the office facility was settled in the rotation of supporting companies. Japan Council was established in 1999. Now we have 9 sections and totally more than 14,000 members.



Supporting companies given with memorial plaques.

Then greetings of present Japan 9 section chairs were presented by video messages. The 2016 supporting friend award was presented to 8 companies in the Tokyo section for their long supporting IEEE Japan sections.

The reception started in the University canteen room. The former JC president Prof. Tomonori Aoyama introduced the meaning of 60 years using Japanese old calendar. March 3rd coincides with the young girl's festival, where we Japanese displayed old fashioned Japanese dolls. After the greeting of the president CIT Prof. Kazuhito Komiya, the past JC chair Dr. Toshiharu Aoki opened the ceremony party. There were prepared many Japanese sake bottles and delicious food. All participants from other countries, generations, positions, and cultures enjoyed drinking, eating, and talking each other. The ceremony ended with the closing remarks by IEEE Tokyo section chair Prof. Iwao Sasase.

5. IEEE Milestone memorial lecture meeting for "Invention of a Temperature-Insensitive Quartz Oscillation Plate"

The research achievement of "A Temperature-Insensitive Quartz Oscillation Plate" made by Issaku Koga, 1899 to 1982, Prof. Emeritus of Tokyo Institute of Technology (Tokyo Tech), was acknowledged as an IEEE Milestone. On April 6 from 11:00, the ceremony of the Milestone plaque presentation from Karen Bartleson, President of IEEE to Yoshinao Mishima, President of Tokyo Tech, was held in the Centennial Hall of Tokyo Tech. From 14:00, memorial lecture meeting with the following five lectures was held at the Lecture Theater in the West 5 building of the same university gathering 190 participants.

Lecture 1

At first, Isao Shirakawa, Chair of JC History Committee, overviewed IEEE Milestone, and introduced the IEEE Milestones of Japan and some examples in the whole world.

Lecture 2

Next, Dr. Ken-ichi Iga, former President of Tokyo Institute of Technology, Prof. Emeritus, lectured on



Prof. Shirakawa giving his talk.

"Quartz Oscillators by Dr. Issaku Koga and IEEE Milestone". In the research on cut planes, he found the temperature coefficients are of opposite signs between the traditional X-cut and Y-cut which a craftsman made wrong. He expected that there should be a cut plane with zero temperature coefficient, and finally realized R' cut with almost zero and R1- and R2-cuts with completely zero temperature coefficient. Meanwhile, he pursued theoretical analysis of oscillation modes to reduce the ambiguity of experiment parameters.

Dr. Iga actively presented the invented oscillator in the world conferences so that the value was recognized in URSI, CCIR and Bell Telephone Laboratories. It was put into practical use in Yosami Transmission Station in 1933. Moreover, the applications to quartz-watches and communication instruments were carried out. As oscillators have much influence to industry, there occurred patent disputes with companies. However, he won as his document had been well prepared.



Dr. Iga giving his talk.

Lecture 3

Dr. Yasuharu Suematsu, past President of Tokyo Tech, Distinguished University Professor of Tokyo Tech, lectured on "From Quartz Oscillators to Optical Communications - Communication Research in Tokyo Tech". He introduced an episode that Prof. Koga told him to select a research topic which deserves being pursued long time, as is impressive to our hearts. Then, he summarized the research on temperature-insensitive quartz oscillators, and its effects to modern optical communications.

Next, as the genealogy of the research on information communications in Tokyo Institute of Technology, he explained the flow on quartz oscillators led by Dr. Koga and that on communications by Dr. Morita. His talk clearly showed the fact that the two flows grew in the supplementary manners each other, and the subsequent continuous flows to the current researchers.

Dr. Suematsu invented a dynamic single -mode laser in the research of optical communications. He told of his gratitude that the experiment setup was prepared by the grant-in-aid offered by the Ministry of Education, Science and Culture. This laser is used in land trunk lines and a trans-Pacific submarine cable (TPC-4), and so on widely in the world.



Dr. Suematsu giving his talk.

Lecture 4

Nobuhiro Endo, Representative Chairman of the Board of Directors of NEC, graduated from Tokyo Tech, lectured on "AI, IoT, and big data toward a rich human society". Quartz oscillators by Dr. Koga are the basis of modern digital world in terms of supplying high frequencies and pulse synchronization. After 80 years of his research, ICT is much improved in computing, wireless network and data base. Resultantly, real-time, dynamic and remote functions have been realized, and in a future interfaces and security will get more important. Full-scale AI (Artificial Intelligence) is coming,



Dr. Endo giving his talk.

and needs the real-time processing of big data. Currently, computing and wireless network have been improved to enable good quality analysis, but the data base is still lacking. The issue of privacy should be solved to enrich its capability.

Lecture 5

Finally, Kazuo Kyuma, Executive Member of CSTI (Council for Science, Technology and Innovation, Cabinet Office), former Vice President of Mitsubishi Electric Corporation, graduated from Tokyo Tech, gave a lecture titled "Science, Technology and Innovation Strategy of Japan".

First, he said that the invention of "Temperature Independent Crystal Oscillator" that matched with social needs and basic technology is a great science and technology innovation that produced many industries. Next, he explained The 5th Science and Technology Basic Plan formulated by CSTI in January 2016 and focused on "Society 5.0" as a society to be aimed at in the future.

Society 5.0 is a concept that balances economic development and solving social issues, which leads to a human-centered society. In Society 5.0, we will utilize ICT to integrate physical space and cyber space and create new value.

CSTI works in collaboration with industry, academia and government to develop eleven cyber-physical systems such as energy, manufacturing, automated driving, disaster prevention and mitigation developing the platform of fundamental technologies such as AI, big data, cyber security, device, and network technologies.

It is important to strengthen the collaborations between industry, academia, and government, and to relevant ministries and agencies for realizing Society 5.0. Dr. Kyuma said that he would like to promote SIP (Cross-Ministerial Strategic Innovation Promotion Program) and ImPACT (Impulsing Paradigm Change through disruptive Technologies Program) as its role model. SIP and ImPACT also emphasize intellectual property strategies and international standardization, and clarify the competitive domain and cooperative domain from the early stages of research and development.



Dr. Kyuma giving his talk.

6. Lecture in 2017 Annual General Assembly of Tokyo Section

After the 2017 Annual General Assembly of Tokyo Section, the lecture by Prof. Akira Toriumi was held in the Kikaishinko-Kaikan building at 16:00 with 52 participants. Prof. Toriumi is Professor of University of Tokyo, recipient of “2016 IEEE Cleo Brunetti Award”.

The lecture was entitled “Expectation to Materials Science towards the next Generation Electron Devices”. The lecture was started by introducing Cleo Brunetti who investigated the electric tubes’ integrated circuits.

Prof. Toriumi when he entered Toshiba Corporation intensively investigated the hot carrier effect and the carrier mobility relating to the carrier transport mechanism in Si semiconductor. He challenged to fabricate the CMOS with the 0.1 μm gate length, where this gate length was said the boundary limit at that time. In 1992, he succeeded in the room temperature operation of this device for the first time in the world.

Moreover he thought with the shorter gate length, the more difficulty was caused not only in the device operation but also in the integration. He found the variation in the threshold voltage of FET occurred due to the statistically distribution of the impurities in the devices.

At the same time he invented 3 terminals’ Esaki tunnel FET and in 1996 he succeeded in the realization of the differential negative resistance at room temperature.

After he moved to University of Tokyo, he has mainly investigated Ge-FET and HfO_2 with the high dielectric constant promising the thinner gate oxide film.

The carrier mobility of Ge was larger than that of Si, therefore the high performance was expected. However there was the problem that the characteristics of n-channel FET were worse. Recently the electron mobility of Ge-FET was reported 2.5 times larger than that of Si-FET.

Then from the point of the view of the material, the oxidation process and Schottky-barrier formation were investigated. For the oxidation, from the experimental results by using ^{16}O and ^{18}O , the Ge oxidation process showed the large difference from the Si, and the Schottky barrier height in Ge was changed by introducing the isolation film or the metal with less electron quantities.

To obtain the higher dielectric constant of HfO_2 , it was considered that the crystalline structure was the important issue. Changing the structure, almost the double value was obtained. Later, he was surprised



Prof. Akira Toriumi giving his lecture.

to hear the other institution’s report that HfO_2 became ferroelectrics. He recognized that the basic research on the materials needed the wide range knowledge, so it was important to correspond thoroughly with many researchers of different fields.

In the end of his lecture, he introduced the following opinions. Here after the research and the development on the materials are indispensable in order to create the novel electronic devices, and it is important to communicate researchers in different fields to enhance the probability of the serendipity. Simple slogan of “Selection and Concentration” does not take an important role in this field.

Finally as the senior researchers or engineers have the much knowledge on the research and development history, they are ready to be deeply impressed by the new results. To invoke such impression in young researchers without such knowledge, it is useful to give them admirations and positive suggestions from the outside people.

7. Announcement

LMAG-Tokyo is planning “LMAG Evening Salon” as a new trial, which provides the opportunity to discuss with a topic to have interest to people of the local community. The first LMAG Evening Salon is going to be held as follows. The detail information will be mailed later.

- Time and Date: 18:00-20:00, May 19, 2017
- Place: NEC Shiba Club
5-21-7 Shiba, Minato-ku, Tokyo
- Topic provider: Dr. Rikio Maruta, ex NEC

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