



IEEE Tokyo Section Life Members Affinity Group

This issue is devoted to two historical events: the LMAG Tokyo Commemorative Lecture and Discussion Meeting for Prof. Y. Okumura's NAE Charles Stark Draper Prize Winning, and the Fifty Years Anniversary on the Demonstration of Optical Fiber Communications specially contributed by Prof. Y. Suematsu, both as messages bridging the junior and senior generations.

1. Report on the Commemorative Lecture and Discussion Meeting for Professor Emeritus Y. Okumura's NAE Charles Stark Draper Prize Winning

LMAG Tokyo held the meeting mentioned above in cosponsorship with IEEE Tokyo Section and IEICE Tokyo Section at the lecture room 1301, Toranomon Campus, Kanazawa Institute of Technology, from 14:30 to 17:00 on July 12, 2013.

The National Academy of Engineering (NAE) of the USA awarded Professor Emeritus Yoshihisa Okumura, Kanazawa Institute of Technology, and four other researchers 2013 Charles Stark Draper Prize, with the citation "for pioneering contribution to the world's first cellular telephone networks, systems and standard", on February 19, this year. He is the first Japanese winner of this prize, and this splendid accomplishment has been taken up widely by the news media. The LMAG Tokyo proposed this meeting to commemorate the outstanding accomplishment. The meeting was carried out successfully in close collaboration of the above three groups, getting more than 100 participants.



Lecture and Discussion Meeting

Following the greetings of Dr. Hiroki Shoki, TPC Chair of IEEE Tokyo Section, and Prof. Kunio Tada, LMAG Tokyo Chair, the research background and achievements of Prof. Okumura were introduced in the starting lecture by Mr. Sadao Ito (formerly with NTT Laboratories), who also participated in the Draper Prize award ceremony.



Starting lecture by Mr. Sadao Ito

His lecture was about the characterization of VHF/UHF mobile radio propagation required for the cellular telephone network design, the development of the world's first cellular mobile phone networks, the trouble associated with new 800MHz band for mobile phone services, and so on. He has accentuated the enormous volume of propagation data collected in the Tokyo downtown area and Kanto Plains, and the compilations through statistical processing of data as "Okumura Curves", which was adopted in CCIR (present ITU-R) Recommendations and still used in the world for the cellular radio network design.

After the lecture, with Prof. Okumura, Mr. Matsuzaka, Mr. Kamata, Dr. Yoshikawa and Mr. Eguchi, who were engaged in the research and



Lecture by Prof. Yoshihisa Okumura

development of cellular phone in NTT, the discussion session was held, and Mr. Ito chaired the session. At the beginning of discussion, Prof. Okumura said he had been notified on November 1 of last year that he was to receive Draper Prize, which surprised him greatly. Then he felt “the prize is the gift from Heaven,” awarded for the work which he himself had almost forgotten. As for the award ceremony, he mentioned it was held in the NAE office space of the Washington D.C. Union Station building, and it was performed in an impressive party-like atmosphere, very different from a formal-style ceremony. His talk extended to his life after he received the prize. He became very busy with the newspaper interviews and coverage. He emphasized that the significance of the prize winning was that mobile communication technology of Japan was recognized worldwide. As for the early research and development on the mobile phone, he explained the following matters in detail; hardship stories about the mobile radio propagation measurement for total distance of 2,500km, many troubles he had in persuading people concerned in pursuing the research based on his own plan, in having been forced to the development of the new frequency band of 800MHz as he could not get permission to use the existing band of 400MHz for mobile application, and so on. He told that the collected study of mobile radio propagation was published in English as approximately 50-page paper [1] in October 1968, which was a pioneering achievement. Furthermore, he introduced the

circumstances toward the commercial mobile phone which were led by his presentation about its practical development plan at the IECEJ (presently IEICE) Communication Systems Technical Group Meeting in October, 1971 [2].

Eighty-seven-year-old Prof. Okumura's speech was full of vitality, and in response to his speech, the following questions were made by the participants of the discussion; What was the negotiations process to get approval of frequency band , when the Ministry of Posts and Telecommunications was not indicating a policy in a frequency band for mobile phones?, How did he overcome the study method differences between radio field and switching field which were indispensable for mobile phone networks?, What did he think of the possibility and danger in talking on the phone while driving a car?, etc. For these questions, Prof. Okumura's remarks were full of enthusiasm, and the hot discussion continued for a long time.

Finally the closing address was made by Prof. Hiroshi Suzuki, former Chair of the IEICE Tokyo Section which was one of cosponsors for the meeting.

References

- [1] Y. Okumura, E. Ohmori, T. Kawano and K. Fukuda: Field Strength and its Variability in VHF and UHF Land-Mobile Radio Service, Rev. Elec. Comm. Lab. No.9-10, pp. 825 - 873, 1968.
- [2] Y. Okumura, Y. Matsuzaka and M. Watanabe: Outline of High Capacity Land Mobile Telephone System, IECEJ Technical Report, CS71-76, October 27, 1971.

(Reported by Tetsuya Miki, Secretary of LMAG Tokyo)

2. Invited Article

Fifty Years Anniversary on the Demonstration of Optical Fiber Communications

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The original “demonstration of optical fiber communications” was performed on Sunday, May 26th, 1963, as an event of the open house

at Anniversary of Foundation, Tokyo Institute of Technology, as shown in Fig.1.

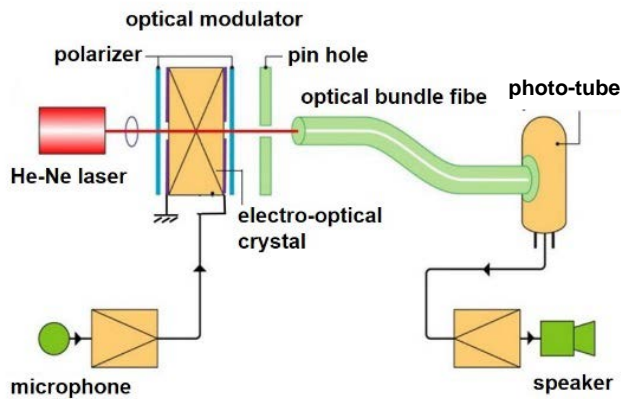


Fig.1 Demonstrated optical fiber communication

Fifty years anniversary to commemorate that demonstration was hurriedly formulated on Sunday, May 26th, 2013, exactly fifty years after that event, at the Museum of Tokyo Tech, with influential participants at Tokyo area (Fig.2), so as to encourage future researchers. This event has been believed to be the first demonstration of optical fiber communications, because the optical fiber was not yet applied to communications in those days. Several noted experimental achievements were reported prior to that demonstration, namely, cladded optical fibers, 1959, by N.S. Kapany et al, ruby lasers, 1960, by T. H. Maiman et al, He-Ne lasers, 1961, by A. Javan et al, and pulse operations of homo-junction lasers, 1962, by four groups in the USA. Typical demonstrations of optical

communications through free space propagation were known firstly “Photophone”, 1880, by A. G. Bell, and, after appearance of lasers, “Talking Light”, 1961, by Bell Telephone Laboratories.

Above mentioned event was a demonstration of optical fiber communications implemented by the undergraduate students, H. Fukinuki, S. Nonaka, T. Yamamura and T. Suzuki in consultation with the graduate students, K. Iga and T. Ikegami, under supervision of Y. Suematsu, Associate Professor. The attendants concerned about the demonstration made speeches at this meeting how the demonstration performed. The voice and music carried by laser light were transmitted through the optical fiber and finally demodulated to the electrical signals (Fig.1). He-Ne gas tube with Brewster windows made by NEC was used for the laser light source. Bulk electro-optical crystal, ADP plate, was used for the external optical modulator, with applied electrical signal of a couple of thousand volts to rotate the polarization of light. The ADP was a sample grown by S. Namba and T. Ogawa at the Institute of Physical and Chemical Research. The optical fiber was bundle fiber consisted of multi-components glass, offered by Research Laboratory of Canon at Nakameguro. The photo-tube made by Hamamatsu Television Co. was used for light detector. The transmission of signal could be performed stably by use of the flexible optical fiber. The main optical elements used at that demonstration were identical in



Fig.2 Participants at the fifty years anniversary

principle to that of existing optical fiber communications. A restored model of that demonstrated is displayed and the ADP used there is well kept at the Museum.

Y. Mishima, President of Tokyo Tech., made opening address, the demonstrators attended explained how it worked, H. Mizuguchi, former director of Ibaragi Communication Laboratory, NTT, and K. Shimoda, a member of Japan Academy, made speeches to celebrate this event.

Finally, the author appreciates greatly to the attendants for their warm collaboration, to the LMAG Tokyo officers for the invitation of this manuscript, and to the organizer of Rakusuikai, especially Nobuhiko Nishiyama, Associate Professor, for their energetic arrangement within very limited period to make success of this event.

REFERENCE

Yasuharu Suematsu, "Demonstration of the Optical Fiber Communications as an event of the Open House at Anniversary of Foundation, Tokyo Institute of Technology ~May 1963~," Chronicle, issued by Tokyo Institute of Technology, pp.3-4, Oct., 1986.

[Editors' note: On May 26, 2013 at the Ookayama Campus of the Tokyo Institute of Technology, "the Reunion of the Fifty Years Anniversary on the Demonstration of Optical Fiber Communications" was carried out as an event of the open house at Anniversary of Foundation. Just like 50 years ago, the world-first optical fiber communication demonstration experiment was replicated. At the same time, a fruitful meeting was held bridging the multi-generation experts and students in the optical communication field. Prof. Suematsu kindly accepted to write the above article.]

3. Important Notice

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Every year in late October you will be asked to reply to the simple questions sent by mail from

IEEE. You can also respond by email through; http://www.ieee.org/societies_communities/geo_activities/life_members/lm_profile.html

4. Call for Contribution

Your contributions are welcome from not only LMAG members but also other IEEE members. Besides your opinions, suggestions, proposals for LMAG Tokyo operation, articles on your experiences, stories related to the history of technology, etc., may be included. Please send them to our office below. They will be introduced in this Newsletter after committee review.

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