Event Report: Tsukuba Forum 2019

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Abstract

Tsukuba Forum 2019 was held on October 31 and November 1. The theme of the forum was "Supporting the present, shaping the new era—World-leading technology for creating services and field front-line technology for transforming operation/maintenance." This article gives a brief overview of the speeches and exhibits presented at the forum.

Keywords: Tsukuba Forum, overview of speeches, overview of exhibits

1. Introduction

The main theme of Tsukuba Forum 2019 was "Supporting the present, shaping the new era—World-leading technology for creating services and field front-line technology for transforming operation/maintenance." It was held with the intention of creating a smart world with NTT as *Your Value Partner* as it looks back on network access technologies that have supported society to date and pioneers new access networks of the future. In addition to NTT Access Network Service Systems Laboratories (AS Labs), 105 organizations, including co-hosting organizations and NTT Group companies (**Table 1**), participated. They introduced and exhibited the latest research and development (R&D) and technological trends.

2. Overview of speeches

The two keynote speeches were given at the Tsukuba International Congress Center on the first day. They were relayed from the main convention hall of Tsukuba International Congress Center to a venue at the NTT Tsukuba R&D Center. The speeches were received by a large audience.

2.1 Keynote speech 1

Mr. Motoyuki Ii, senior executive vice president and representative member of the Board of NTT, gave a speech titled "Towards Social Infrastructure Sharing" (**Photo 1**). For details, see the article in this issue [1].

2.2 Keynote speech 2

Mr. Naoki Shibutani, senior executive vice president and representative director of NTT EAST, gave a speech titled "Shaping Prosperous Future through Regional Innovation" (**Photo 2**). For details, see the article in this issue [2].

3. Workshops

On the second day of Tsukuba Forum 2019, workshops were held at AS Labs. A business unit manager of NTT Advanced Technology and two project managers from AS Labs conducted the workshops (**Photo 3**).

3.1 Workshop 1

Mr. Kazuo Kitamura, business unit manager of the AI and Robotics Business Headquarters, Robotics Solutions Business, NTT Advanced Technology Corporation, gave a lecture titled "WinActor Business

Table 1. List of Tsukuba Forum 2019 exhibits.

■NTT Group companies
NIPPON TELEGRAPH AND TELEPHONE EAST CORPORATION
NTT EAST-MINAMIKANTO CORPORATION
NTT EAST-KANSHINETSU CORPORATION
AIREC ENGINEERING CORPORATION
NTT RENTAL ENGINEERING CO., LTD.
Nippon Telematique Inc. (NTI)
NIPPON TELEGRAPH AND TELEPHONE WEST CORPORATION
NTT Communications Corporation
NTT PC Communications Incorporated
NTT World Engineering Marine Corporation
NTT COMWARE CORPORATION
NTT Electronics Corporation
NTT Advanced Technology Corporation
NTT-AT TECHNO COMMUNICATIONS CORPORATION
NTT TechnoCross Corporation
NTT Infrastructure Network Corporation
NIPPON CAR SOLUTIONS CO., LTD.

■Information & Telecommunications Engineering Association of Japan (ITEA)
EXEO TECH CORPORATION
KYOWA EXEO CORPORATION
Nippon COMSYS Corporation
MIRAIT Corporation
TOSYS CORPORATION
NDS Co., Ltd.
C-Cube Corporation Ltd.
Hokuriku Denwa Kouji Co., Ltd.
NIPPON DENTSU CO., LTD.
MIRAIT Technologies Corporation
SOLCOM Co., Ltd.
Shikokutsuken Co., Ltd.
Seibu Electric Industry Co., Ltd.
SYSKEN Corporation
DAIWA DENSETSU CORPORATION
TTK Co., Ltd.
TSUKEN CORPORATION

■Communication Line Products Association of Japan
AICHI CORPORATION
ASABA MANUFACTURING CO., LTD.
IWABUCHI CORPORATION
OCC Corporation
Okano Cable Co., Ltd.
KANDO Co. Ltd.
FUJIKURA HIGH OPT Co. LTD.
JFE Metal Products Corporation
JAPAN RECOM Ltd.
SHODEN SEIWA CO., LTD.
SWCC SHOWA CABLE SYSTEMS CO., LTD.
Suzuki Giken Co., Ltd.
SUDA SEISAKUSHO Co., Ltd.
Sumiden Opcom, Ltd.
Sumitomo Electric Industries, Ltd.
Corning International K.K.
DYDEN CORPORATION
DAITO DENZAI CO., LTD.
TADANO LTD.
Tsushin Kogyo Electric Wire & Cable Co. Ltd.
TOTSU-SOKEN CORPORATION
SEI Optifrontier Co., Ltd.
NISHI NIPPON ELECTRIC WIRE & CABLE CO., LTD.
NIPPON CONCRETE INDUSTRIES CO., LTD.
Nippon Tsushin Denzai Co., Ltd.
Fujikura Ltd.
Fujikura Dia Cable Ltd.
Furukawa Electric Co., Ltd.
MASARU INDUSTRIES, LTD.
DAINICHI CONCRETE INDUSTRY CO., LTD
Milliken Japan G.K.

■Japan Telecommunications Equipment and Materials Manufacturers Cooperative Association (Zentsukyo)
Asakuraseisakusho Co, Ltd.
OTANI KOGYO CO., LTD.
Sankosha Corporation
SANWA DENKI KOGYO CO., LTD.
SANRITZ ELECTRONICS CO., LTD.
TAIEI Manufacturing Co., Ltd.
Takacom Corporation
TAKACHIHO SANGYO CO., LTD.
Chuko Electric Co., Ltd.
TOMEITSUSHINKOGYO CO., LTD.
NAGAMURA MANUFACTURING CO., LTD.
NISSHIN ELECTRIC CO., LTD.
HACHIKO ELECTRIC CO., LTD.
MSK Technologies Co.,Ltd
WATANABE CO., LTD.

■Other Corporations
Anritsu Corporation
NEC Corporation
NEC Magnus Communications, Ltd.
NTEC
FXC Inc.
Oi Electric Co., Ltd.
OPT Gate Co., LTD.
SUNREC CO., LTD.
SHOSHIN Corporation
Seiko Solutions Inc.
HARADA CORPORATION
Hitachi, Ltd.
FUJITSU LIMITED
HellermannTyton Co., Ltd.
MAEDA ROAD CONSTRUCTION Co., Ltd.
MARUBUN CORPORATION
MIKI Inc.
Mitsubishi Electric Corporation
Yokogawa Test & Measurement Corporation / Yokogawa Solution Service Corporation
RIKEN KEIKI Co., Ltd.

Overview."

Mr. Kitamura first gave an overview of WinActor. WinActor is a client PC (personal computer)-based robot process automation (RPA) tool developed by NTT research labs in 2010 with its unified management support system technology. It was commercialized by NTT Advanced Technology and released in 2014. As of the first half of 2019, over 4000 companies have adopted this software, giving it the largest RPA tool market share in Japan. Over 700 companies are currently sales partners of this software.

Next, Mr. Kitamura described WinActor's three major features: simplicity, support, and scalability. New functions to strengthen the product and promote simplicity include a new service called *Cast on Call*, which provides ready-made scenarios for task automation, contour matching, and enhanced virtualization support. Version 7, slated for release in 2020, will feature a refreshed user interface (UI) and multilingual support. Mr. Kitamura also discussed personnel training to bolster support and gave examples of WinActor's management functions and enhancements for achieving scalability. He argued that to further strengthen collaboration with work applications for digital transformation (DX), the key issues are how to migrate WinActor to the cloud and implement on-premise and cloud collaboration and how to use artificial intelligence (AI) in areas where human judgment is required, which is not stereotypical, thus considered an area RPA tools are poor at.

Finally, Mr. Kitamura stated that NTT Advanced Technology is further pursuing customer's DX by increasing customer value when using WinActor together with all NTT's partners through the

Photo 1. Keynote speech delivered by Motoyuki Ii, senior executive vice president and representative member of the Board, NTT.

Photo 2. Keynote speech delivered by Naoki Shibutani, senior executive vice president and representative director, NTT EAST.

Photo 3. Workshop leaders (from left to right: Kazuo Kitamura, business unit manager, NTT Advanced Technology; Minoru Tanaka, project manager, AS Labs; and Takeshi Onizawa, project manager, AS Labs).

Technology Partner Program established in July 2019.

3.2 Workshop 2

Mr. Minoru Tanaka, executive research engineer and supervisor of the Civil System Project, AS Labs, gave a lecture titled "R&D Trends in Technologies for Maintaining and Managing Telecommunication Infrastructures." For details, see the article in this issue [3].

3.3 Workshop 3

Mr. Takeshi Onizawa, executive research engineer and executive manager of the Wireless Entrance Systems Project, AS Labs, gave a lecture titled "Wireless Systems Technologies for Present and Future Services." For details, see the article in this issue [4].

4. Two-day events

4.1 30th Tsukuba Forum Exhibit

The evolution and the future of access network

Photo 4. 30th Tsukuba Forum Exhibit.

Photo 5. Panel discussion.

technologies were showcased. Changes through the eras and transformation of systems were exhibited. Some visitors viewed the exhibit nostalgically, and many said, "I could easily understand how things changed" (**Photo 4**).

4.2 Panel discussion

Co-hosting organizations, NTT Group companies, and the NTT research labs united to introduce efforts and hold salon-style discussions on two themes: "Next-generation optical fiber cable technology" and "New wireless developments in the Reiwa era*." The panelists introduced examples from different companies. Many attendees commented, "I learned a lot" and "It was extremely interesting" after listening to discussions about specific challenges for the future and different companies' views (**Photo 5**).

4.3 Radio equipment supporting the local community and disaster preparedness

A video presentation on wireless facilities that support safe living in remote islands and mountain areas and prevent the isolation of affected areas during disasters was given.

4.4 Stamp rally

A digital stamp rally using smartphones was carried out for the third time at Tsukuba Forum 2019 to enable visitors to navigate throughout the exhibition hall of AS Labs. Those who gathered the seven stamps in the venue were awarded an original utility pole number tag. When the souvenir was handed to the participants, they remarked, "I look forward to this every year" and "I want to collect the utility pole number tag every year."

5. Overview of exhibits

In addition to exhibits from AS Labs, exhibits on the latest technologies of the co-hosting organizations and NTT Group companies were held (**Photos 6** and **7**).

5.1 AS Labs

The exhibition area was divided into three zones in which a wide range of AS Labs' R&D results were exhibited (**Fig. 1**). Recommended exhibits were marked and presented to attendees in an easy-to-understand manner (**Photo 8**).

(1) Future access network

Optical and wireless technologies that will make future access networks a reality were introduced. Recommended exhibits included presentations of analog radio-over-fiber technology to accommodate high-frequency multi-band radio systems, the direction of technological development to achieve future access networks, protocol-free wavelength-management-control technology, and optical-fiber environment monitoring.

(2) Pioneering technologies

State-of-the-art technologies to develop future access networks for a smart world were introduced. A recommended exhibit showed the information and communication technology (ICT) transformation of a conduit management system.

(3) Supporting technologies

Cutting-edge technologies to support a safe and secure society and current access networks were

* Reiwa is the name of the current Japanese imperial era, which began on 1 May 2019.

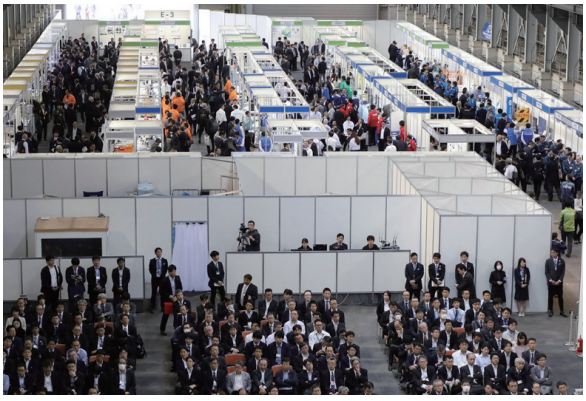

Photo 6. Main hall.

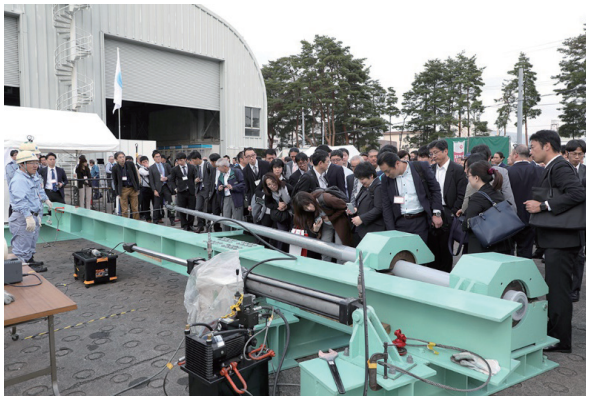

Photo 7. Outdoor exhibits.

Future access network

Introduces optical and wireless key technologies that will be responsible for future access networks.

Pioneering technologies

Introduces state-of-the-art technologies that will pioneer future access networks for achieving a smart world.

Supporting technologies

Introduces cutting-edge technologies that support a safe and secure society and the current access network.

Display of a model network

Introduces an overview of the access network technologies (those already deployed) in a physical sequence from an NTT building to customer's premise.

Fig. 1. Overview of NTT exhibits.

introduced. Recommended exhibits included UI extension technology to easily enable external collaboration, Internet of Things (IoT) wireless communication technology that extends the Wi-Fi standard (IEEE802.11ah), rule-learning-based failure location estimation and response support AI, optimal control technology that reflects human intentions, optimal wiring route configuration technology to avoid cable congestion, wiring technology with tolerance for demand fluctuation and that does not require operation, automatic failure recovery technology with auto-configuration and auto-wiring, multi-layer network autonomous control technology, automated manhole inspection technology using drones, technology for obtaining absolute coordinates of underground facilities, technology to visualize load and technology for understanding the relationship between unbalanced loads and structural degradation, and technology for making reinforced-concrete manholes maintenance-free.

(4) Display of a model network

This exhibit visually introduced the overall picture of access network technologies in a physical sequence from an NTT facility building to the customer's home.

5.2 Information & Telecommunications Engineering Association of Japan (ITEA)

This exhibit presented ITEA's efforts to develop secure, safe, and reliable information communication infrastructure facilities. These efforts include maintaining the technology and know-how that have been cultivated thus far; building, maintaining, and improving the quality and efficiency of optical access

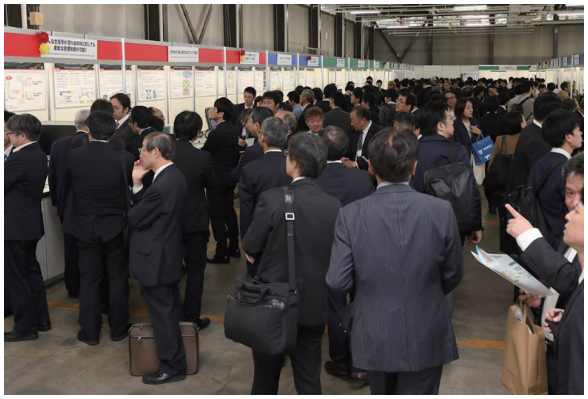

Photo 8. NTT exhibition zone.

Photo 9. Events of exhibiting companies.

networks; and promptly restoring facilities in the event of a major disaster.

5.3 Communication Line Products Association of Japan

The latest efforts and technologies of all the member companies were displayed. The technologies and products exhibited included optical and metal cables, connectors, and related components for outdoor facilities and technologies and products for datacenters and indoor facilities. Demonstrating safety considerations and diversity of needs, the offerings emphasized workability and drew the interest of many visitors.

5.4 Japan Telecommunications Equipment and Materials Manufacturers Cooperative Association (Zentsukyo)

With the slogan "Contributing to the development of an IoT society with reliable technologies and the art of manufacturing (*monozukuri*)," exhibitors belonging to Zentsukyo introduced their united efforts as an association to comprehend the expansion of the ICT market and environmental changes and respond to customers' demands with a sense of urgency.

5.5 NTT Group

Through their exhibits, NTT Group companies demonstrated collaborations with business partners as *Your Value Partner* through business activities. As *Your Value Partner*, NTT seeks to achieve a smart society through R&D and the use of ICT platforms. The exhibits introduced the NTT Group's latest technologies that contribute to solving social challenges.

5.6 Events of exhibiting companies

In the AS Labs main hall and in the outdoor venue, exhibiting companies gave demonstrations, which drew many visitors (**Photo 9**).

6. Conclusion

Tsukuba Forum 2019 was blessed with sunny weather on both days. It was a success, drawing about 9400 attendees, including many international visitors. They expressed great interest in the presentations of exhibiting companies, including the latest R&D and future trends of AS Labs. Visitor questionnaires were distributed, and the results indicated that 97% of customers achieved the purpose of their visit. Tsukuba Forum 2019 was a rich event that allowed NTT and participating organizations to share transformations in access networks through presentations of short-term efforts to support current access networks and pioneering medium and long-term efforts to create future access networks.

Acknowledgments

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References

[1] M. Ii, "Working toward Sharing Social Infrastructure," NTT Technical Review, Vol. 18, No. 4, pp. 27–34, 2020.

https://www.ntt-review.jp/archive/ntttechnical.php?contents=ntr202004fa5.html
[2] N. Shibutani, "Pioneering a Prosperous Future with Regional Innovations," NTT Technical Review, Vol. 18, No. 4, pp. 35–42, 2020. https://www.ntt-review.jp/archive/ntttechnical.php?contents=ntr202004fa6.html
[3] M. Tanaka, "Technical Trends in Infrastructure Maintenance Management," NTT Technical Review, Vol. 18, No. 4, pp. 43–48, 2020. https://www.ntt-review.jp/archive/ntttechnical.php?contents=ntr202004fa7.html
[4] T. Onizawa, "Wireless Systems Technologies for Present and Future Services," NTT Technical Review, Vol. 18, No. 4, pp. 49–55, 2020. https://www.ntt-review.jp/archive/ntttechnical.php?contents=ntr202004fa8.html

Trademark notes

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