

# Lecture

## President's Inaugural Address Message from the President: Toward New Value Creation with “Connecting X” Yukari TSUJI



### 1. Introduction (The Evolution of My Relationship with the Institute)

I am Yukari Tsuji, and I have recently been appointed as the 103rd President of the Institute of Electronics, Information and Communication Engineers (hereinafter, “the Institute”). I feel a deep sense of responsibility as I take on the role of steering this historic organization. I look forward to working closely with our members and a wide

range of stakeholders to further enhance the Institute, and I ask for your continued support.

To begin with, I would like to briefly introduce myself and outline my past activities at the Institute. Since joining NTT in 1989, I have worked at a network-related laboratory, focusing on network architecture, ATM switch development, and R&D on ITS services. Throughout this time, I participated in the Institute's conferences and conventions as a researcher. In particular, I

remember looking forward to interacting with others in the same field, searching for conferences held in regional locations, and giving presentations at them. (They say "necessity is the mother of invention," but to be honest, I worked using a sort of "carrot-on-a-stick" approach: if there was a particular conference I wanted to attend, I would push myself to produce some results in time for it.)

After that, I took on management responsibilities at the laboratory stepping away from presenting research for a while and becoming involved with the Institute as a board member. When I served as Director of General Affairs from 2016 to 2017, the Institute was right in the midst of its 100th anniversary celebrations. There was an overwhelming amount to do—from preparing the centennial history to emceeding commemorative events and writing the commemorative report—so I worked frantically behind the scenes. Balancing my duties as Director of General Affairs with my corporate responsibilities (I was the Director of the Laboratory at the time) was quite a challenge. Furthermore, from 2021 to 2022, as the COVID-19 pandemic began to subside, I had the honor of serving as President of the Communications Society. Around this time, the COVID-19 pandemic had finally begun to subside, and my fondest memory is hosting ICETC (an international conference organized by the Communications Society) in Hokkaido as our first “post-COVID-19” event. While we wanted to return to face-to-face interaction, there was still considerable psychological hesitation regarding in-person gatherings; consequently, we decided to hold the event in a hybrid format that allowed for remote participation. In organizing this hybrid event, we were essentially feeling our way in the dark—from setting participation fees and registration procedures to preparing the venue’s audio equipment and figuring out how to run the conference within the online streaming environment. This created significant challenges for the organizing team. Ultimately, it turned out

to be a very successful international conference, and I believe we passed the baton to the next organizers. Thus, having already served as President of the Communications Society, I had assumed there would be no further opportunities—but I have now been entrusted with the important role of President of the IEICE.

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Now, as some of you may have already noticed, all of the Institute’s past presidents have been men. With the 103rd president, the first female president has finally been appointed. Regarding the topic of "women's empowerment" (though I have reservations about the term itself, given that so many predecessors have long played active roles regardless of gender), we often hear about the "glass ceiling"—where women and minorities struggle to rise above a certain rank—or the "glass cliff"—where women are more likely to take key positions when an organization is in crisis. Unfortunately, my eyesight is poor, so I hardly notice the glass at all. Furthermore, as I am somewhat of a scatterbrain, I might not only smash through that glass but also tumble right off the cliff. Should that happen, I would be grateful if you could kindly lend a hand or, at the very least, watch over me with a warm and understanding eye. I would greatly appreciate your understanding and support in this regard.

## **2. Changes in the Environment Surrounding Us and Our Challenges**

At this point, I would like to look back at the changes in the environment surrounding us. Since I have been involved in network research and

development for a long time, please forgive me if my perspective is somewhat network-focused.

Figure 1 shows an overview of the history of telecommunications. Telephone service first began in Japan in 1890, and the Institute of Telegraph and Telephone Engineers of Japan, the predecessor of the Institute, was established 27 years later, in 1917 (therefore, as previously mentioned, 2017 marked the Institute's 100th anniversary). For approximately 100 years after the launch of telephone service, "telecommunications" was virtually synonymous with the telephone. While the number of users was around 200 the number of subscribers was around 200 when telephone service began, it grew to 60 million at its peak (in the 2000s, roughly coinciding with Japan's population peak). To keep pace with this rapid expansion, the technology supporting telephone

systems focused on increasing user capacity, increasing subscriber capacity and miniaturizing equipment. Furthermore, it was a history of demanding extremely high standards for telephone quality and reliability. The history of telephone service was also characterized by extremely stringent requirements for quality and reliability. (Even today, in basic research on materials and devices, I feel there are similarities to the period when telephones came into widespread use, in that we are relentlessly pursuing performance improvements. I feel that these similarities may be the reason why Japan continues to maintain its competitive edge in these fields.) I believe the turning point in the information and communications sector—which could significantly transform this situation—is the emergence of the Internet and generative AI.

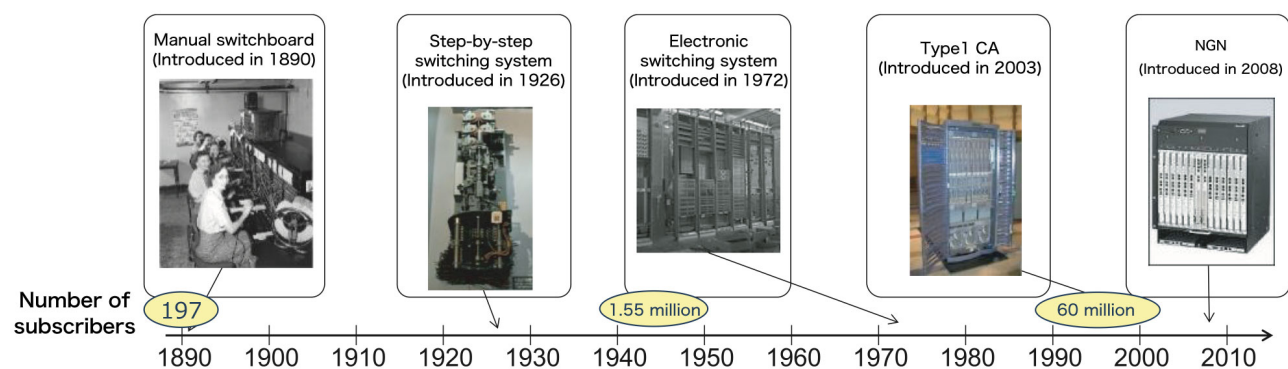


Fig. 1 History of Telecommunications

In the mid-1990s, the release of Windows 95 led to the rapid spread of the Internet throughout society. As you all know, the subsequent IT and digital revolution—driven by the widespread adoption of smartphones—has enabled anyone to access the network from anywhere. The range of available services has expanded from text-only email to social media platforms and video streaming services that allow users to send and

receive images and videos, resulting in a dramatic increase in data traffic per person. Furthermore, with the advent of the IoT, not only people but also objects have become connected to the network, leading to a dramatic increase in the number of connected devices. In addition, the evolution of cloud infrastructure has driven the construction of numerous data centers capable of collecting and processing vast amounts of data. It is precisely the

advent of the Internet that has rapidly transformed the world into the convenient place it is today over the past thirty years.

Furthermore, it is still fresh in our memories how AI has advanced and proliferated rapidly since 2020, spurred by the emergence of generative AI. As exemplified by U.S. tech companies, the “law of the strong” has taken hold: those with large amounts of information (data) are becoming even stronger with the help of AI, which in turn allows them to collect even more data. Technology is advancing not just year by year, but almost by the day, and I truly feel that the pace of technological development has fundamentally changed. A vision articulated by the U.S. tech industry—often referred to as the “San Francisco Consensus”—predicts that AI will bring about dramatic changes to human society over the next three to six years. While I acknowledge that there are differing views on the realization of AGI (Artificial General Intelligence), there is no doubt that AI will continue to have a profound impact on people’s lives, industry, and academic research alike. With the establishment of an Internet environment that allows anyone to connect to the network at any time, and the increasing use of AI in all aspects of life, convenience has greatly improved, and while at first glance it may seem as though our lives have become more prosperous, various challenges unique to the AI era are also coming to light.

The first challenge concerns networking. In the past, networks have essentially relied on human intervention at key points. Alternatively, in situations where network expansion failed to keep pace with surging Internet traffic, or when temporary congestion occurred, the systems were designed to tolerate minor delays and recover from packet loss through mechanisms such as retransmission. In a sense, traditional networks, centered on the Internet, have been used with the understanding that connections might be interrupted or delays might occur, and both protocols and users have adapted accordingly.

However, in a world where robots and autonomous vehicles are everywhere, what would happen if packets were delayed or lost, or if the network became unavailable? Going forward, as life-critical services such as healthcare and transportation, services that have a major impact on business such as finance and manufacturing, and many other social systems become interconnected through networks and begin to operate at the speed of AI processing, it is anticipated that not only will network resilience be essential, but there will also be situations in which even the slightest delay or packet loss is unacceptable. I believe that determining how to realize networks that interconnect the many AI systems distributed throughout society is one of the most pressing challenges of the AI era.

The second challenge concerns data reliability and security. In situations where vast amounts of data are generated at the grassroots level and AI hallucinations are a possibility, the question arises of how to ensure the reliability and security of that data. Furthermore, it has become necessary to develop comprehensive countermeasures that rely not only on technical measures but also on a wide range of perspectives, including ethics, legal frameworks, and economic security.

The third challenge concerns sustainability. As you all know, there has been intense competition in the development of generative AI over the past few years. However, for example, the more data that are processed in a single data center, the more electricity it consumes. It is advantageous to build data centers near urban areas with as many users as possible, including both companies and individuals, as this minimizes latency and facilitates the provision of a wide range of services. However, building data centers for AI requires vast tracts of land, as well as substantial amounts of electricity and water for cooling. At present, there is a construction boom in data centers that support AI, but securing not only land, but also sufficient electricity and water, has become a major challenge.

While improving convenience, we must also consider how to build sustainable systems.

Furthermore, as we consider changes in the social environment around us, we must not overlook the following two points.

The first is the so called “digital deficit.” Today, across all industries and aspects of social life, we routinely use cloud services, generative AI, and other digital technologies provided primarily by overseas companies. We are reaping the maximum benefits of that technology, but this also means that our “digital deficit” continues to widen. The situation of relying excessively on foreign technology is a critical issue that must be addressed, both from the perspective of economic security and in terms of Japan’s competitiveness. This is because if, all of a sudden, information services from a specific country were to become unavailable, virtually every industry and social activity would be affected. I believe that the Institute, as a research community in the field of information and communications, has a significant role to play in addressing the digital deficit.

Another point is Japan’s population trends. Japan’s population peaked in 2004 and has been declining ever since. It is projected to reach just over 95 million by around 2050, and by 2100, it is expected to fall below 50 million—a level last seen about 100 years ago. In 2100, the generation that is currently 25 years old will be 100. Shouldn’t everyone involved in relevant fields already be thinking about what form our social infrastructure, including information and communications, should take?

As discussed above, we are currently living in an era that could be described as a second industrial revolution. While we reap many benefits from AI, we must also address challenges unique to the AI era, such as network latency and resilience, data reliability and security, and sustainability issues, including power consumption. Furthermore, we must begin now to pool the collective wisdom of researchers from all fields to determine what kinds

of urban structures and information infrastructure we will need to ensure that people can live prosperous and secure lives, even in a future where the population has drastically declined and our children’s and grandchildren’s generations are facing such a reality.

Information and communications serve as the neural network of society, connecting all industries and all aspects of social life — “Connecting X.” The Institute aspires to fulfill its role as the neural network connecting various “X” elements—namely, Intelligence, Human, and Community—and we sincerely hope to contribute to building the information and communications infrastructure of society that will support the next 100 years.

Looking back at history, in the early Meiji period, Japan, under strong government leadership, actively adopted technologies that had emerged in Europe and the United States following the Industrial Revolution. In just over 20 years, Japan developed infrastructure such as telephones, postal services, and railroads, and established an industrial base in sectors such as textiles and steel. Now it is our turn. I hope that we can join forces, not only within the Institute but also in collaboration with related academic organizations, and work together in a concerted, all-out effort to envision the information society infrastructure of the AI era that will serve as the foundation for future industry.

### **3. What is the value of the Institute?**

Since its establishment over a century ago, the Institute has produced a wide range of technological innovations across diverse research fields. Currently, the Institute is organized into five societies based on major technical domains. Within each society, there are multiple technical committees, and their number continues to rise steadily. Currently, more than 8,000 research presentations are given each year at meetings organized by 84 technical committees. Technical

meetings serve as forums for lively discussion among researchers in the same field and play a vital role in helping them advance their research and development. I believe that continuing these activities is essential to the Institute's mission. I suspect that many researchers feel that they have been "nurtured through these technical meetings."

Meanwhile, as the advancement and widespread adoption of AI accelerate the "clock speed" of technological development, the importance of cross-disciplinary interaction is increasing, as is the need to accelerate research across diverse fields. There are three main reasons for this:

(1) Innovation occurs precisely at the boundaries.

When conventional wisdom from different fields collides, new perspectives emerge, and groundbreaking ideas are born from the questions that arise. By bringing together the expertise of specialists from various fields, we may be able to uncover new opportunities.

(2) Many social issues cannot be solved by any single field alone.

While individual AI systems are now capable of tasks ranging from information gathering and organization to programming, AI agents will continue to evolve, and we are moving toward a future in which multiple agents collaborate to tackle increasingly complex problems. Currently, solutions to problems remain confined to individual fields, and humans are still the ones filling in the gaps, making judgments, and taking action. Going forward, as machine-based AI becomes increasingly integrated into the real world as AI-enabled machines become increasingly integrated into the physical world, situations in which decisions and processing are carried out entirely by AI systems will become more common. These systems will interact with one another in complex, intertwined environments. Consequently, the importance of system design that takes into

account the interplay among related disciplines is expected to increase.

(3) To address the social challenges of the AI era, it is crucial to consider not only technology itself but also its relationship to ethics, legal systems, and the economy.

Discussions on AI guidelines have already begun in various quarters. Issues such as what tasks should be entrusted to AI and how to define the role and value of human beings require a multifaceted examination that goes beyond technology to encompass ethics, legal frameworks, and the economy.

Given this context, I believe it is essential to find ways to increase interaction with other disciplines and cultures, while continuing to build expertise within the community, as we have done through our traditional conference activities and traditional technical committee activities. To establish the information infrastructure for the AI era, I hope to work with all of you to transform the Institute, a driving force in information and communication technologies, into a hub that fosters more flexible thinking and innovative initiatives. This involves not only cross-collaboration within the Institute itself, but also partnerships with related academic associations and organizations.

With approximately 23,000 members, the Institute is one of the largest academic societies in Japan. However, as mentioned earlier, Japan is entering a phase of rapid population decline, and not only the Institute but also related academic societies are facing the challenge of declining membership. Therefore, we intend to collaborate with these related associations as appropriate and to promote initiatives based on the following strategic direction. Figure 2 illustrates the Institute's current position and its future direction.

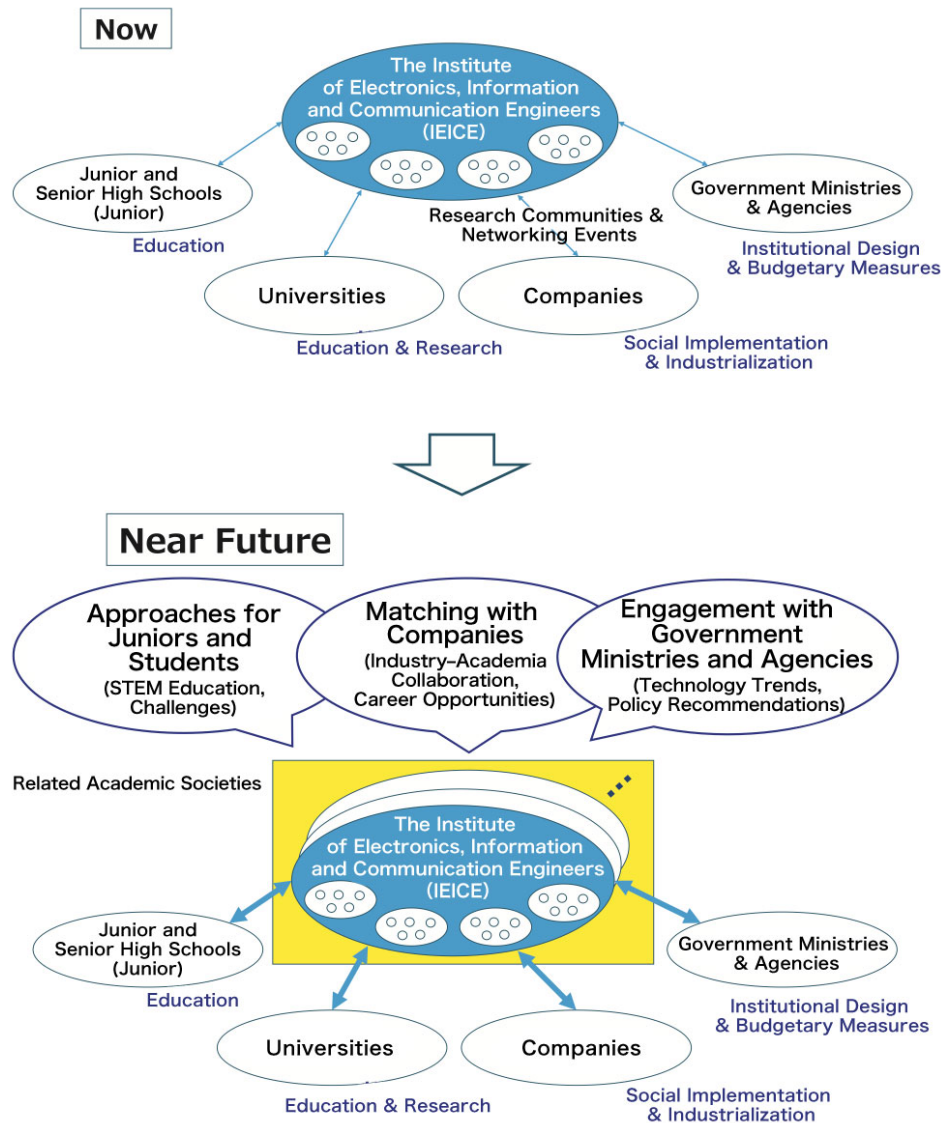


Fig. 2 The Institute's Position: Now and in the Near Future

- Approaches for Junior and Senior High School Students and University Students (STEM Education and Opportunities to Take on New Challenges)

We aim to broadly foster interest in science and engineering among junior and senior high school students, university students, and other young people, and to provide STEM education and opportunities to take on new challenges so that they will eventually participate in various academic societies. As the Institute, we will continue to

create opportunities for young researchers to set their own goals and proactively pursue new challenges. In doing so, we will also work to foster an environment in which they can feel secure in taking on challenges and turn the failures that arise during the process of trial and error into opportunities for learning.

- Matching with Companies (Industry-Academia Collaboration, Career Opportunities)

The industrial sector looks to us to provide a



forum where diverse industries can gather, share information on future technological trends, strengthen industry-academia-government collaboration, and foster young researchers. Furthermore, while the scope of ICT-related industries continues to expand, we face the reality that we have not yet been successful in engaging the R&D professionals who are active in this field. Therefore, we will continue to develop initiatives that are appealing even to those who are new to the ICT field.

• Engagement with Government Ministries and Agencies (Technology Trends, Policy Recommendations)

To strengthen the Institute's policy recommendations, which are grounded in expert knowledge, on national and local government policies, we will leverage events such as our annual conference to further advance dialogue with government ministries, agencies, and local governments.

#### 4. Aiming for "Connecting X"

As mentioned earlier, for more than 100 years the Institute has served as a research community dedicated to advancing cutting-edge technologies. These technologies have supported our daily lives and a wide range of industries, both in the past and today. These technologies have supported our daily lives and industries in a wide variety of contexts. The importance of efforts to advance specific elemental technologies within individual research fields will remain unchanged in the future.

Meanwhile, the environment surrounding us has changed dramatically over the past three decades since the advent of the Internet. In particular, since the beginning of the 2020s and the emergence of generative AI, the pace of change has accelerated even further, and AI and ICT have begun to exert a profound influence on all industries and social

activities. Under these circumstances, we can no longer chart a clear path toward solving societal challenges by relying solely on individual research communities, as we did in the past.

Therefore, to envision the ideal form of a "sustainable information society infrastructure" and to develop the technologies needed for the future, we intend to move beyond relying solely on grassroots efforts by individual conferences or academic societies to individual technical committees or societies and instead focus on activities that bring together diverse stakeholders through "Connecting X," where X represents Intelligence, Human, and Community.

In doing so, we believe it is essential to keep the following three points in mind.

- (1) Making individual activities visible
- (2) Actively communicating with the outside world
- (3) Engaging other research groups and academic societies facing similar challenges in joint initiatives

I believe this is not something that can be achieved by my efforts alone. But if we all move forward with the same mindset, we can turn this into a powerful movement.

Furthermore, we aim to clarify challenges and transform our activities into a more efficient and effective model by making the Institute's operations more transparent. Our plan is to first have the Strategic Planning Committee test various approaches to identify the most effective methods and then roll out these best practices across the entire Institute. We hope to streamline administrative tasks that have traditionally been time-consuming as much as possible, so that we can use the time saved to focus on the issues that truly require our attention.

We believe these issues involve envisioning the future of Japanese society, establishing research themes that contribute to that vision, promoting



those research activities, and continuously disseminating our findings. Rather than allowing everyone's wisdom and efforts to remain isolated, we aim to connect them so that each individual can enjoy the Institute's activities while contributing to the creation of a more prosperous society.

## 5. Reforms Are Well Underway!

The Institute has long pursued various initiatives to achieve three goals: globalization, enhancing the Institute's status, and ensuring sustainable operations. We believe that our overall direction with respect to these three goals will remain unchanged. Below, we introduce some key initiatives that the entire Institute is undertaking to shape its future as we move into a new era.

### (1) The Society's Flagship International Conference

In addition to expanding the Institute's presence overseas, we have been exploring the possibility of holding an international conference at the Society level starting in fiscal 2025, as part of our efforts to increase the number of overseas members by creating opportunities for them and international students to present their work and build networks. In fiscal 2026, we will launch the new ESS Symposium, organized by the IEICE Engineering Sciences Society, and will also work to expand the geographical reach of the existing ICETC, organized by the IEICE Communications Society.

### (2) Multilingual Publishing Services

In response to the current trend among international academic societies to pursue global strategies almost exclusively in English, offering the option to publish in each country's native language could serve as a differentiating factor in the Institute's globalization efforts from the perspective of diversity. Furthermore, native languages facilitate the dissemination and

understanding of research, and the active use of AI-powered translation in recent years has helped to support this. For example, when content written and presented in various languages is translated into multiple languages, it can facilitate cross-use among members of international academic societies, increase opportunities to access the Institute's content, and allow researchers abroad to participate in the Institute's activities in their own language from their home countries, thereby potentially offering them new ways to engage with the Institute. To develop this new model for academic societies, we have been conducting a trial of multilingual publishing services for the IEICE Transactions and Journals since fiscal 2024. In fiscal 2026, we will continue our evaluation while working to resolve the issues identified during the trials, thereby accelerating discussions toward the launch of full-scale services. We will also work to improve the accuracy of machine learning in specialized fields and explore the possibility of providing multilingual translation services to our members.



Fig. 3 Future 60-Year Award

(3) Hosting the GlobalNet Workshop (English-Language Sessions within the Conference)

At both the IEICE General Conference and the IEICE Society Conference, we host the GlobalNet Workshop, an English-language poster event held prior to the main conference and designed to be accessible to international students and young researchers. The GlobalNet Workshop not only helps build relationships between international students and IEICE members from their home countries, but also provides a platform for outstanding international students to showcase their talents to corporate participants.

#### (4) Raising Issues and Communicating with Society

We believe that a major role of an academic society is to drive societal change by raising issues and sharing perspectives on matters that would be difficult for a single organization, such as an

individual company or university, to address on its own. In fiscal 2024, to raise awareness of current issues in the job-hunting process, we issued the President's Statement on "Transitioning to a Recruitment Style That Respects Educational Opportunities for Undergraduate and Graduate Students." In fiscal 2025, to contribute to the development of the information and communications sector, we submitted our "Proposals for the 7th Basic Plan for Science, Technology, and Innovation." We will continue to raise awareness of social issues in a timely manner.

(5) Revitalizing the Academic Society through New Awards: Future 60-Year Award

Awards are a key element in revitalizing the activities of an academic society, and the Institute has also been presenting various awards to recognize outstanding achievements. In fiscal 2025, to further revitalize the Institute, we established

guidelines for creating awards funded by external sources and have been working to establish new awards. As a first step in this direction, we have significantly shifted our focus from previous awards that recognized past achievements and have established the Future 60-Year Award to encourage bold initiatives by young people (aged 35 and under) in future-oriented technologies (See Figure 3: Flyer for the Future 60-Year Award). At the final judging session, held in conjunction with the General Conference in March, eight finalists delivered highly engaging presentations. In fiscal 2026, we will host a conference at which the Future 60-Year Award winners and judges will exchange views on the winning proposals, with the aim of guiding the future endeavors of young researchers and engineers. Furthermore, we will continue our efforts to enhance the Institute's value by raising awareness of the Future 60-Year Award through interviews with award winners and other channels, and by strengthening public relations activities related to the award.

#### (6) Information and Communications Engineering

Information and communications infrastructure is a social foundation and system that not only supports the lives of people today but will also bring tremendous benefits to future generations. It is the mission of the Institute to comprehensively manage these aspects—design, construction, operation, and maintenance—and we must ensure that we possess the capabilities necessary to promote the sound development of the field of information and communications engineering and to contribute to the advancement of society. Against this backdrop, we established the Information and Communications Engineering Division in fiscal 2025 to comprehensively address information and communications engineering, and we have been conducting studies to prepare for the full-scale launch of its activities. In fiscal 2026, we will begin implementing our detailed plans.

As the saying goes, “Two heads are better than one.” When our 23,000 members come together, we represent Japan's largest pool of collective wisdom in the information and communications sector. If each member connects with relevant people and technologies, we can expand this body of knowledge even further. Who will you connect with? What technologies will you bring together? Let's work together to create new value under the slogan “Connecting X” !