# Technology Strategy

## Meeting the Challenge of Developing Technology by Providing New Solutions with Components × Digital and AI

**Tomonori Sato**
Executive Officer
CTO (in Charge of Technology Strategies);
Group President, Defense & Space Systems

To achieve innovation through Circular Digital-Engineering, we are working to strengthen technology development and intellectual property activities aimed at providing new solutions using Mitsubishi Electric's superior components together with digital and AI technologies. We will meet the challenge of playing our part in realizing sustainability by using our formidable technology and creative prowess to design the future.

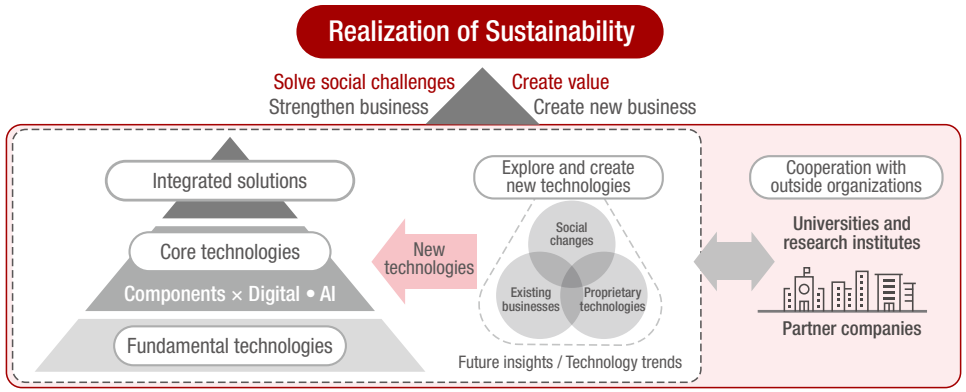
## Research & Development

### Basic Policies

The Mitsubishi Electric Group will enhance core technologies that generate business competitiveness, and deepen the fundamental technologies that support the functions, performance, quality, and reliability of our components, systems, and services. Further, we will focus on exploring and developing new technologies for a game-changing future. The realization of sustainability is a corporate responsibility. This is an area where the Mitsubishi Electric Group's strengths can be utilized, and we will invest approximately 900.0 billion yen, equivalent to over 50% of our research and development expenses, in green-related research and development over the seven-year period from fiscal 2025 to 2031 with a focus on carbon neutrality, which is attracting significant interest around the world. As a "Circular Digital-Engineering Company," we will promote research and development aimed at providing solutions that create new value using digital and AI technologies with our superior components.

We will also actively collaborate with universities and other research and development institutions in Japan and overseas, as well as partner companies, to accelerate development and create value. This will help promote with a sense of speed the verification and social implementation of our vision of a future society.

With our technological and creative prowess, we will drive innovation that is open to society to design the future and achieve the ideal vision. We will create new value in a timely manner, work with our customers to solve social challenges, and meet the challenge of technology development that plays a part in realizing sustainability.




Basic policies of research and development

### Developing Technology to Realize a Green Society

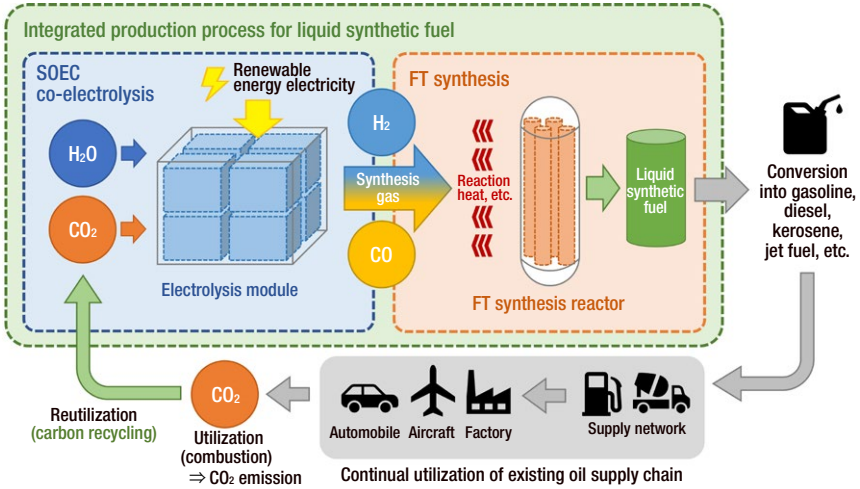
The Mitsubishi Electric Group will promote green-related research and development with a focus on carbon neutrality to play our part in solving social challenges. We will continue to move forward with research and development on energy conservation and electrification of equipment, as well as next generation power semiconductors with raw materials such as silicon carbide (SiC) and gallium oxide (Ga2O3), and research and development to realize energy management that contributes to increase use of renewable energy, carbon recycling, and the circular use of materials and products.

For example, in air conditioning & refrigeration systems, we will focus on taking steps toward new, low environmental impact coolants and meeting the demand for heat pumps in Europe and the United States. We will also work on research and development to expand the range of recyclable plastics, including Carbon dioxide Capture, Utilization, and Storage (CCUS) and waste plastics containing composite materials that are difficult to recycle.

In December 2023, in partnership with Tokyo Institute of Technology, Niterra Co., Ltd., and Central Research Institute of Electric Power Industry, we commenced research and development for commercialization of solid oxide electrolysis cell (SOEC) co-electrolysis for high-efficiency production of liquid synthetic fuels, such as gasoline, diesel, kerosene, and jet fuel, using $CO_2$ as a raw material.*1 Producing fuel using emitted $CO_2$ as a raw material is attracting attention as an effective method of carbon recycling. To overcome the issues of low production efficiency and high costs, we will develop highly efficient system configurations and operating conditions to realize social implementation of the technology at the earliest possible opportunity.

Over the three years from fiscal 2022 to fiscal 2024, we invested approximately 370.0 billion yen in green-related research and development. Over the next seven years, we will invest a further 900.0 billion yen in this area, equivalent to more than 50% of our R&D expenses. We will continue to address the green-related area in which the Mitsubishi Electric Group's strengths can be utilized.

*1 The research was selected for Research and Development on Commercialization of SOEC Co-electrolysis in an additional call for proposals under Development of Technologies for Carbon Recycling and Next-Generation Thermal Power Generation (JPNP16002)/ Development of Technologies for $CO_2$ Emissions Reduction and Utilization/Development of Technology for Producing Fuel Using $CO_2$/Research and Development on Next-Generation Fischer and Tropsch (FT) Reaction and Integrated Production Process for Liquid Synthetic Fuels by New Energy and Industrial Technology Development Organization (NEDO)




Liquid synthetic fuel using $CO_2$ as a raw material: Flow of the carbon recycling process and overview of the current research and development

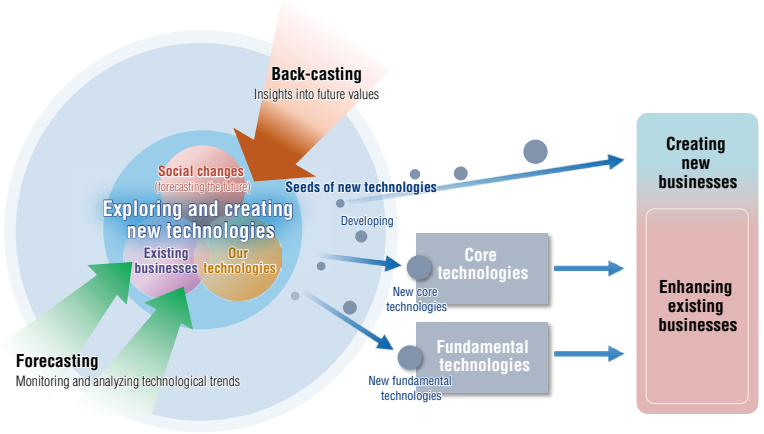
## Developing Advanced Digital Technologies that Create New Value

"Circular Digital-Engineering" creates new value and contributes to solving social challenges by consolidating and analyzing data obtained from customers in digital space and sharing strong connections and wisdom within the Group. More specifically, it involves consolidating and analyzing diverse data produced through the use of the Mitsubishi Electric Group's components and systems to identify the potential issues and need. Based on these issues and needs, we enhance our components, systems, and integrated solutions to create new value, which we share with an even broader range of customers to help solve social challenges together with customers.

Realizing new value requires both technology that creates services and products and technology that can be used with confidence. Therefore, we are pursuing the development of advanced digital technologies, including those related to security and privacy to ensure the security and safety of AI, in parallel with development of technologies for individual services and products.

## Exploring and Creating New Technologies to be Ready for a Game-Changed Future

In today's ever-more complex and changing society, it is important to keep an eye on uncertain risks and potentials in the future and to be prepared for them. For this, we are taking a back-casting approach to imagine the likely future and to think about the value we should provide, and a forecasting approach to monitor and analyze technological trends and to explore and create research and development themes that will contribute to realizing a sustainable society. We will take on the challenge of developing new technologies that respond to the needs of a future society, and technologies that enhance and transform existing businesses to create new usages and acquire new customers.




Exploring and creating new technologies

## Solving Social Challenges through Co-creation to Realize Sustainability

Through industry-academia-government collaboration, we aim to solve complex and diverse social challenges through strong global cooperation between organizations. We will discuss future social transformation, changing values, technological innovation, and a range of opportunities and risks taking into account social, policy, and technological trends to draw up a vision for the society of the future together.

As part of this process, we established the Future Design Committee by Mitsubishi Electric and the University of Tokyo ("FDC") in April 2023 to identify social challenges that we need to explore in depth. In addition to this, we are pursuing plans to select themes that are social challenges in need of solutions and establish several corporate sponsored programs. As the first step, we established a Corporate sponsored program at The University of Tokyo based on the theme of the circular economy in October 2023. The establishment of a cooperation framework to translate the results of research into social implementation and policy recommendations based on the results of social collaboration are also part of the activity.

**From left: Akiko Kumada, Vice Dean and Professor, School of Engineering, The University of Tokyo; Yasuhiro Kato, Dean and Professor, School of Engineering, The University of Tokyo; Kunihiko Kaga, Senior Vice President, Mitsubishi Electric; Toru Oka, Executive Officer, Vice President, Corporate Research and Development, Mitsubishi Electric**

We also concluded a comprehensive agreement with Waseda University in November 2023 to strengthen organizational collaboration aimed at realizing a sustainable society, including carbon neutrality, by going beyond the individual joint research projects of the past. In addition to shared key themes such as carbon neutrality, we will engage in research and development that incorporates the perspective of well-being, including the comfort and health of users, with an eye to social implementation of the results at the earliest possible opportunity.


**From left: Aiji Tanaka, President, Waseda University; Kei Uruma, President & CEO, Mitsubishi Electric**

Moreover, in April 2024, we entered into a basic agreement with Taiwan's Industrial Technology Research Institute (ITRI) related to cooperation on research aimed at realization of a green society. The agreement will last for four years until April 2028 and is the first time we have concluded a basic agreement on comprehensive collaborative research with an overseas research institution. We will engage in a wide range of research and development related to green energy including Carbon dioxide Capture, Utilization, and Storage (CCUS) and energy management systems and aim to achieve social implementation at an early stage.

We plan to invest approximately 60.0 billion yen in industry-academia-government collaborative research and development between FY2025 and FY2031 to promote development at a global level with a sense of speed.

**From left: Jwu-Sheng Hu, Executive Vice President, ITRI; Edwin Liu, President, ITRI; Toru Oka, Executive Officer, Vice President, Corporate Research and Development, Mitsubishi Electric**

# Mitsubishi Electric's Researchers Creating Advanced Technologies and New Value

In the Mitsubishi Electric Group's extensive business fields, we work at a global level to continually enhance our fundamental technologies while exploring and creating new technologies that are the source of further growth.

### Power Semiconductors Helping to Realize Carbon Neutrality

## SBD-embedded SiC-MOSFET

Achieving carbon neutrality has become a global mission and a wide range of solutions are emerging from different fields. Among them, using electricity efficiently with the lowest possible power loss is an important theme facing society. One factor holding the key to realizing this is the semiconductor devices known as power semiconductors that convert electric power. In recent years, silicon carbide (SiC) power semiconductors that can significantly reduce power losses have been receiving attention. The Advanced Technology R&D Center has further improved the capacity to reduce loss for power modules employing SiC power semiconductors by applying an SBD-embedded SiC-MOSFET to power modules with the aim of promoting use in large industrial equipment such as railway rolling stock and DC power transmission.

**Shiro Hino (left), Kotaro Kawahara (right)**
**Advanced Technology R&D Center**

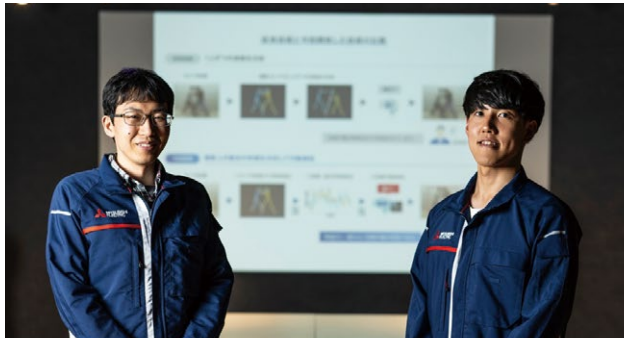
### Using Video for Early Detection of Violence in Public Spaces

## Dangerous Behavior Detection Technology through KOTSUMON Motion Analysis Using Maisart*

Using Mitsubishi Electric's Maisart® AI technology, we provide the KOTSUMON solution that analyzes the motion of workers in a factory from movement information. Based on technology that identifies and analyzes the movement of workers' joints from video, it focuses on individual workers to support improvements in the efficiency and productivity of on-site work.

The Information Technology R&D Center applied this technology to develop technology to detect dangerous behavior using KOTSUMON that analyzes the movement data of multiple people from videos and automatically detects violent or threatening behavior. Early detection of dangerous behavior in public areas such as stations or commercial facilities using the power of technology meets a global need for safety and security.

* An acronym for Mitsubishi Electric's AI creates the State-of-the-Art in technology. It is Mitsubishi Electric's AI technology brand aimed at making all devices smarter.



**Katsuhiro Kusano (left), Kohei Mochizuki (right)**
**Information Technology R&D Center**

### Aiming to Mitigate Transport Access Issues with New Mobility Framework

## On-Demand Transport Service Control System to Solve Local Issues

Buses are a part of the transportation infrastructure that is essential for daily life, but there has been a serious shortage of workers in recent years due to the aging of drivers. To solve this social challenge, Mitsubishi Electric has been working to make on-demand autonomous driving into a reality. In addition to autonomous driving technology for vehicles, we have commenced demonstration testing aimed at creating a system that coordinates routes and dispatch schedules in alignment with user reservations and congestion and sends vehicles to their destinations via the best route. It is hoped that on-demand autonomous driving will provide a key to maintaining bus services, particularly in regions with a small population. The Integrated Design Center developed the user interface (UI) for the terminals used at stops, on buses, and in control rooms, etc.


**Misato Yuasa (left), Daiki Kuriyama (right)**
**Integrated Design Center**

This information is current as of October 2024.

# Intellectual Property

## Basic Policy

To help solve social challenges and create new markets through our businesses, we will strategically link our intellectual property activities and standardization activities to form the required rules and to secure competitiveness. By underpinning our businesses, marketing and sales, and research and development with such initiatives, we will aim to transform into being a Circular Digital-Engineering Company that achieves sustainability management.


**The structure of contribution through intellectual property activities**

| Number of international patents filed*1 | Number of patents filed in Germany*2 | Number of patents obtained in China*3 | |
|---|---|---|---|
| **Fourth** in the world | **Top-ranked** Japanese company | **Fourth-ranked** Japanese company | |
| Number of registered patents in Japan*4 | Number of registered designs in Japan*4 | Largest scale of patent assets in Japan*5 | The power to keep other electronic equipment competitors under control*6 |
| **Second** in Japan | **Sixth** in Japan | **First** in Japan | **Second** in Japan |

**The Mitsubishi Electric Group's intellectual property in numbers**

*1 As announced by the World Intellectual Property Organization (WIPO) (from January–December 2023 data)
*2 As announced by the German Patent and Trademark Office (DPM) (from January–December 2023 data)
*3 As announced by the China National Intellectual Property Administration (CNIPA) (from January–December 2023 data)
*4 As announced by the Japan Patent Office (from January–December 2023 data)
*5 As announced by Patent Result Co., Ltd. (from April 2022–March 2023 data)
*6 As announced by Patent Result Co., Ltd. (from January–December 2023 data)

## Respecting Intellectual Property Rights

The Mitsubishi Electric Group firmly recognizes the importance of mutually acknowledging and respecting not only its own intellectual property rights but the intellectual property rights of others as well. This stance is clearly set forth in the Mitsubishi Electric Group Conduct Guidelines and practiced throughout the Group.

In order to prevent any infringement on the intellectual property rights of others, various educational measures are provided mainly to engineers and intellectual property officers, to raise employee awareness and promote greater respect for the intellectual property rights of others. At the same time, a set of rules has been put in place to ensure that a survey of the patent rights of others to Mitsubishi Electric Group is carried out at every stage from development to production. The Mitsubishi Electric Group places particular weight on collaborating with industry organizations while approaching government agencies both in Japan and overseas as a part of a wide range of measures to prevent the counterfeiting of our products.

## Intellectual Property Activity Policy for Sustainability Management

To achieve sustainability management, solving social challenges with economic rationality is needed, and doing everything by oneself is extremely difficult, and so it requires a framework for co-creation and an ecosystem to be developed and operated so that multiple business operators can mutually and effectively collaborate with one another.

Effective co-creation requires responding to the rules and regulations of each country, as well as appropriate standardization and rules being in place for the country, which is why we believe we need to proactively get involved in establishing these rules. In the ecosystem, intellectual property needs to be secured for the roles of each respective company, and rules must be established to utilize such intellectual property for co-creations.

## Structure to Support Intellectual Property and Standardization and the State of Intellectual Property Activities

The Mitsubishi Electric Group's intellectual property structure consists of intellectual property divisions in our works, R&D centers, and associated companies and the Intellectual Property Division at the head office which supervises them. These intellectual property divisions are collaborating and merging to promote more effective intellectual property activities that are suitable for our businesses.

We established the IP Strategy Division within the Corporate Intellectual Property Division in fiscal 2023, the Standardization Strategy Section within the IP Strategy Division in fiscal 2024, and the IP Transaction Section in fiscal 2025. These units are conducting more strategic intellectual property activities, standardization activities, and co-creation activities to utilize the technology assets held by the Group.

We also assign intellectual property representatives in key countries and regions to enhance local intellectual property capabilities and take measures against counterfeit products in collaboration with intellectual property divisions of overseas associated companies. We aim to obtain intellectual property rights in the correct proportions on considering the business situation in each country. For standardization, we engage in international standardization activities, utilizing European locations. Going forward, we will enhance global standardization activities utilizing Mitsubishi Electric Group locations not just in Europe, but in other regions as well.

We are aiming to develop what will be globally regarded as a robust patent network by strategically increasing filing overseas. We will also increase the ratio of patents we own overseas in proportion to the increase in overseas revenue.

## Driving key themes

In response to changes in our business environment, the head office's Intellectual Property Division proposes themes that require Group-wide activities and it takes the initiative in promoting intellectual property activities and standardization activities, together with business groups and associated companies. More specifically, the division selects key themes from social challenge themes, solution themes, technological themes and other themes from various perspectives, evaluating use cases that will result in contributing to solving social challenges and securing the required intellectual property.

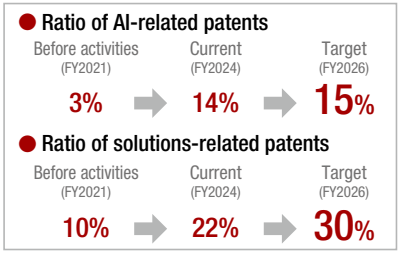
**Key theme examples**

| | |
|---|---|
| Social challenge | Carbon neutral, well-being, mobility |
| Solution | Circular economy, security, energy |
| Technological | 5G/6G, digital twin, AI |

## Change to the Intellectual Property Portfolio with Corporate Strategy Taken into Consideration

To transform into being a Circular Digital-Engineering Company, we need to not just enhance digital-related technologies, but also very importantly to maintain and enhance the intellectual properties regarding components and systems-related intellectual properties. We are developing AI-based solutions and embedding AI into components and systems to raise their value and consider it important to raise the AI ratio. We have set a target of raising the AI ratio in our filed patents to 15% by fiscal 2026.

Our policy is to expand and enhance solution-related intellectual properties on this foundation. We have set a target of raising the ratio of solutions in our filed patents to 30% by fiscal 2026. Furthermore, to protect technologies in both function and design perspectives, we have been actively promoting activities to obtain design rights inside and outside of Japan alongside developing a patent network.

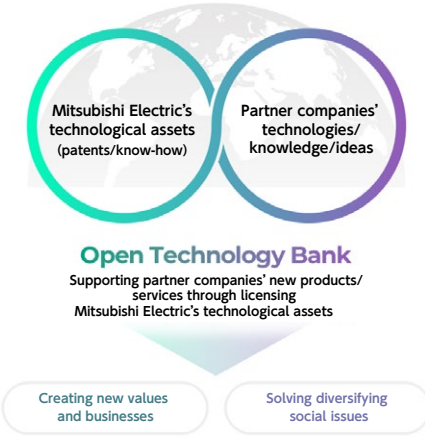



## Open Technology Bank

To realize a sustainable future, in fiscal 2022 Mitsubishi Electric Group started Open Technology Bank activities to promote internal and external collaborations of Mitsubishi Electric Group with intellectual property as the starting point. Until then intellectual property had been used mostly for competition with other companies (for monopolies and for exercising rights against other companies), but we will proactively apply intellectual property as a tool to promote co-creations and as a management resource to form market ecosystems.

## Creating "Seeds" for Businesses to Help Solve Social Challenges

Overcoming social challenges that are becoming increasingly diverse and complex as technological innovation accelerates requires a co-creation approach that fully utilizes open innovation as a tool to create new value in a timely manner in collaboration with diverse stakeholders. As part of our Open Technology Bank activities, a new mission for intellectual property divisions is meeting the challenge to create "seeds" for new businesses that will help solve social challenges leveraging the technological strengths of the Mitsubishi Electric Group. More specifically, this involves setting activity themes based on both social challenges and the Group's proprietary technology, establishing a business model hypothesis, approaching potential partner companies about collaboration, exploring the challenges in depth, and verifying value while refining the business model and technology to cultivate the "seeds" for businesses. Through this activity, we have produced a track record of multiple cases of cocreation, including new businesses at the Mitsubishi Electric Group, licensing-out of technologies and joint verifications.




### Topics

### A co-creating initiative using an advanced plastic filtering technology

To realize a circular society, we are working on plastic recycling that transcends industries by using the advanced plastic filtering technology that our Group has developed over many years for the recycling of home appliances. At present, we are evaluating the efficacy of Mitsubishi Electric Group's technologies with partner companies from various industries, aiming to launch services to provide deployment and operational support for the advanced plastic filtering devices from fiscal 2026 onward.

## Enhancing Collaborations within the Mitsubishi Electric Group

As an integrated electrical manufacturer with businesses in many areas, we have a number of technological assets in a wide range of fields from home appliances to outer space, and this is one of the Mitsubishi Electric Group's strengths. To unlimitedly combine our technologies and expertise to create new impactful value that society needs, we are accelerating the development of integrated solutions across the Group and promoting internal technological collaborations to pursue further technological synergies across divisions. For instance, to promote combinations of technologies, we have internally

released a technology map that illustrates as many as 70,000 of the patents we own by category to visualize our technologies, and we are organizing rules and designing incentives for internal technological collaborations. We are also promoting measures to accelerate matching of internal needs and seeds using both digital and real-world tools. As a Circular Digital-Engineering Company, we will strive to contribute to solving many social challenges by fully utilizing our internal technological assets.

## Enhancing International Standardization Activities

International standardization is becoming increasingly important as a means to expand and acquire global markets, by forming rules for changing industry structures in which digitalization connects products and services across companies and industries. To secure competitive superiority and to continue to play our part in solving social challenges through our businesses, the Mitsubishi Electric Group will proactively work on shaping rules through international standardization activities.

### International Standardization Strategies

The Mitsubishi Electric Group establishes key projects on cross-business themes and promotes international standardization activities that are united with intellectual property activities, working in coordination with business strategies and development strategies to provide integrated solutions that utilize data to create new value. And we are leading global standardization activities and contributing to solving social challenges together with diverse stakeholders. In the field of international standard development, approximately 1,200 members are serving as committee members of various standardization organizations.

| Name and affiliation | Organization | Position |
|---|---|---|
| **Kazuhiko Tsutsumi**, Specially Appointed Technology Advisor | IEC*1 | Vice-President and Chair of the Market Strategy Board (MSB) |
| **Atsushi Miyoshi**, Corporate Intellectual Property Div. | IEC | Japan representative member of the Business Advisory Committee (BAC) |
| **Hiroaki Sugiura**, Corporate Research and Development Group | IEC | Chair of TC 100/TA 2 (color measurement and management) |
| **Yukimasa Nagai**, Information Technology R&D Center | IEEE*2 | Secretary of the 802.19 (Wireless Coexistence) Working Group |

*1 International Electrotechnical Commission
*2 Institute of Electrical and Electronics Engineers

### Examples of initiatives

#### (1) International standardization to respond to digitalization

With the changes in industrial structure brought about by digitalization, communications technology now involves all kinds of products and services. The Mitsubishi Electric Group positions 6G which serves as an advanced communications infrastructure as an important technology for providing integrated solutions. We participate in projects by the XG Mobile Promotion Forum, the Beyond 5G New Business Strategy Center, NEDO*1, and NICT*2 and work on international standardization in conjunction with research and development and intellectual property.

In a more familiar environment, we are developing radio frequency sharing technology that prevents mutual interference between wireless communications when home IoT devices connect via wireless LAN and smart meters. This contributes to the effective use of radio waves by leading the consideration of specifications at IEEE802 and establishing standards.

In addition to these activities, to help realize a decarbonized society, we are participating in an IAF*3 project to promote smart factories that improve productivity by sharing data between companies and have proposed SMKL*4 to the ISO*5 and IEC.

*1 New Energy and Industrial Technology Development Organization
*2 National Institute of Information and Communications Technology
*3 Industrial Automation Forum
*4 Smart Manufacturing Kaizen Level
*5 International Organization for Standardization

#### (2) Taking the initiative in international standardization for power semiconductors

Mitsubishi Electric served as project leader on the IEC White Paper "Power semiconductors for an energy-wise society" published by the IEC in October 2023. The white paper compiled a series of recommendations on the need to establish and expand international standards and certification systems for power semiconductors. Power semiconductors, which are one of Mitsubishi Electric's mainstay products, reduce electricity consumption and contribute to the efficient use of energy through efficient power transformation. This means they are key devices for realizing carbon neutrality by 2050, and, recently, there have been expectations of further market expansion and technological advancements. Mitsubishi Electric will contribute to realizing carbon neutrality by taking the initiative in activities aimed at international standardization for power semiconductors area.


**IEC White Paper**

#### (3) International standardization for space batteries

Mitsubishi Electric is promoting development of products that use lithium-ion batteries to further reduce the size and weight of aerospace batteries on satellites and space probes. We are also working toward international standardization as part of our efforts to improve the quality appeal and market presence of our batteries in the aerospace market. We have been leading the development and publication of ISO standards through discussions with the ESA*1, NASA*2, and overseas battery manufacturers. As a result of this, we have won a share of the commercial aerospace battery market. We have also received orders from JAXA*3 related to lithium-ion batteries for space applications for the crewed lunar orbiting base Gateway, following orders for the Habitation and Logistics Outpost and the International Habitation module under the Artemis Program, the U.S.-led crewed moon exploration program.

*1 European Space Agency
*2 National Aeronautics and Space Administration, U.S.
*3 Japan Aerospace Exploration Agency

**Gateway and Gateway resupply craft**

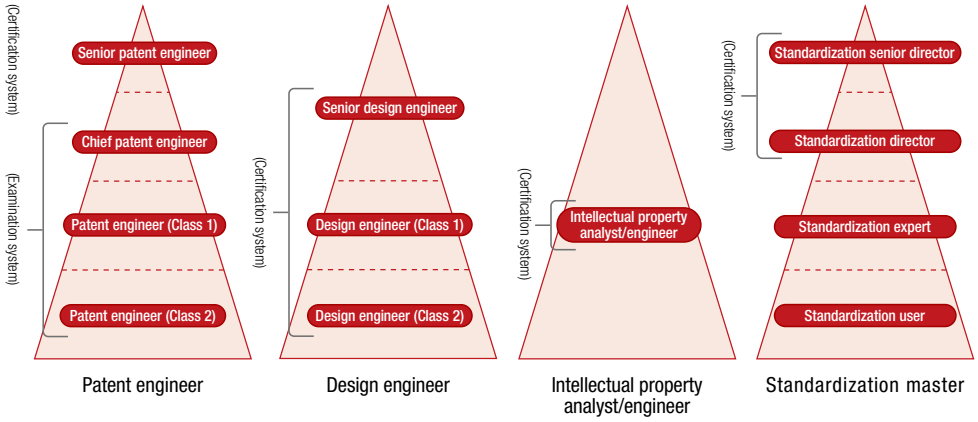
### (4) International standardization of dynamic signs

We have conducted technological development on dynamic signs, a technology to display highly visible signs on the floor with optical animation, jointly with the National Institute of Advanced Industrial Science and Technology, a national research and development agency, taking into consideration how the signs will spread due to international standardization. We proposed international standards to ISO in 2018 concerning this technology, and successfully had it standardized in 2021. The technology and ISO standard has been applied to Mitsubishi Electric Products' "Terasu Guide," which is used to support the smooth transportation of diverse range of facility users, including the elderly, wheelchair users and non-Japanese people. Through our technological developments and international standardization activities, Mitsubishi Electric will contribute to realizing a society in which everyone can enjoy achieving their potential.

## Human Capital Development and Awards System

### Internal Certification System

Mitsubishi Electric Group has established an internal certification system to encourage personnel to attain outstanding competence in intellectual property and standardization operations, and it provides related training programs. The certification system offers four certifications according to the person's responsibilities, and also corresponding training. We also have a certification system for intellectual property analysts.




### Internal Awarding System

For creative intellectual property activities, we grant incentives to inventors through internal compensation and awards. We also have other systems, such as the President Award, the General Manager Award, and the Center Manager Award, to award inventors for their intellectual property, standardization, and co-creation activities depending on the content of their activities.

## External Awards

Mitsubishi Electric's achievements in intellectual property and standardization have also received a high level of external recognition.

- Intellectual property

| | | |
|---|---|---|
| "Clarivate Top 100 Global Innovators 2024" |  | Received the award for the 12th time in total as one of the world's top 100 companies for innovation with outstanding intellectual property |
| 2024 National Commendation for Invention* The Invention Prize | | Received the award for the first time in four years in recognition of the "Invention of motors with reduced amount of rare earths through effective use of magnetic flux" (patent no. 5855680) |

* Awards given by the Japan Institute of Invention and Innovation (JIII) for inventions, ideas, or designs that have made significant contributions.

- Standardization

| Name of award | Recipient |
|---|---|
| 2023 Industrial Standardization Award, Director-General, Industrial Science, Technology and Environment Policy Bureau's Award (International Standardization Encouragement Award) | Noritaka Okuda, Advanced Technology R&D Center<br>Takenori Baba, FA-European Development Center |
| 2023 IEC (International Electrotechnical Commission) 1906 Award | Kazuhiko Nakane, Advanced Technology R&D Center |
| Japan Electronics and Information Technology Industries Association<br>2023 Semiconductor Standardization Committee Distinguished Service Award | Hitoshi Kurusu, High Frequency & Optical Device Works |