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Innovative Development,
Imagination for the Dream,
Identity & Diversity

Feature

Mobility Society Created by the Sumitomo Electric Group

Changes Surrounding Automobiles and a New Mission for Mobility as Social Infrastructure

The automotive industry is currently undergoing a major transformation that goes beyond just electrification. The concept of mobility is evolving from individual ownership to shared use within society.

Driving this change are serious social issues such as traffic accidents causing the deaths of more than a million people worldwide every year, the urgent need to achieve carbon neutrality, and the need to support mobility-challenged individuals in an aging society.

The key lies in the advancement of CASE, an acronym that represents the four next-generation trends in the automotive industry: Connected, Autonomous, Shared/Service, and Electric. In particular, autonomous driving has evolved from conditional operation under specific scenarios to a roadmap for implementing fully autonomous driving that leverages communication technologies. However, communication latency and electromagnetic interference pose significant challenges to ensuring absolute reliability. To achieve the ultimate goal of zero traffic fatalities, an advanced communication infrastructure is essential—one that enables automobiles to instantly communicate with infrastructure and detect and respond to a wide range of events.

In this period of transformation, the Sumitomo Electric Group will leverage the expertise it has gained, primarily in wire harnesses—often called the “nervous system” of automobiles—and integrate these with digital/AI and energy networks to help establish the foundation that will support the next generation of society.

At the heart of this strategy is AutoNetworks Technologies, Ltd. (hereinafter referred to as “ANTech”). From this cutting-edge technology research hub, the Sumitomo Electric Group envisions the future of mobility.

Unifying the Group's Collective Wisdom to Create New Value

— Integrating Technologies Toward Mobility as a New Social Infrastructure —

Toward Building a Foundation Supporting Society Beyond the Boundaries of Automobiles

The automotive industry is said to be undergoing a once-in-a-century transformation. In this transformative period, the Sumitomo Electric Group is focusing on more than improving vehicle performance. It faces a monumental challenge: to reconceive transportation itself as part of the social infrastructure. Yoshiyuki Ogata, Managing Director and General Manager of the Automotive Business Unit, who leads the business operations, describes the current situation as “a fundamental departure from the existing trajectory.”

“What we are facing now is a fundamental transformation of mobility. For example, one challenge is how to ensure that elderly people in sparsely populated areas who have surrendered their driver's licenses can travel freely to the places they want to go. To solve these pressing social issues, we need to redefine all forms of mobility—including electric scooters, micromobility devices, and even flying cars—as part of our business scope. Until now, we have been manufacturing automobile parts, but from now on, we must commit ourselves to building the infrastructure that supports mobility.” (Ogata)

The Sumitomo Electric Group's automotive business has established a solid global position as a supplier of automotive parts, primarily wire harnesses. However, Ogata sees beyond this, as he looks ahead of the Sumitomo Electric Group's long-term 2030 VISION and envisions a connected society where everyone can travel safely and comfortably.

“The essence of our strategy is not simply to sell high-performance components. We are committed to building a foundation that adds new value to all forms of mobility, positioning the ability to move as a fundamental part of social infrastructure. Our social responsibility lies in how we apply our technology to address society's pressing challenges. Fulfilling that social responsibility remains the unchanging core principle

of the Sumitomo Electric Group.” (Ogata)

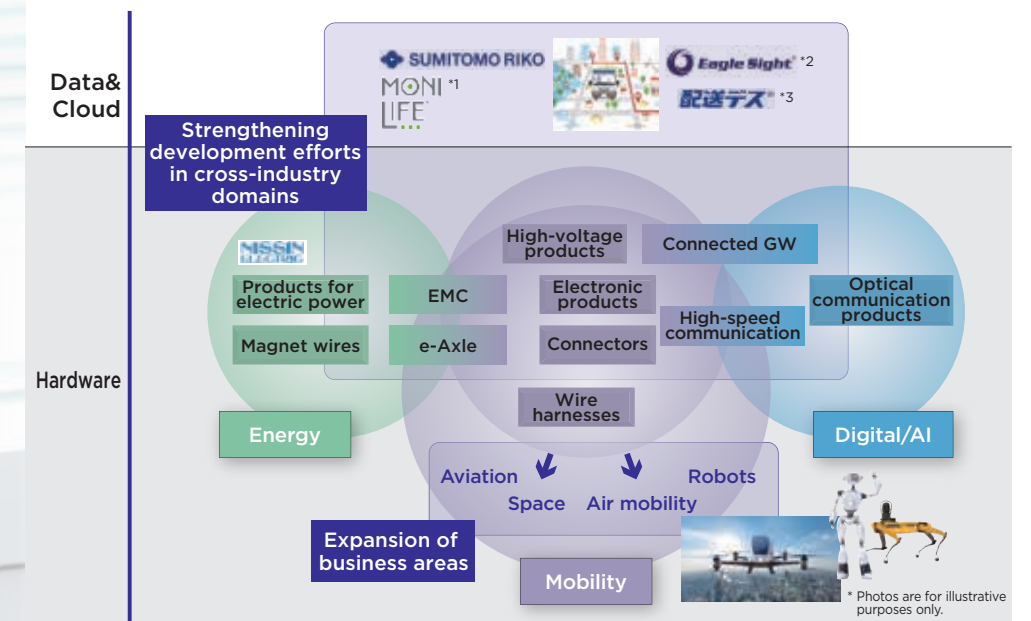
Accelerating Groupwide Strength through Synergies—the Convergence of Communications, Electric Power, and Sensors

The value of vehicles is shifting from hardware to software amid the rise of software-defined vehicles (SDV). In this paradigm shift, the integration of the Sumitomo Electric Group's long-developed communications and electric power technologies will be the decisive source of its competitive advantage. The Sumitomo Electric Group has core business areas in the digital/AI and energy fields. By strengthening collaboration among these fields, it can expand its operations in unique convergence domains that competitors cannot easily replicate.

“As autonomous driving technology advances, the amount of data exchanged inside and outside vehicles is increasing exponentially. By leveraging our expertise in optical fiber technology developed through our infocommunications business, as well as our connected gateway (GW) technology—a product that links mobility with digital/AI systems—we can seamlessly connect in-vehicle networks with external infrastructure. Specifically, we are developing technology that transmits driver health information detected by advanced sensors developed by our group company Sumitomo Riko Company Limited (hereinafter referred to as Sumitomo Riko) to the cloud via a connected GW and immediately provides feedback to vehicle control. Furthermore, by combining our battery design technology with the power grid expertise of our group company Nissin Electric Co., Ltd. (hereinafter referred to as Nissin Electric), we are building a new business called sEMSA™, an energy management system that efficiently utilizes EV batteries by connecting them to the power grid.” (Ogata)

Sumitomo Electric has strengthened group synergies by acquiring full ownership of Nissin Electric in 2023

Future Focus Areas in Automotive Business



*1:MONILIFE™: a vital signs data monitoring service utilizing sensors and cloud technology
*2:Eagle Sight™: a cloud-based vehicle operations management service that combines delivery planning and vehicle tracking functions
*3:Haisodesu™: a delivery planning system that enables automatic creation of efficient delivery plans

and Sumitomo Riko in 2026.

“We are maximizing synergies by placing ANTech at the core of our technology hub, where knowledge from diverse industries intersects. Focusing on cross-industry domains is our proactive business strategy in the SDV era.” (Ogata)

Preserving the Spirit of Traditional Craftsmanship and Paving the Future

Meanwhile, Ogata's strategy is not limited to flashy cutting-edge technology. Rather, he places deep trust in the on-the-ground capabilities that have been built over more than 120 years.

“To make our offensive strategy to pioneer cutting-edge technology effective, it is essential to simultaneously innovate our defensive efforts—especially by thoroughly refining manufacturing operations centered on our core wire harness business. In an era where software defines the car, the importance of the wiring harness, which is the physical

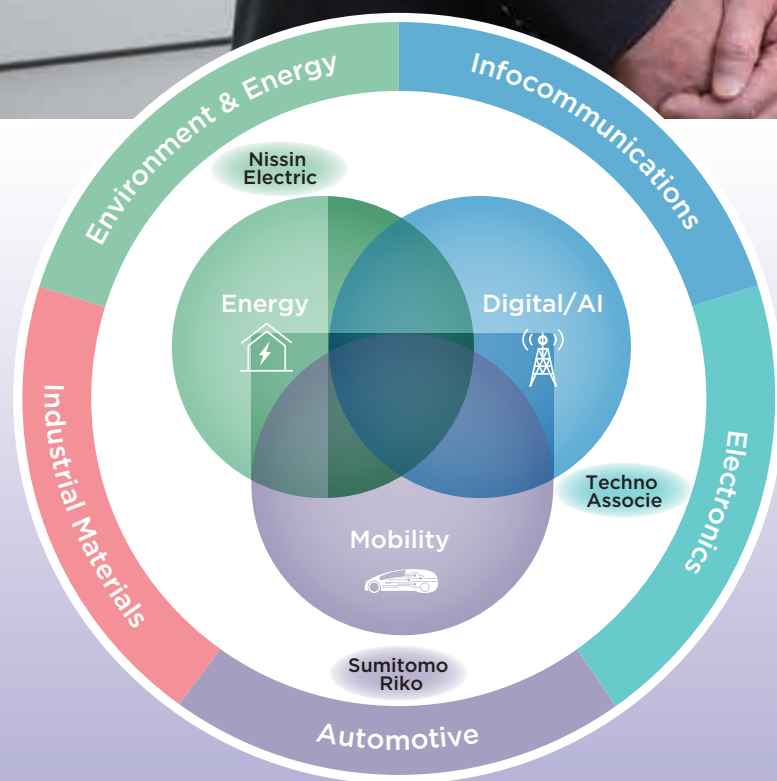
connection point, is becoming increasingly significant. Next-generation mobility can only be realized with absolute hardware reliability.” (Ogata)

By simultaneously advancing the offensive strategy of ANTech and reinforcing the defensive strategy of Sumitomo Wiring Systems, Ltd. (hereinafter referred to as Sumitomo Wiring Systems), whose manufacturing sites—including wire harness production—exemplify this approach, we constantly ask ourselves, “What is unique to us?” Through this, we build an overwhelming strength that keeps us from being caught in price competition. That sense of unity is the driving force toward the future.

“We cannot maintain the status quo. Therefore, we will strengthen cross-industry business synergies within the Group. Our strength lies in group synergies arising from combining different industries.” (Ogata)

He concluded, “A bright future is something we create ourselves.”

Yoshiyuki Ogata
Managing Director
General Manager, Automotive Business Unit
General Manager, Chubu District Office



The Three Key Areas in the Mid-term Management Plan 2028

Where Knowledge Intersects, Seeds of the Future Take Root

— ANTech's Role in Developing the Neural Network for Next-Generation Mobility —

Evolution from Wire Harness to Next-Generation Mobility

Research and development in the automotive business of the Sumitomo Electric Group is led by ANTech, which celebrated its 30th anniversary in 2025. Established as a specialized research laboratory for automotive electrical parts, primarily wire harnesses, the organization is now dramatically evolving its role.

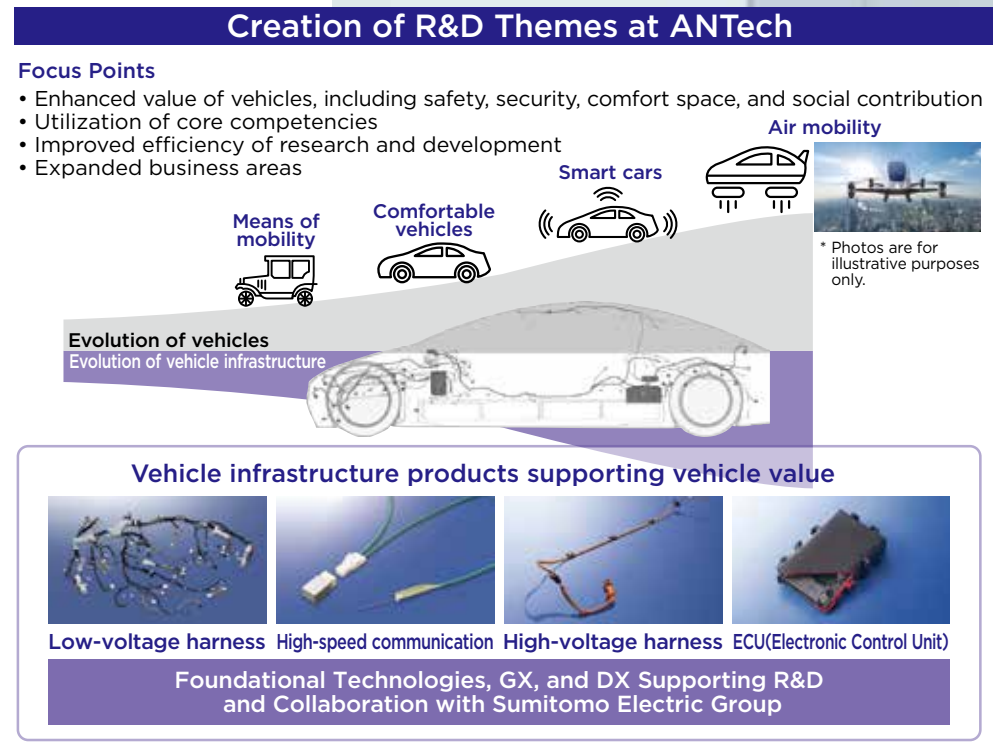
"The research scope has expanded to encompass the entire vehicle infrastructure, and even mobility itself."

Hiroki Hirai, Deputy General Manager of the Automotive Business Unit and President of ANTech, reflects on the organization's journey so far. Today, ANTech serves as a crossroads of knowledge, integrating the diverse technologies of Sumitomo Electric and Sumitomo Wiring Systems—including materials, mechatronics, and information and communications technologies—and transforming the Group's synergies into technological value.

Harvesting for 2030 and Sowing Seeds for the Future

To succeed in the fierce competition driven by the advancement of CASE, the speed of bringing development results to market and advancing our next steps is crucial.

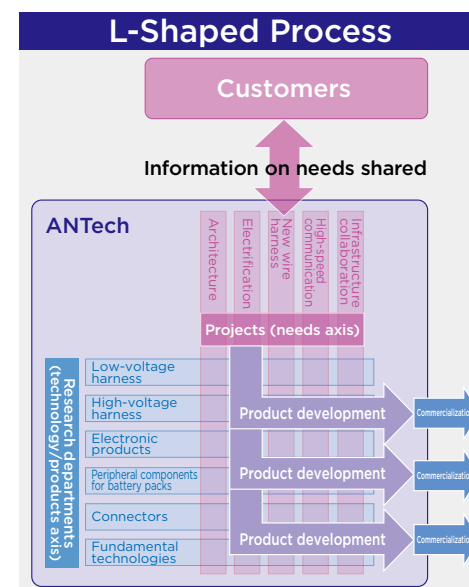
"We are currently working on two



important phases simultaneously. One is the commercialization of technologies aimed at the Sumitomo Electric Group's 2030 VISION—in other words, harvesting. Busbar modules for efficient power distribution, connectors for the EV integrated drive unit e-Axle, and wire harnesses for high-speed communication are being brought to market as planned. The other is sowing seeds, looking even further ahead. We

view wiring harnesses as a nerve network that circulates information within the automotive system and aim to evolve them into next-generation in-vehicle infrastructure equipped with sensor and security functions. This is our strategy for long-term sustainability." (Hirai)

ANTech's Research on In-Vehicle Communication Infrastructure and Overall System



L-Shaped Process Behind Harvesting Fruits and Sowing Seeds for the Future

To put this strategy through practice into products, Hirai introduced the L-shaped process. This development system features two intersecting axes forming an L-shape. The vertical axis focuses on accurately identifying needs and driving projects forward, while the horizontal axis emphasizes deeply pursuing and implementing technology. By advancing along these two axes simultaneously, progress is being made in building intelligent in-vehicle infrastructure.

The L-shaped process is driven by human power. Hirai is particularly focused on nurturing individuals who can uncover latent needs unknown even to customers. One symbolic example of this is the prototype project for an electric motorcycle by young engineers.

"The automotive electrification project I previously worked on was, in a sense, a practical opportunity to learn about development from a manufacturer's perspective. This electric motorcycle development project is a challenge aimed at discovering the true value sought by end users. Our goal wasn't simply to create a high-performance vehicle but to embody the fun, enjoyment, and comfort that the rider experiences—qualities that might be overlooked when focusing solely on specifications." (Hirai)

In this project, the true thrill of motorcycle riding—the engine's sense of acceleration—was recreated by switching the motor's windings.

"When I discussed the completed electric motorcycle with engineers from a car manufacturer, young engineers' eyes lit up. I truly experienced the core essence of development when the customer resonated with the value they had discovered." (Hirai)

Creating Value in In-Vehicle Infrastructure for a Future of Hardware and Data Integration



Electric motorcycle



Motor part

Hiroki Hirai

President, AutoNetworks Technologies, Ltd.

Let us take a closer look at the unique strategies of ANTech for the era of SDV, where automobiles are defined by software.

"Our role is not just to make electrical and signal connections but to ensure their reliable operation. As data traffic and power consumption increase, noise and heat effects inside the vehicle intensify. Our mission is to solve this complex challenge and establish an environment where the system can function properly. In addition, we have begun the challenge of transforming the data obtained through wire harnesses into value that can improve safety and reliability.

If you encounter any challenges with mobility solutions such as cars, flying cars, or robots, turn to ANTech first. To earn such recognition, we are determined to fulfill our role as the intersection of the Sumitomo Electric Group's synergies." (Hirai)

Building on Ogata's synergy strategy, ANTech will create seeds for the future.

Evolving Manufacturing That Paves the Way to the Ideal Future

— Automation and Local Production Strategy Demonstrated in e-STEALTH W/H™ Manufacturing —



Kenichi Urushibata

Representative Director
President and Chief Executive Officer,
Sumitomo Wiring Systems, Ltd.

From Labor-Intensive Approaches to a Strategy of Optimal Talent Allocation

Wire harnesses are core products of the Sumitomo Electric Group's automotive business. Sumitomo Wiring Systems is solely responsible for their manufacturing and operates a global supply chain network. Sumitomo Wiring Systems boasts a leading global market share in wire harness manufacturing, often called the nervous system of automobiles. It has

105 locations in 32 countries and regions worldwide and employs approximately 250,000 people. Historically, wire harness manufacturing was a labor-intensive industry requiring a vast amount of manual work, which led to the practice of relocating production to optimize cost. However, pandemic-induced lockdowns and soaring logistics costs exposed vulnerabilities in remote supply models. Kenichi Urushibata, President of Sumitomo Wiring Systems, says it is time to

fundamentally rethink the role and location of manufacturing bases to fulfill supply responsibilities.

"Our mission is to continue providing high-quality products at competitive prices, but the business environment has changed dramatically in the last five years. The era of relocating production sites around the world to reduce cost is over. Producing and delivering right next to the market, shifting towards local production for local consumption, is the way to simultaneously strengthen business

continuity planning and reduce environmental impact." (Urushibata)

New Product e-STEALTH W/H™: Revolutionizing Vehicle Structure

For production in advanced economies, automation that addresses higher labor cost is an absolute necessity. However, the conventional structure of wire bundles was extremely difficult to automate. This led to the development of a next-generation wire harness with a flat structure, e-STEALTH W/H™ (e-Stealth Wire Harness). The e-STEALTH W/H™ is applied to the main harness of the area harness structure, in which the complex wiring running throughout the entire vehicle is modularized into main and branch harness units. By adopting aluminum conductors, the harness was made lighter; by using fusion technology to arrange the wires flat, space was saved; and the manufacturing process was automated. In practical applications, the flat design, with integration with surrounding in-vehicle components, enabled reducing the height of the instrument panel by approximately 40 mm.

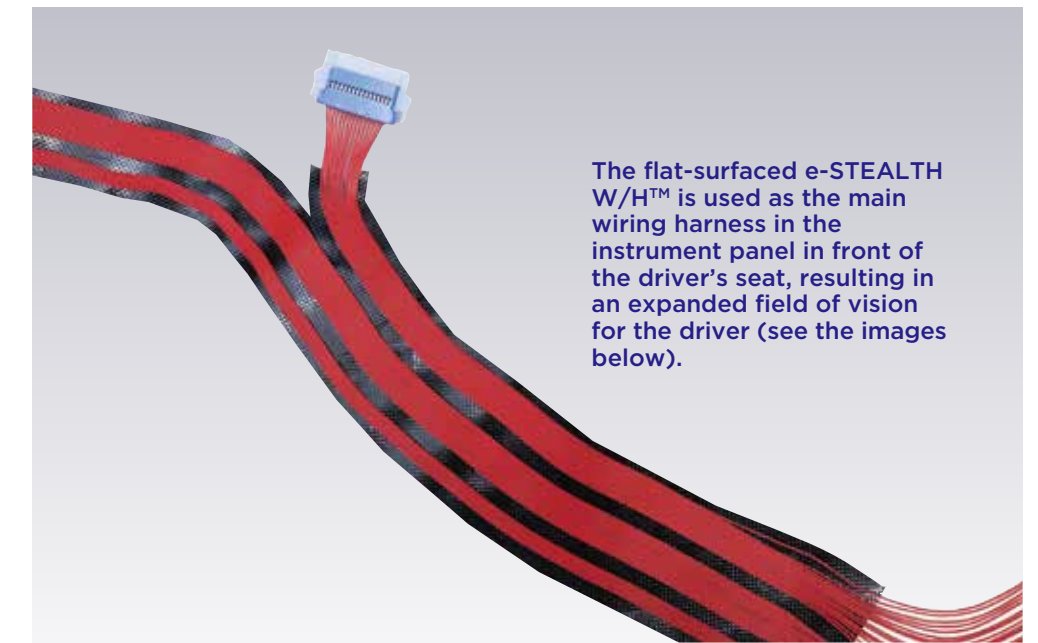
Furthermore, e-STEALTH W/H™ provides a groundbreaking solution to electromagnetic noise, a serious challenge as CASE technologies continue to advance.

"The development of e-STEALTH W/H™, conducted in collaboration with ANTech, features an innovative design that arranges wires in a flat, parallel structure. This design reduces electromagnetic noise interference and ensures stable communication quality. In connected vehicles and electric vehicles (EV), this infrastructure technology, which enables stable current flow, represents a key strength for us." (Urushibata)

Reshoring to Japan and Reclaiming the Role as the World's Main Mass Production Factory

The e-STEALTH W/H™ has also achieved significant results from a business perspective.

"Instead of transporting bulky



The flat-surfaced e-STEALTH W/H™ is used as the main wiring harness in the instrument panel in front of the driver's seat, resulting in an expanded field of view for the driver (see the images below).

e-STEALTH W/H™ flat wiring

Expanded Field of View due to the Low Positioning of the Instrument Panel



finished products, we transport main wiring harnesses in a flat-packed form and assemble them near the point of consumption. This significantly reduces transportation costs and inventory space, improving profitability. This means that Sumitomo Wiring Systems is redesigning itself from simply supplying parts to becoming a system supplier with integrated logistics capabilities." (Urushibata)

Then, what is Sumitomo Wiring Systems' future vision centered on e-STEALTH W/H™?

"The challenge is cost. We must avoid focusing solely on price comparisons of individual parts and instead work closely with our customers from the vehicle's structural design stage, with e-STEALTH W/H™

adoption assumed from the outset. Moving forward, we will not only expand the scope of application to areas such as underfloor, ceilings, and battery surrounds but also establish a system that can flexibly respond to fluctuations in market demand, including applications in the flying car and robotics sectors. This will impress our customers and put their minds at ease." (Urushibata)

Furthermore, Urushibata's vision for the future is the reshoring of production to Japan. By maximizing automation, manufacturing costs can be leveled out, enabling mass production even in Japan where labor costs are high, without relying on overseas production. If Japan can achieve cost competitiveness, it will not only strengthen its supply chain but also reactivate the country as the world's primary mass-production hub, contributing to the recovery of its economic strength.

"Ideally, a smart factory would assemble the optimal modules by robots immediately upon receiving an order, embodying the ultimate form of local production and consumption. This also represents a challenge to reclaim the pride of Japanese manufacturing." (Urushibata)

The Sumitomo Electric Group's proud on-site strengths are now evolving into an unprecedentedly robust infrastructure, powered by digital technology.



e-STEALTH W/H™ in the instrument panel (main bundle within the dotted line)



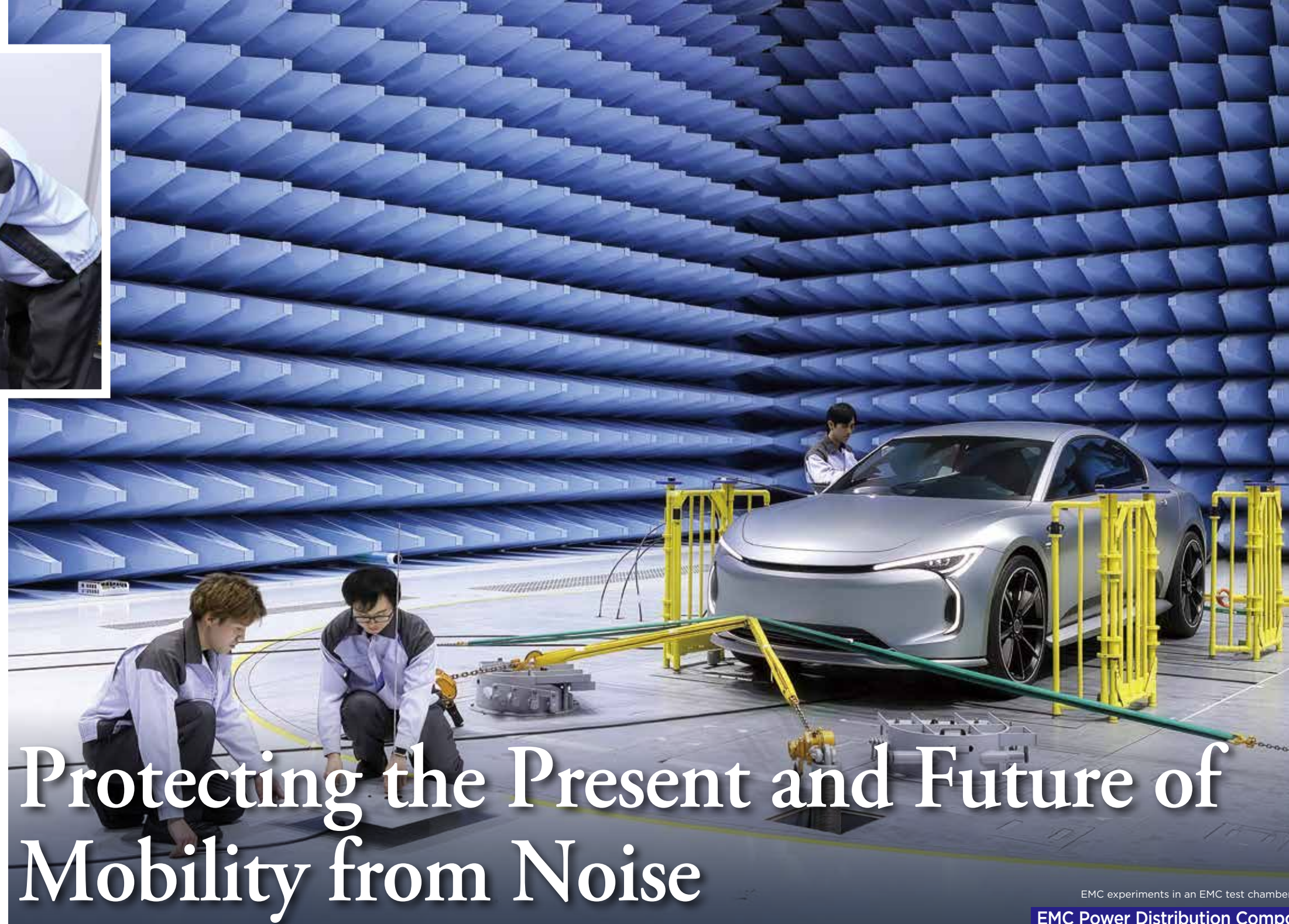
The ANTech research team members diligently collecting experimental data

The New Standard for EMC Measures: Electromagnetic Quietness Required

Modern automobiles, especially EVs and hybrid electric vehicles (HEV), are both precision electronic devices on wheels and sources of electromagnetic noise. These opposing characteristics present a new challenge in development known as EMC.* Suppressing noise generation and enhancing noise immunity are crucial. EMC is a critical requirement for integrating mobility with social infrastructure. Masayoshi Hirota of the Power Integration Laboratory at ANTech expresses a strong commitment to overcoming this challenge.

"The inverter is an essential component of an EV, which optimally controls power from the battery to drive the motor. However, voltage and current fluctuations during inverter operation generate high-frequency electromagnetic noise. Additionally, the interior of a vehicle is made up of various devices that act as noise sources. If left unaddressed, these issues can cause not only disturbances to the car navigation display and audio but also, in the worst-case scenario, system malfunctions that could lead to serious accidents endangering lives. As autonomous driving technology advances, ensuring electromagnetic quietness inside the vehicle will become a critical factor in determining the reliability of mobility." (Hirota)

Typically, noise mitigation measures have been coordinated by car manufacturers for the entire vehicle. However, with the increasing specialization of electric units and increased output power and power density, strict electromagnetic shielding by each unit's suppliers has become essential. For example, in inverters, EMC filters with magnetic cores or integrated into the power distribution system are installed at the input and output to suppress noise ingress and egress. As performance demands increase, conventional cores become larger, creating significant



Protecting the Present and Future of Mobility from Noise

— The Challenge of EMC in CASE —

constraints on layout.

* EMC: electromagnetic compatibility

From Connecting to Protecting: Sumitomo Electric Group's Value-Added Survival Strategy

"Until recently, connectors and terminal blocks have generally been passive components made of assemblies of metal and plastic materials. However, if things continue as they are, these components will eventually become commoditized and swallowed up by global price competition. This sense of urgency is what drives us to pursue technological innovation." (Hirota)

The novel strategy Hirota devised was to add a new function of "containing noise" within the in-vehicle products of which the Sumitomo Electric Group has a large market

share.

"Instead of forcibly adding a large core to counter noise, we reduce core size by implementing optimal placement and routing tailored to each of our products, including connectors and terminal blocks, thereby significantly reducing the overall system size while maintaining functionality. We add value to existing connecting technology and evolve it into an active infrastructure. This is our unique survival strategy that competitors cannot replicate." (Hirota)

Beyond the Dilemma Between Ideal and Reality: A Fresh Start from Zero

"In 2021, we received an inquiry from a customer regarding EMC design for drive-system inverters. However, at that time, we didn't have any know-how in that area." (Hirota)

The biggest obstacle was the gap between the development team, which aimed for ideal circuit design, and the manufacturing team, which prioritized mass production efficiency. Efforts to minimize noise require wiring that is both short and complex, leading to concerns from the manufacturing floor, "This structure is impossible to assemble." "Ideal performance or stable mass production?"

While navigating conflicting demands, Hirota repeatedly visited the production floor and relentlessly made adjustments. For six years, he continuously sought the optimal solution that would enable production lines, supported by 250,000 employees, to achieve stable output without any compromise on performance. As a result, a system was established to commence the first mass production in 2027. This transformation into manufacturable cutting-edge technology earned Hirota and his team unwavering trust.

The Ideal EMC Filter Leveraging Group Synergy

Meanwhile, Hirota is looking even further ahead. This reflects a sense of urgency that simply assembling parts sourced from external suppliers will not enable the company to win the inevitable cost competition.

"What we aim for is our proprietary EMC power distribution components that integrate our materials and products. Currently, the mainstream approach involves assembling the EMC core afterwards, requiring designs that accommodate dimensional accuracy and assembly tolerances, which leads to larger overall sizes. How can we achieve miniaturization that satisfies customers? The key to solving this challenge was the collective strength of our group." (Hirota)

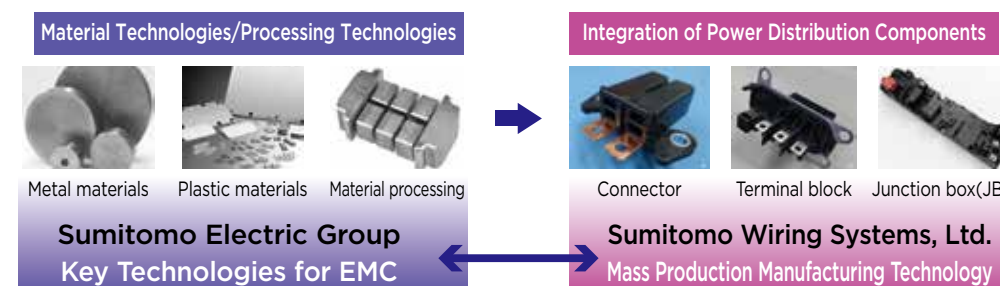
We leveraged the EMC design and evaluation technologies developed by ANTech together with the metal and plastic material technologies of the Sumitomo Electric Group. We successfully established the ultimate EMC filter concept that integrates our power distribution materials and EMC components into a unified unit. Hirota's team is currently dedicated to developing key technologies.

"If you entrust noise countermeasures to the Sumitomo Electric Group, your noise challenges will be solved. We want to establish ourselves as a trusted development partner who deserves such confidence." (Hirota)

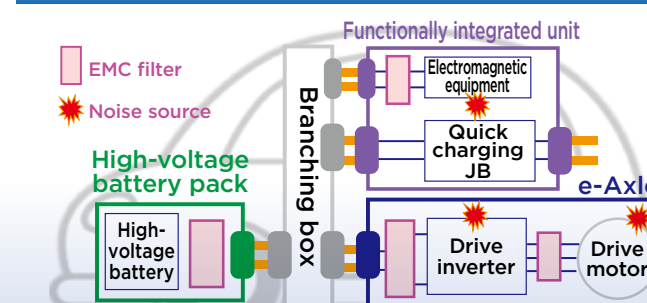
Hirota has announced his intention to move beyond the role of a supplier and become a strategic partner that co-creates the future with car manufacturers. This involves connecting electric power and information while eliminating invisible noise. The steady development of each individual technology will continue to fundamentally support the essential infrastructure of the next-generation mobility society: safety and security.

EMC experiments in an EMC test chamber

EMC Power Distribution Components of the Sumitomo Electric Group



AutoNetworks Technologies, Ltd. Technology Planning Ahead for Electrification



Transform Automobiles into “Supporters of Society”: Energy Circulation

— A New Paradigm for Mobility and Infrastructure, Opened up by the Fusion with Nissin Electric —

Three Key Themes Connecting Energy and Mobility

As we move toward the realization of a decarbonized society, mobility is becoming a vital piece of the overall energy infrastructure. Leading energy collaboration at ANTech is Takaaki Sano of the Infrastructure Collaboration Development Promotion Office. Sano is approaching the next generation of power platform from three key themes.

“The energy management system sEMSA™, which promotes the use of EVs and other technologies, aims to maximize renewable energy utilization and reduce costs. The Vehicle to Everything (V2X) initiative focuses on developing charge/discharge devices that connect and control power infrastructure and mobility. Battery reuse involves repurposing vehicle batteries as storage batteries after their automotive life span ends. My mission is to integrate these elements to build a system that adds value to mobility while ensuring healthy energy circulation.” (Sano)

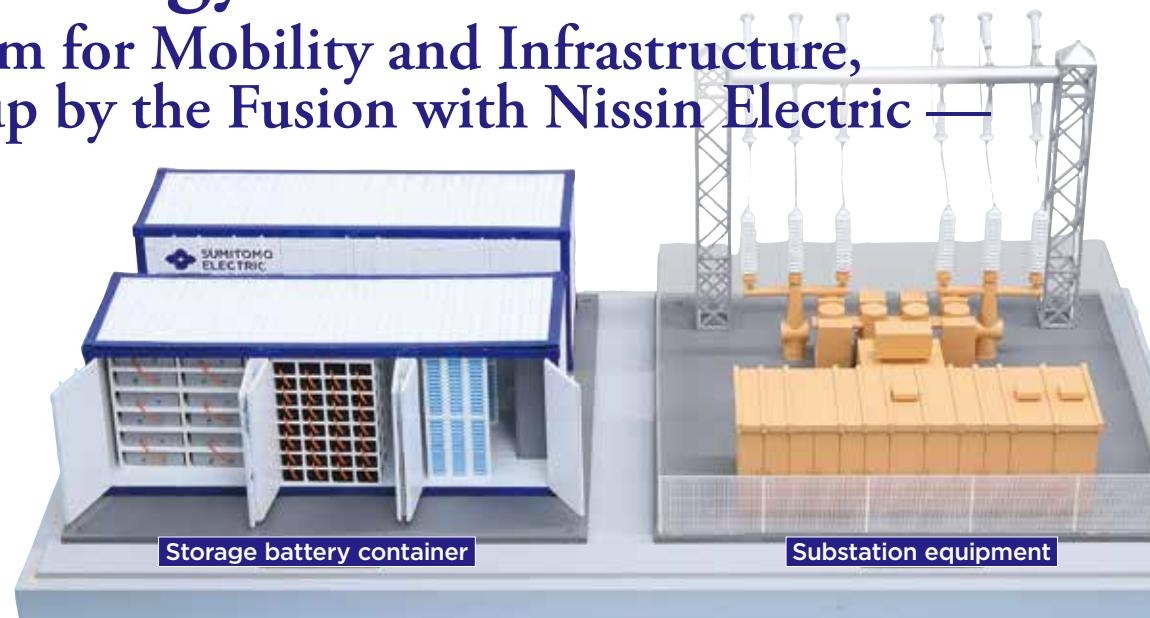


Takaaki Sano
Senior Assistant General Manager, Infrastructure
Collaboration Development Promotion Office
AutoNetworks Technologies, Ltd.

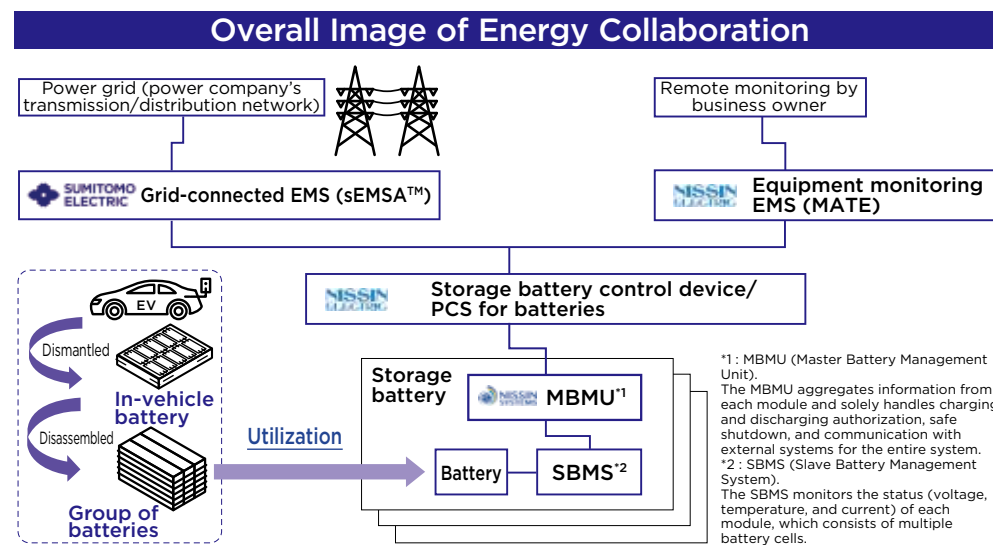
Controlling Batteries in Groups through Fusion with Nissin Electric

Among these, the key lies in battery reuse. Supporting this massive circulation system is the strong synergy with Nissin Electric.

“While each battery collected from scrapped vehicles is tiny compared to the whole of society, when they are combined they allow us to create large storage battery systems that adjust the power balance in substations and power plants. That is an integration of Sumitomo Electric’s technology for controlling in-vehicle batteries as “groups,” combined with Nissin Electric’s substation equipment and power electronics technology required for grid connection, which leads to a total energy solution. The strength of the Sumitomo Electric Group lies in its flexibility, which allows us to offer solutions ranging from total coordination to providing only the



A storage battery system using collected used in-vehicle batteries (illustration)



necessary functions, such as energy management, according to our customers’ needs.” (Sano)

Sumitomo Electric has expertise in mobility, and Nissin Electric has deep knowledge of energy infrastructure. The Nissin-Sumiden Energy System Development Center was established to combine the strengths of both companies. ANTech plays a key role in bridging the gap between the cultures of the automotive and energy industries. Within a few years, they aim to put into operation an energy storage system that reuses in-vehicle batteries, developed collaboratively with car manufacturers.

A “Reverse Proposal” That Changes the Future 10 Years Ahead

The biggest obstacle to creating a system that enables full use of batteries is that current in-vehicle batteries are not designed with reuse in mind. Backed by insights gained from demonstration data, Sano is making a “reverse proposal” directly to car manufacturers.

“It will be more than 10 years before in-vehicle batteries built with the proposed design come back to the

market. However, a sustainable resource cycle in the future cannot be established unless we start the cycle now. To create what will be considered normal in 10 years, we need to change the conventional design wisdom now.” (Sano)

One of the roles spearheaded by ANTech within the Sumitomo Electric Group is to transform mobility into a “supporter of society” through renewable energy. Sano and his team are steadily demonstrating the necessity and value of energy collaboration, with a view to a sustainable future.



Master Battery Management Unit (MBMU) monitor screen
The monitor display is used to monitor and manage the storage battery system that reuses in-vehicle batteries as a “group.”



Connected GW

Visualization of Safety Created by the Fusion of Multifaceted Sensors and Communication — The Innovation of a Data Utilization Platform Pioneered by Science and Engineering Collaboration —

Bridge IT and Mobility While Ensuring “In-Vehicle Quality”

In the SDV era, where next-generation mobility evolves into a “driving computer,” connecting various in-vehicle devices to the internet (cloud) becomes crucial. The electronic control unit that serves as the gateway for information flow is the connected GW developed by ANTech.

The barrier to developing the connected GW was the design criteria for adopting IT and cloud technologies to in-vehicle quality. Even a slight communication delay acceptable in PCs and smartphones is intolerable in



Shuhei Takimoto
General Manager, Connected X Business Promotion Department
AutoNetworks Technologies, Ltd.

automobiles that bear responsibility for life.

Shuhei Takimoto of the Connected X Business Promotion Department at ANTech, specializing in cloud collaboration, says that overcoming the barrier was made possible by insights gained from the unique group strength of Sumitomo Electric, which has an information and communication business.

“We repeatedly conducted meticulous verification to meet the stringent requirements regarding latency and data loss. I am proud to say that, because the Sumitomo Electric Group has a deep understanding of both information and communication technologies related to the internet and cloud, as well as electronic control unit (ECU) design technologies that aim to ensure the highly reliable quality required for in-vehicle applications, we were able to create a data utilization platform that can bridge IT and mobility in a sophisticated way.” (Takimoto)

One-Stop Advantage Delivering the Group’s Insights as a Complete Package

The Sumitomo Electric Group is leveraging the connected GW,

integrating the Group’s unique advanced technologies such as Sumitomo Riko’s biometric sensors, to develop a driver assistance system that visualizes the driver’s health condition and road surface status in real time.

Leading this development of intelligent manufacturing—or the collaboration between science and engineering—is Yuichi Taniguchi of the Infrastructure Collaboration Development Promotion Office at ANTech.

“Our strength lies in our ability to integrate advanced devices such as sensors from each of our Group companies, through ANTech’s

connected GW. Furthermore, our development capability to provide these as a one-stop complete system, connected with Sumitomo Wiring Systems’ dedicated harness offers an overwhelming advantage that no other company can match.” (Taniguchi)



Yuichi Taniguchi
Director, Infrastructure Collaboration Development Promotion Office
AutoNetworks Technologies, Ltd.

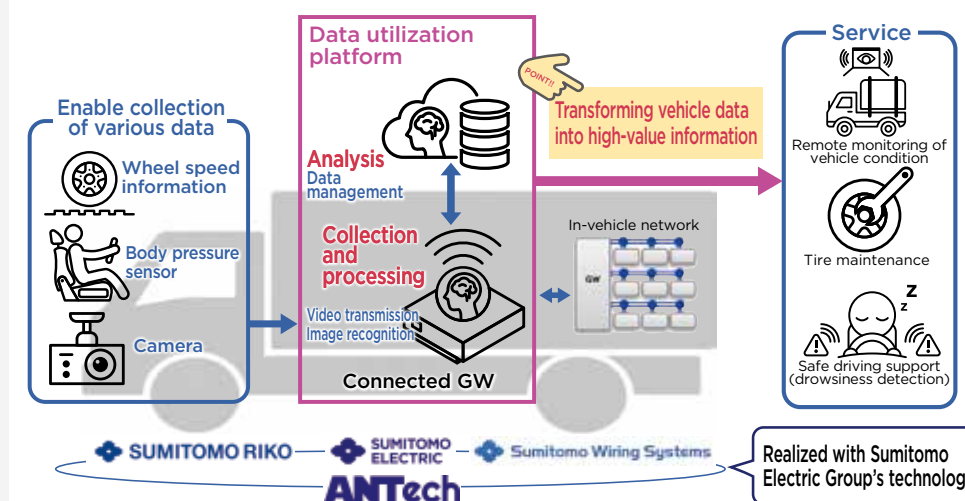
Targeting Social Infrastructure, Learning from the 2024 Logistics Problem

Currently, we are aiming for the commercial adoption of the connected GW in commercial vehicles by 2027 and are conducting demonstrations at logistics sites, including fuel cell truck operation management and safety training.

“Safety technologies once dismissed as not profitable have now become indispensable vehicle equipment. By visualizing ‘invisible risks’ such as early signs of wheel detachment and driver health changes, we aim to make investments in safety the societal standard. I aspire to realize a mobility society where everyone can benefit from these advances.” (Taniguchi)

The proprietary technologies developed independently by each Group company have been connected through the connected GW, creating a single, greater value. The visualization of safety envisioned by the collaboration between science and engineering will continue to evolve to contribute to the next generation social infrastructure.

A Framework for Creating Valuable Information from Data



Takeshi Ueda

Section 2, Osaka Support Group,
Administrative Department, Research Planning Division

- 1992: Joined Sumitomo Electric Industries, Ltd.
- 1993: Medical Electronics Group, System Equipment Plant (CO2 sensors, artificial blood vessel manufacturing, inspection, and sterilization)
- 1994: Biomaterials Group, Section 3, Osaka Administrative Section (Artificial blood vessel manufacturing and development)
- 2003: Electrochemistry Group, Section 2, Osaka Support Group, Research Planning Department (Development of aluminum Celmet products, defect mitigation measures for Ni Celmet)
- 2011: Instructor for the practical technology training for stabilizing plating quality at Itami TTC
- 2022: Electrochemistry Group, Section 2, Osaka Support Group, Development Operation Department, R&D Planning & Administration Division (Development of and defect mitigation measures for FPC board products)
- 2023: Company-wide Expert* certification

* Expert: Sumitomo Electric focuses on the skills that underpin the core of its manufacturing process. To maintain, improve, and ensure the succession of these skills, it certifies employees with essential skills as Experts.

“Be true to the basics, and observe the object carefully. That way, you’ll be able to sense the messages from the object.”

Visualizing the Invisible World and Taking the First Step Toward Standardization

— Seeking the Optimal Solution between Theory and Mass Production —

From a Local Electronics Shop to a Workplace Where Uncompromising Quality Matters for Lives

My roots lie in a neighborhood electronics store run by my family. Since childhood, I helped with air conditioner installation and electrical work. Perhaps because I grew up in that environment, although I attended a regular high school, when it came time to consider employment, I joined Sumitomo Electric because I was familiar with a company that handles electrical wires.

When I joined the company, I thought the main focus was on electric wires and automotive-related fields. However, during a recruitment briefing session, I learned that the company also had a medical business, which piqued my interest and led me to apply. That was the Medical Electronics (ME) Group at the System Equipment Plant. My responsibilities included the manufacturing and development of artificial blood vessels and sensors that measure carbon dioxide and oxygen levels inside blood vessels. Medical devices, particularly artificial blood vessels, are products that directly impact patients’ lives. Even the slightest foreign matter contamination is unacceptable. Although this development department no longer exists, the commitment to absolute quality that I learned there formed the initial foundation of my career as an engineer.

After that, I was transferred to the research and development department and entered the world of surface treatment (plating), where I experienced a major culture shock. At the manufacturing site, the priority was to produce zero defects, but in research and development, deliberately failing was part of the job in order to find a solution. I learned the importance of trying countless conditions and finding the path to the solution from failure data.

I believe that experiencing two completely different approaches—the rigor of the manufacturing floor and the inquisitiveness of research and development—has become the foundation of who I am today as an engineer.

Visualizing the Invisible World

In particular, the development of flexible printed circuits (FPC) was a major turning point for me. These circuits, which bend intricately inside smartphones and PCs, require advanced plating technology. Initially, there were many defects, and it was difficult for the product to take shape as a tangible item. Slight differences in pretreatment, plating thickness, and shape all interacted in complex ways. Therefore, we established a pilot plant, which precedes mass production, to

thoroughly examine all conditions.

Plating is a technology that creates a metal film on the surface of metal products to enhance their performance, durability, and safety. By immersing the product in a solution containing metal ions of the plating metal and applying an electric current, tiny metal particles adhere to the surface, forming a film at micron scale. This process is a battle fought within an “invisible world.”

The temperature, concentration of the solution, along with pretreatment interact in complex ways. Even when the calculated conditions are the same, it is commonplace for the actual results on site to be completely different. Even when research staff say “theoretically, it should be like this,” when we actually try it, the way bubbles form is different or the voltage becomes unstable.

In such instances, I would never simply say, “I couldn’t do it.” Instead, I always report any unusual observations from the site, such as “this is the reaction we’re seeing here” or “the bubbles are coming out differently than usual.”

Sometimes we close the gap between theory and reality through discussion. After all the trial and error, when a mass production plant is finally completed and the product is released to the market, I feel a deep sense of pride as an engineer.

If I had to describe my job in one sentence, I would say it’s about making the invisible plating process visible. Experiments that succeed at the lab level in a beaker are pointless if they can’t be scaled up to mass production. In mass production environments, a system is needed that allows for the consistent production of high-quality goods, even if workers aren’t highly skilled. Therefore, rather than relying on experience alone, we clearly define numerical targets like “temperature at X degrees and process time of Y seconds.” In short, it is important to establish standards for mass production. My role is to act as a bridge between researchers, who create the initial prototype, and mass



Plating practice



Instructing junior staff with a serious gaze

production plants, which scale it up reliably; that is, to ensure that the first crucial step is solid.

Staying True to the Basics and Listening to the Voice of the Object

In 2023, I was certified as an Expert recognized on a company-wide basis. Currently, in addition to honing my own technical skills, I am also focusing on mentoring young engineers as an instructor at SEI University.¹

In my lectures, I teach the fundamentals of plating through practical exercises such as the Hull cell test.² Two things I always tell young people are to “stay true to the basics” and to “observe the object carefully.”

If you try to jump straight into applying concepts or taking shortcuts, you’ll inevitably get lost. First, faithfully adhere to the basic conditions exactly as you were taught. Then, carefully observe the reactions taking place in the solution—the size of the bubbles, changes in color, and sounds. I believe that true adaptability, the ability to handle irregular situations, is only acquired when you can perceive the messages from materials that don’t show up in data.

Going forward, I want to not only focus on plating itself but also deepen my skills in areas such as evaluating the quality of plating—for example, cross-sectional observation and polishing. Furthermore, even when I receive requests for work in areas I haven’t yet experienced, such as automotive parts and wiring harnesses, I want to continue to be a versatile engineer who people can rely on: “If we leave it to Ueda, he’ll figure something out.”

I continue to take steps toward establishing standards by making the invisible microscopic world visible. This is the challenge.

¹: SEI University is the collective name for the education and training programs of the Sumitomo Electric Group.

²: The Hull cell test is an electrodeposition plating test that uses a small trapezoidal test bath (Hull cell). This test quickly visualizes the plating bath condition using a small volume of plating solution.

Teigo Iba



Teigo Iba during his time as Director-General.
The photo was taken in Osaka.
Photo courtesy of Sumitomo Historical Archives



A panoramic view of Shisakajima in 1909. The Shisakajima Smelter began operations in 1905.
Photo courtesy of Sumitomo Historical Archives

— His Management Philosophy and Its Impact on Environmental Initiatives —

Teigo Iba, Sumitomo's second Director-General, was a business leader during the Meiji era and is considered a pioneer in environmental issues in Japan. His activities have had a profound influence on the Sumitomo Group's operations and environmental considerations, and his ideal of the public interest and the common good continues to resonate deeply with contemporary environmental challenges.

Iba joined Sumitomo in 1879 and became the General Manager of the Osaka Head Office. He embraced the company's philosophy and strove to realize its vision, rather than seeking status or wealth. His philosophy, "A gentleman loves wealth, but acquires it by the right means," emphasizes that the pursuit of profit must be consistent with moral principles.

In the mid-Meiji era (around the 1890s), the problem of air pollution caused by sulfur dioxide gas arose at the Besshi Mine, and Iba decided to relocate the smelter approximately 20 km from

Niihama to Shisakajima Island. Moreover, he formulated a forest conservation policy and implemented measures to halt ore roasting and smelting, as well as to convert fuel use from firewood and charcoal to coal.

His afforestation project expanded significantly, with more than a million trees planted each year, but the problem of air pollution persisted even after the smelter started operations. Iba said, "We face real challenges, but we must not forget our ideals," and continued working steadfastly while keeping his ideals in mind. Although he was unable to fully solve the air pollution problem during his lifetime, his efforts embodied a grand vision for the future.

In his later years, Iba said, "Afforestation in Besshi is my true endeavor," which remains an important message for today's environmental challenges. Iba's achievements have contributed to Sumitomo's growth, and his thoughts and actions continue to serve as a guiding light toward building a sustainable future.

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<https://sumitomelectric.com/id>



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