



## We will accelerate our research and development initiatives based on the long-term perspective to realize sustainable value creation as an Innovator in Electronics.

### Sharing a healthy sense of urgency with regard to pursuing proactive research and development

Murata's performance in fiscal 2021 marked a record high thanks to the support of our stakeholders. We believe that today's prosperity is the result of this group's ongoing efforts as well as the blossoming seeds of new technologies that our predecessors created and built upon. My major mission in this regard is to develop new technologies so that when our younger employees who will become Murata's future leaders look back 10 or 20 years from now they will say, "The seeds that the people before us planted brought Murata even greater prosperity."

Murata's legacy commitment to take on the challenge of creating new technologies stems from a long-term management perspective that

the entire company shares a common sense of immediacy. In the constantly evolving electronics industry, it is already too late to start doing something when performance is weak. It is necessary to prepare in advance, envisioning what kind of value we can provide to the future society, while looking clearly ahead at the world 10 to 20 years ahead in terms of long-term technological innovation. Fortunately, Murata has strong intellectual, technological, human, and financial capital built up by our predecessors. We will use these forms of management capital to prepare for the future in research and development now while our performance is strong.

### Seeds of innovation (accidental discovery)

In more than two years of the COVID-19

pandemic, online meetings became widespread, and we have been able to communicate more frequently than before, both domestically and internationally, internally and externally. This has allowed our research and development to proceed without major impact. However, we must take care not to focus only on discussing predetermined agenda items. As President Nakajima often says, important ideas can emerge from casual conversations such as when standing around talking after a meeting.

For example, while discussing a certain topic with a customer, an off-topic issue may arise. As Murata regularly develops technical proposals on such issues, before you know it, that business may become even more important than the project that was underway originally. In other words, what was previously invisible has the potential to grow into an important business.

Looking at Murata from the outside, it may seem that the company has created a profitable business by developing technologies for a market hawse have targeted from the beginning. However, it may be surprising to learn that many of the technologies used in Murata's successful businesses are also derived from things that were invisible. As I mentioned earlier, in the course of conversations including chatting with customers, we proposed Murata's elemental technologies to seed an idea that we had not originally envisioned. This led to unexpected high praise and business as a result. Murata's research and development has long valued this kind of serendipity and has never missed a commercial opportunity to develop its business.

Conversely, we believe that we are at a disadvantage if we rush to respond to issues without a vision. Specifically, if we see a need, it is likely that someone else is already working on it, and we can expect fierce competition. What Murata really needs to do is to increase the number of technologies that respond to issues that few see and create mechanisms that proactively create opportunities for innovation.

### A mechanism to promote innovation – "KUMIHIMO Tech Camp with Murata"

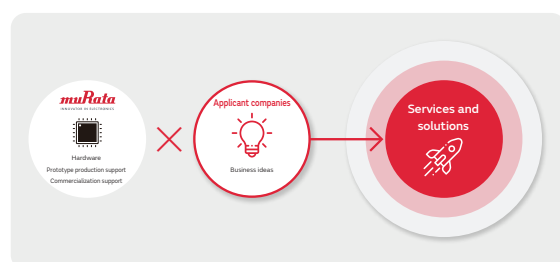
I have personally observed Murata's research and development activities for many years. While our vertically integrated business model is one of our strengths, I feel that if we take a self-reliance approach and keep our technology in a black box too much, we will not be able to accelerate our technological development or generate innovative ideas. Not reaching beyond our current scope is a challenge we must face. Based on this, we would like to create "technology displays" to showcase our technology to customers and partners and promote "knowledge collaboration" to realize innovation. In this issue, I would like to introduce KUMIHIMO Tech Camp with Murata as an initiative we are focusing on.

The concept of this project is to provide Murata's sensors and modules to start-up businesses that have not had much opportunity to use them and to solicit ideas for new products, services, and solutions. To realize these ideas, Murata will work together with companies to support the process of prototyping, mass production, and sales. In other words, the idea is to create and realize new value together with partners by combining Murata's electronic components, the heart of Murata's technological capabilities, with the creative and innovative ideas

of start-up businesses. The project name, KUMIHIMO, is conveys the meaning of creating a new business that contributes to society together with participating partners, just like a kumihimo (braid), which is made by combining several layers of string together.

In the past, start-up businesses were unable to try Murata's products even if they wanted to due to credit management restrictions. To overcome that challenge, we radically changed our thinking and began to proactively create opportunities for start-up businesses to try Murata's products. Through these efforts, we come up with innovative ideas, and we will team with these partners to launch the solutions by leveraging our resources. We started this initiative in Japan last year. Several projects are underway, and we hope to expand the network overseas.

What is important about KUMIHIMO is that we grow together with start-up businesses by leveraging each other's strengths. We consider it most important to build trusting relationships between people, not only in this project, but also in collaboration and cooperation with people outside the company. We will create opportunities through a variety of mechanisms that will trigger "knowledge collaboration" and promote a change in the awareness of engineers within the company.



For details of the KUMIHIMO Tech Camp with Murata, please see here.  
<https://solution.murata.com/ja-jp/collaboration/kumihimo-tech-camp/>

## The Murata-style human resource development for "knowledge collaboration"

Future research and development activities must accelerate co-creation with people outside of the company. To accelerate this process, we believe it is necessary not only to develop technical education programs to improve the skills of engineers, but also to provide opportunities for engineers to be positively stimulated and challenged.

For example, we promote the "Venture Study Abroad Program" as an opportunity for employees to work at an actual venture-backed company for a certain period. Dispatched employees are under great pressure as they are expected to immediately perform active roles by their new location. However, human resources who have experienced trial and error on an individual level with constraints such as time and cost factored in, will have a different attitude toward their work -- and in no small part, a different perspective of their work will bear fruit. If people can use this experience to learn and understand the ideas and work styles of venture-backed companies and start-up businesses that are at the forefront of innovation, they will be able to leverage their experience to launch new businesses in the future and collaborate with other companies to enhance each other's corporate value.

## Creating new business models with "visualization" as the keyword

In the long-term Vision 2030, Murata advocates the practicing of 3-layer portfolio management, with the third layer aiming to create a new solution-centered business model. The important point is not what the clear definition or targets of the third layer are, but whether or not a business model can be established that can be monetized based on Murata's technology.

In proceeding with technological development, I am promoting the concept of visualizing everything around us. One example is AIRSual, which visualizes CO<sub>2</sub> concentrations in real time. This system analyzes CO<sub>2</sub> concentration data collected by sensors based on AI technology and informs users of the need for ventilation several hours in advance. Other products include a fatigue stress meter, which visualizes human fatigue stress, and a soil sensor, which visualizes soil conditions in farmland. Visualization is not the ultimate goal of these products. We believe that new business opportunities lie in identifying who will pay for the use of visualized data and changing people's behavior beyond that.



**Murata's soil sensors**

Achieves simultaneous measurement of electrical conductivity, moisture content, and temperature conditions as environmental indicators related to soil and water quality. Continuous monitoring of such data contributes to solving various issues in agriculture, such as stabilizing yields, maintaining and improving crop quality, and reducing environmental burden by preventing excessive fertilizer application.

When we try to establish a new data visualization business model, we must consider that it has been difficult to quantify cause and effect relationships. We must now imagine how we can add value to that data and provide it to our customers. Naturally, there are areas that our resources alone are not sufficient to handle, and we are accelerating collaboration with companies from other industries, venture-backed companies, and start-up businesses.

## Creating innovations that help resolve social issues

As stated in Vision 2030, Murata is seriously committed to solving social issues. In the challenging fields of environment and wellness, it is clear what needs to be done. However, I believe that no one has yet envisioned what kind of technology will be used to solve the issues. We would like to prepare for the changes we anticipate in 2030 and beyond by considering which of the future technologies are missing from Murata today. To this end, we are implementing the Preparation Project with members who will lead the next generation. Various efforts are underway internally to develop technologies from this long-term perspective. Some of which are disruptive to existing technologies, and we hope to introduce them gradually.

To meet the expectations of our stakeholders, we will continue to be an Innovator in Electronics, mapping a future that has yet to be seen, aiming for further development of our business, and contributing to the realization of a prosperous society. We would like to ask for your continued support.