Demonstration of mass production for social implementation of the ASTERMOTOR drive system （ASTER Co., Ltd.）

City	Year of Establishment	Founder
Yokote city, Akita	2010	Takenobu HONGO

Partner VC	Latest round of Fundraising	Valuation
—	Non-Disclosure	Non-Disclosure

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○ Business Plan

The ASTERMOTOR drive system, which includes an ASTERMOTOR using our proprietary aluminum ASTERCOIL technology and a specially designed inverter, is an incomparably compact, lightweight, and highly efficient system that has already been installed in EVs, drones, and industrial and consumer equipment in small quantities, and we are expanding our business with domestic and overseas partners.

○ Research Outline

We will address the following three themes.

- A. Performance improvement of high occupancy aluminum coil ASTERMOTORs
- B. Performance improvement of controllers optimized for ASTERMOTORs
- C. Improvement about QCD of mass production

In A and B, we will work on development to solve product needs and issues obtained from leading partners in the market for several individual markets where we aim to expand the use of ASTER motors. In C, we will work on improving QCD to enable early market launch of motor development products at low cost. By automating production and inspection and improving the versatility of processes, etc., a system will be created to achieve low-cost mass production and still be able to transfer and expand mass production technology.

Business Area/Field	Research Period	Research Grant Amount	International collaborative technology demonstration
Mobility	DMP 2023～2025FY	JPY 1,011 million	—

As of March,2024

Demonstration of low-cost mass production of high-performance α-Ga2O3 power semiconductors （FLOSFIA INC.）

FLOSFIA

City	Year of Establishment	Founder
Kyoto City	2011	Toshimi Hitora

Partner VC	Latest round of Fundraising	Valuation
—	Series E	JPY 14,500 million

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○ Business Plan

We will develop high-functionality and low-cost technology for power semiconductor devices using α-Ga2O3 (corundum-structured gallium oxide), a new material that demonstrates excellent performance specifically for power semiconductor applications, and by establishing mass production technology that achieves both high functionality and low cost and implementing it in society, we aim to reduce power conversion loss in a wide range of application fields, including electric vehicles, robots, power supplies, and inverters, and expand the market.

○ Research Outline

This R&D project will develop high-functionality and low-cost technology for power semiconductor devices using a new material α-Ga2O3, and solve issues through optimization of device structure and process, reliability evaluation, and customer feedback. By achieving the development items listed below, we aim to clear the important levels of "high functionality" and "low cost".

(1) Small chip size device design and development
(2) Low-cost process design and development
(3) Larger wafer diameter
(4) Chip miniaturization
(5) Ensuring reliability

Business Area/Field	Research Period	Research Grant Amount	International collaborative technology demonstration
Materials	DMP 2023～2025FY	JPY 300 million	—

As of February,2024

Research for mass-production of in-line battery inspection equipment of current density distribution （Integral Geometry Science, Inc.）

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Website :
https://www.igs-group.com/

City	Year of Establishment	Founder
Kobe, Hyogo	2012	Kenjiro Kimura

Partner VC	Latest round of Fundraising	Valuation
SBI Investment	Series C	JPY 34,800 million

Business Area/Field	Research Period	Research Grant Amount	International collaborative technology demonstration
Mobility	DMP 2023～2025FY	JPY 2,496 million	United States(State of Michigan, State of California), Korea, China

○ Business Plan

In recent years, there has been an urgent need to achieve carbon neutrality, and the development of energy storage sites with high energy density has become essential for the effective use of natural energy. Lithium-ion batteries are superior to lead-acid and nickel-metal hydride batteries in both energy density and output density, and demand for these batteries is expected to continue growing. On the other hand, the number of accidents involving battery ignition has been increasing every year, and there have been numerous reports in the media in recent years of product recalls and the like that have been attributed to lithium-ion batteries.With the mission of realizing storage batteries with high energy density for carbon neutrality, we have been developing an in-line inspection system that can inspect batteries from a new perspective of current density distribution, with the vision of establishing a new battery inspection method that guarantees battery quality and eliminates fire accidents caused by the few defective Li-ion batteries that slip through the current inspection system and appear on the market, and to spread this method as an inspection standard throughout the world.
Currently, a test method known as an aging test is widely used in battery outgoing inspection systems. However, the aging test is difficult in principle to screen out potential defective products that have a large local current leakage, because the amount of voltage change is the same in the case of uniformly small current leakage and in the case of locally large current leakage. Unlike the semiconductor manufacturing process, the battery manufacturing process, such as mixing battery active material powder, inevitably results in spatial irregularities, and cells with localized leakage will deteriorate and fail with subsequent charging, discharging, and battery use. Cells with such latent defects, which cannot be screened out by aging tests, are placed on the market, leading to the accident described above. Our storage battery inspection system senses the magnetic field generated by the current inside the battery with ultra-high sensitivity, analytically visualizes the current inside the battery from the obtained magnetic field distribution, and evaluates the localization of the current density inside the battery.The IGS research group is the only group in the world to have successfully developed an analytical method that uses analytical solutions to the fundamental equations for current and magnetic fields, which are the core technologies of inspection systems.IGS has been conducting research and development as a pre-production product, and has succeeded in detecting current irregularities even in battery cells that are determined to be normal in aging tests.By switching from the existing aging test to the IGS inspection system for pre-shipment inspection, quality control with higher accuracy will be realized.

○International collaborative technology demonstration

- Local base establishment
- Relationship development with potential local partner
- Supply chain development

Based on the UN transport regulation UN38.3 and the regulations of individual transporters, there are significant restrictions on the overseas transport of lithium-ion storage batteries, so the demonstration must be conducted in the country where the battery manufacturer is located.The goal is to establish offices in the United States, Korea, and China, where the major storage battery manufacturers are located.
As a means of achieving this, in the first half of the grant period, the company will establish relationships with major overseas manufacturers by setting up overseas offices. In the second half of the grant period, the overseas office will function as a demonstration center. In addition, by building relationships with those involved in process and production management, contract negotiations for the introduction of in-line inspection equipment will be promoted.
Through the exhibitions and conferences we have attended in Korea, Germany, the U.S., and Canada, we have established connections with major storage battery manufacturers in China and Korea, and we have received high interest in our in-line inspection system, for which no alternative method exists, from the top management of these companies. With the funds from the NEDO project, we plan to accelerate the practical application of the in-line inspection system, complete feasibility studies of the in-line inspection system at each company within the period of the grant, and start introducing the in-line system.

As of February,2024

Development of autonomous heavy transport robots for mixed-flow production in a human coexistence environment.（LexxPluss, Inc.）

City	Year of Establishment	Founder
Kawasaki, Kanagawa	2020	Masaya Aso

Partner VC	Latest round of Fundraising	Valuation
DRONE FUND	Series A	Non-Disclosure

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○ Business Plan

While the automation of new EV factories, led by Tesla, is attracting attention, conventional factories in the manufacturing and automotive industries need to be upgraded to highly flexible production facilities that enable mixed production to meet consumer demand for EVs and other products. The goal of this project is to develop a large-scale human-coraborative autonomous transportation system that increases the flexibility of the assembly process of production facilities.

○ Research Outline

This project will improve the durability of robots, adapt to safety standards, handle heavier weights, and adapt to local 5G to meet the needs of a wider range of manufacturing plants. In addition, on the software side, we will develop manufacturing execution system (MES) connectivity and shorten implementation time.

Business Area/Field	Research Period	Research Grant Amount	International collaborative technology demonstration
Energy & Infrastructure	DMP 2023～2025FY	JPY 1,925 million	Non-Disclosure

As of February,2024

Development of plant factory technology and validation of business model to realize sustainable agriculture
（Oishii Farm K.K.）

City	Year of Establishment	Founder
Tokyo	2023	Hiroki Koga

Partner VC	Latest round of Fundraising	Valuation
–	Series B	Non-Disclosure

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○ Business Plan

Our goal is to realize a plant factory platform to deliver safe, secure, high-quality, and delicious agricultural products to people around the world in a stable and inexpensive manner by achieving cost reduction through automation of production processes and development of new cultivation technologies.

○ Research Outline

Through research and development mainly on the following three themes during the period of this project, we will create automated and efficient technologies for production in plant factory to achieve cost reduction while maintaining crop quality, and expand our target market.

(1) Development of cultivation technology
(2) Automation technology development
(3) Expansion into multiple crops

Business Area/Field	Research Period	Research Grant Amount	International collaborative technology demonstration
Food & Agriculture	DMP 2024～2026FY	JPY 2,495 million	United States (New Jersey State)

○International collaborative technology demonstration

・Contract with local partners

To accelerate the developments, collaborate with a partner in the US where there are already personnel and both R&D and production facilities available for testing operations.

As of August,2024

Establishment of mass production technology for a propulsion system using water as a propellant for artificial satellites. （Pale Blue Inc）

Pale Blue

City	Year of Establishment	Founder
Kashiwa City, Chiba Prefecture	2020	Jun Asakawa Kazuya Yaginuma Yuichi Nakagawa

Partner VC	Latest round of Fundraising	Valuation
Incubate Fund	Series B First Close	Non-Disclosure

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Website : https://pale-blue.co.jp

○ Business Plan

In the space industry, satellite constellations that coordinate and collaborate multiple small satellites are becoming mainstream. In this project, we aim to develop and demonstrate mass production technology for propulsion systems using water as a propellant. The goal is to establish a system for the mass production of propulsion systems, meeting the demands of satellite constellation operators for cost-effectiveness, short delivery times, and stable quality.

○ Research Outline

In this project, our goal is to establish a mass production system that is cost-effective, has a short delivery time, and maintains stable quality. We are focusing on the following developments:

①Reduction of the number of components
②Shortening the lead time from order placement to shipment
③Establishment of testing methods and procedures suitable for mass production
④Stabilization of product quality for mass-produced prototypes

Business Area/Field	Research Period	Research Grant Amount	International collaborative technology demonstration
Aerospace	DMP 2023～2024FY	JPY 499 million	—

As of February,2024

Development to expand the introduction of picking and storage solutions into warehouses

（Rapyuta Robotics Company Limited）

City	Year of Establishment	Founder
Koto-ku Tokyo	2014	Gajamohan Mohanarajah Arudchelvan Krishnamoothy

Partner VC	Latest round of Fundraising	Valuation
–	Series C Extension	JPY 24,000 million

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○ Business Plan

Due to EC activation, the 2024 problem and labor shortage, there is an urgent need to improve the efficiency of warehouse operations. We will focus on imrproving productivity of picking operations and efficiency of storage in warehouses.

○ Research Outline

The following development will be carried out regarding automated warehouse solutions, automated forklift solutions, and picking assist solutions.

(1) Expanding use cases
(2) Improving ROI
(3) Enriching operational tools

Business Area/Field	Research Period	Research Grant Amount	International collaborative technology demonstration
Information & Communication	DMP 2024～2025FY	JPY 1,800 million	United States (Illinois State, Arkansas State)

○International collaborative technology demonstration

・Contract with local partners

By introducing our picking assist solution to warehouses in United States, where the entire warehouses are large and the aisles are wide, we will verify whether it is possible to improve productivity, operate automatic charging function, and support a three-shift system in their warehouses.

As of April,2024

Mass production verification of ultra-high energy and ultra-high power density lithium-ion batteries （TeraWatt Technology K.K.）

City	Year of Establishment	Founder
Yokohama	2019	Ken Ogata

Partner VC	Latest round of Fundraising	Valuation
Khosla Ventures LLC	Pre-C	Non-Disclosure

Website : https://www.terawatt-technology.com

○ Business Plan

In the pursuit of realizing a sustainable society, 'decarbonization' has garnered unprecedented attention in human history, with global decarbonization strategies accelerating. Electrification, particularly of various devices, serves as a primary driver of 'decarbonization.' Supporting this effort is the lithium-ion battery industry, particularly the next-generation lithium-ion batteries, which have garnered significant global attention. By 2030, the global production scale of lithium-ion batteries is projected to reach approximately 3,000 GWh, with a market size of around ¥40 trillion. TeraWatt Technology is committed to the mission of 'Electrifying Everything for a Sustainable Society.' We are dedicated to developing next-generation lithium-ion batteries that are significantly lighter, smaller, more powerful, and safer than existing ones, with the aim of commercializing these innovations.

○ Research Outline

We aim to establish a large-scale pilot facility for the pilot production and mass verification of next-generation lithium-ion secondary batteries, capable of high energy density, high power density, and enhanced safety, slated for market entry post-2025. Our objective is to deploy these batteries not only in existing applications such as next-generation electric vehicles and drones but also in new applications like eVTOL (electric vertical takeoff and landing aircraft).

At the large-scale pilot facility, we will conduct validation activities to establish production equipment and process technologies that meet customers' desired performance quality. The following developments will be pursued:

Research and Development Project 1: Verification of production technology and performance reproducibility for three cell capacities.
Research and Development Project 2: Verification of productivity KPIs for single-line production.

Business Area/Field	Research Period	Research Grant Amount	International collaborative technology demonstration
Energy & Infrastructure	DMP 2023～2025	JPY 2,499 million	Japan, United States, Europe, Asia

As of March,2024

Demonstration of mass production of an AI-based high-throughput cell analysis and sorting system
（ThinkCyte K.K.）

THINKCYTE

City	Year of Establishment	Founder
Bunkyo, Tokyo	2016	Waichiro Katsuda

Partner VC	Latest round of Fundraising	Valuation
Nomura SPARX Investment	Series C	Non-disclosure

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○ Business Plan

By constructing and demonstrating a mass production system for instruments equipped with "Ghost Cytometry" technology, which combines machine learning (AI) with new ultrafast imaging technology and microfluidic technology, it enables high-throughput analysis and sorting based on cell morphology and structural information. This helps solve global challenges, such as extending healthy life expectancy while reducing healthcare costs. As a result, it becomes possible to elucidate the pathology of cancer and immune diseases, discover new drug targets, and screen for pharmaceuticals. Furthermore, in the long term, the aim is to realize new cell therapies and regenerative medicine, as well as early diagnosis and personalized diagnosis of diseases.

○ Research Outline

In order to enter mass production of devices for widespread sales to major market customers, the following research and development will be promoted to solve technical issues that are particularly in high demand from customers in terms of quality:

1. Improve discrimination performance and prevent variations in device performance during assembly and adjustment processes in mass production.
2. Reduce the impact of external environmental changes and component degradation due to long-term use, and improve long-term reproducibility.
3. Enhance usability, such as expanding optional functions to meet diverse customer needs.

Additionally, plans are underway to expand the research and development space for mass production and work towards reducing manufacturing costs.

Business Area/Field	Research Period	Research Grant Amount	International collaborative technology demonstration
Healthcare	DMP 2023～2025FY	JPY 1,047 million	North America, Asia

○International collaborative technology demonstration

・ Relationship development with potential local partner

Leveraging the expertise and production capabilities of overseas partners with extensive experience in developing and manufacturing products suited for the global market, we will carry out the design and development of the device and produce prototypes.

As of March,2024

Development of software-embedded electrification modules for autonomous driving （TIER IV, Inc.）

City	Year of Establishment	Founder
Shinagawa, Tokyo	2015	Shinpei Kato

Partner VC	Latest round of Fundraising	Valuation
—	Series B	Non-Disclosure

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○ Business Plan

Develop four software-embedded electrification modules for autonomous vehicles to meet the requirements of autonomous driving level 4 and accelerate its implementation in society by establishing the foundations for future mass production.
1. Vehicle Control Unit software 2. Redundant electric power steering 3. Redundant electric brake 4. Absolute steering angle sensors in electric power steering
Maximize sales in this business area and forge new benchmarks targeting customers such as OEM, ODM, and tier 1 suppliers.

○ Research Outline

Develop the modules comprised of three core technologies by utilizing expertise in designing and developing autonomous vehicles, including autonomous driving software to Drive-By-Wire hardware.
1. Verified Autonomous Driving 2. Redundant Drive-By-Wire 3. Scalable Electrical & Electronic Architecture
Resolve issues related to quality, durability, and individual variability achieving efficiency, safety, and scalability, and provide modules necessary for safe autonomous vehicles, regardless of vehicle model or size.

Business Area/Field	Research Period	Research Grant Amount	International collaborative technology demonstration
Information & Communication	DMP 2023～2025FY	JPY 2,000 million	China

○International collaborative technology demonstration

・ Relationship development with potential local partner

Provide fundamental technologies and requirements to local partners. Organize and advance technical demonstration items in line with the Chinese market environment, regulations, and approval systems through partners, and confirm the technical specifications that adapt to business expansion in China.

As of February,2024

Development of a mass production-ready "Small-scale, decentralized water recycling system for residential use"（WOTA CORP.）

City	Year of Establishment	Founder
Chuo-ku, Tokyo	2014	Yosuke Maeda

Partner VC	Latest round of Fundraising	Valuation
JICN (Japan Green Investment Corp. for Carbon Neutrality)	Series B	Non-Disclosure

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○ Business Plan

To create a structural solution to the world's water problems, this R&D project will advance the development of a mass production-ready "small-scale, decentralized water recycling system for residential use" (achieving significant reduction of water treatment costs and versatility of design to be used around the world). This system will offer the advanced treatment capabilities of large-scale facilities but on a scale 100,000 times smaller and feature autonomous control technology for water purification.

○ Research Outline

In order to establish small-scale decentralized water recycling systems as a new standard for water infrastructure that can be used economically and universally around the world, R&D will be carried out with a focus on significantly reducing water treatment costs.

Business Area/Field	Research Period	Research Grant Amount	International collaborative technology demonstration
Energy & Infrastructure	DMP 2023～2025FY	JPY 2,498 million	Island countries, Arid regions in developed countries

○International collaborative technology demonstration

・Contract with local governments
・ Local base establishment
・ Relationship development with potential local partner
・Supply chain development

By conducting technical verifications overseas, where lifestyles and housing environments differ from those in Japan, the project will realize a design that can achieve stable performance under diverse environmental and usage conditions, clarify differences between domestic and overseas operations, and accumulate experience and know-how to build efficient operations overseas.

As of February,2024