

Specialized Batteries and Others



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Review of the Fifth Mid-Term Management Plan

Sales and profit in excess of plan achieved due to higher sales of aircraft batteries and other factors

The Specialized Battery and Other business includes profit, mainly from GS Yuasa Technology, which develops, produces, and sell specialized batteries for use in submarines, satellites, and other applications, as well as company expenses, but the explanation here focuses on the specialized batteries business. In fiscal 2022, which was the final fiscal year of the Fifth Mid-Term Management Plan, GS Yuasa Technology achieved the highest net sales and operating profit since its establishment, and the segment as whole achieved results in excess of plans. The causes were a peak in repair (replacement) demand for aircraft lithium-ion batteries and an increase in the delivery volume for new aircraft. In addition, foreign exchange gains due to the weaker yen also contributed. Overseas sales of lithium-ion batteries for satellites also contributed to the increase in profit. The ability of lithium-ion batteries for satellites to steadily generate profits despite the disappearance of large projects was a significant achievement. In addition, we received orders for and delivered prototype next-generation lithium-ion batteries for submarines. We will continue with commercialization of these products so that they can grow into a pillar of business under the Sixth Mid-Term Management Plan and beyond.

Specialized batteries are often developed through projects that last for extended periods, and we are steadily developing next-generation lithium-ion batteries for satellites and submarines as well as lithium-ion batteries for electric aircraft.

Measures to Achieve Vision 2035 and the Sixth Mid-Term Management Plan

For Aircraft Applications Responding continuously to demand

Lithium-ion batteries for aircraft will be a pillar of sales under the Sixth Mid-Term Management Plan. We are developing the production systems that will enable us to respond reliably to customer requirements. We are also actively expanding sales by developing new products and acquiring new customers, and we will continue to focus our efforts in these areas.

We are developing lithium-ion batteries for use in electric aircraft with the research and development departments under a project of the New Energy and Industrial Technology Development Organization (NEDO). The GS Yuasa R&D Center is responsible for the polar plate design and confirming performance, and GS Yuasa Technology is handling commercialization tailored to customer applications. We are currently in the prototype stage, and we will continue this work to ensure successful development.

For Defense Applications Reliably responding to demand against a backdrop of reinforcement of the defense industry

Since fiscal 2015, lithium-ion batteries have been used instead of lead-acid batteries in Japan's newly-manufactured submarines, and since we started mass producing lithium-ion batteries for submarines in March 2017, we have improved quality. We will maintain stable supplies in the future to respond to continuous demand. Today, high-capacity and cost-competitive batteries are required, and in response, we are developing next-generation lithium-ion batteries for submarines. We are creating structures that will enable the Company to generate profits even during the development

stage.

In conjunction with the reinforcement of Japan's defense capabilities, demand for thermal batteries for defense applications is expected to grow to about five times the current level. To meet this demand, we plan to prepare production lines under the Sixth Mid-Term Management Plan and to expand production capacity even further under the Seventh Mid-Term Management Plan. In addition, we will negotiate with the Ministry of Defense and other customers to improve profitability in fiscal 2023. We will also make efforts to reduce costs, improve production efficiency, and enhance development efficiency by adopting common specifications, improving existing products, and taking other measures.

For Space Applications Increasing sales in the rapidly-growing satellite field

The Group began developing lithium-ion batteries in the late 1980s and has been manufacturing lithium-ion batteries for space applications since 1998. Our products, which were created based on the knowledge acquired through numerous projects and the results of research and development, have been highly praised. In Japan, nearly all of the satellites launched by the Japan Aerospace Exploration Agency (JAXA) have been equipped with our products, as have many overseas commercial satellites. We receive many inquiries from Japan and overseas and expect this business to expand even further.

Until now, launching large satellites and using them for 10 to 15 years has been the norm in the satellite business, but more frequent launches and shift to smaller satellites are expected in the future. We are developing plans to respond to this change in the business in collaboration with a subsidiary in the U.S., and we plan to develop business using a business model whereby cells are manufactured in Japan, modules are produced by a subsidiary in the U.S., and products are customized according to the specific needs of overseas customers.

Refining technology development capabilities in response to high-level customer demands and raising production efficiency

In fiscal 2023, we announced a policy of developing 10 new products. Our specialized batteries are used under extremely harsh environments from the deep sea to outer space. Also, the performance required varies for each product ordered. Since these products involve high levels of technical difficulty and are not mass-produced, automation of production lines is also challenging. Nonetheless, we believe that we can contribute to the development of new public infrastructure by leveraging to the greatest possible degree GS Yuasa Technology's strengths in the form of advanced technological capabilities, cutting costs, and raising production efficiency. To achieve this, we will continue to meet customer expectations based on an attitude of solving problems while tackling new challenges.

Main Initiatives of the Sixth Mid-Term Management Plan

For Defense Applications

- Stable supply of lithium-ion batteries for submarines
- Develop increased production systems of thermal batteries for defense applications

For Aircraft Applications

- Expand sales by developing new products and acquiring new customers
- Develop lithium-ion batteries for use in electric aircraft

For Space Applications

- Develop increased production systems of lithium-ion batteries for satellites use
- Promote product development in response to changes in the satellite business

Specialized Batteries and Others

Sixth Mid-Term Management Plan

Business Policy

Contribute to the building of new public infrastructure through batteries with the highest level of performance and quality

Strategies and Important Tasks

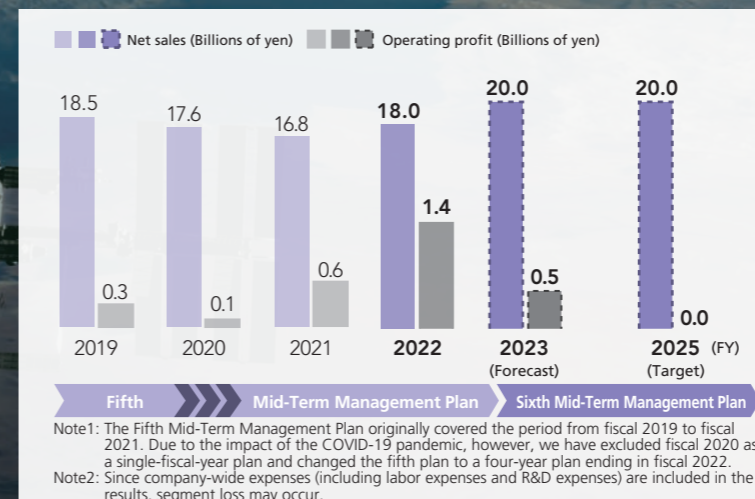
Specialized batteries business

- Improve profitability due to efforts to strengthen the foundation of the defense industry
- Development of next-generation lithium-ion batteries for submarines
- Response to expanded demand of lithium-ion batteries for aircraft
- Expand sales of lithium-ion batteries for satellites

Others

- Increase in environmental response costs
- Increase in costs for DX and creation of new business

Net Sales, operating income, operating profit ratio



SWOT

Strengths	Opportunities
<ul style="list-style-type: none"> ● The only one specialized batteries manufacturers in Japan ● High technology and reliability 	<ul style="list-style-type: none"> ● Formulation of the Three Principles on Defense Equipment Transfer ● Expansion of new market such as for space use
Weaknesses	Threats
<ul style="list-style-type: none"> ● Delay in digitalization ● Aging equipment 	<ul style="list-style-type: none"> ● Higher costs due to increased development difficulty ● Increased social responsibility

Review of the Fifth Mid-Term Management Plan

We strove to provide stable supplies of batteries for submarines in accordance with contracts and are steadily developing next-generation batteries. Passenger demand in air travel is recovering, and sales to airlines (for replacement) of batteries for aircraft were firm.

- Achievements**
- For Submarine Applications
Completed delivery of prototype next-generation lithium-ion batteries for submarines
 - For Aircraft Applications
Increase in orders received from airlines in response to demand for replacement

Outlook for the Sixth Mid-Term Management Plan Period

During the term of the Sixth Mid-Term Management Plan, demand for lithium-ion batteries for submarines is expected to remain firm, while demand from airlines (for replacement) for lithium-ion batteries for aircraft will expand and volumes will increase.

For Submarine Applications

- Steady results

For Aircraft Applications

- Increase in response to demand from airlines (for replacement)

Outlook for fiscal 2023

In fiscal 2023, although orders for lithium-ion batteries for submarines will be stable, it is expected that operating profit will decrease slightly. Demand for lithium-ion batteries for aircraft will remain solid.

For Submarine Applications

- Slight decline in operating profit due to effects of soaring prices for raw materials

For Aircraft Applications

- Sales volumes to airlines (for replacement) will remain solid

TOPIC

Numerous lithium-ion batteries from GS Yuasa Technology used for space applications



May 2020

Kounotori/ International Space Station

Lithium-ion batteries manufactured by GS Yuasa Technology were loaded onto the H-II Transfer Vehicle (HTV) Kounotori. The HTV delivered lithium-ion batteries manufactured by GS Yuasa Technology to the International Space Station (ISS) for installation.



The International Space Station

October 2021

New quasi-zenith satellite "Michibiki-1R"

As was the case with the Cabinet Office's Michibiki-1 to Michibiki-4 quasi-zenith satellites, the Michibiki-1R satellite, which was launched in October 2021 as the first successor to the earlier Michibiki satellites, was equipped with lithium-ion batteries from GS Yuasa Technology. The Michibiki-1R will replace the Michibiki-1 and take over the role of providing satellite positioning services and is expected to transmit positioning signals with even greater accuracy.



Michibiki-4 (Source: Cabinet Office of Japan's Quasi-Zenith Satellite System website)

November 2021

Epsilon-5 Launch Vehicle

The common lithium-ion batteries for launch vehicles installed in the Epsilon-5 Launch Vehicle were developed under a contract with IHI Aerospace Co., Ltd. and have been continuously used since the first Epsilon was launched in 2013. The batteries were installed in stages 1, 2, and 3 of the Epsilon-5 Launch Vehicle to supply electricity to control equipment and other onboard systems.



Image of the Epsilon-5 Launch Vehicle in flight (©JAXA)

Relevant data

