Harmonic Drive Systems Inc.

Q2 Financial Results Briefing for the Fiscal Year Ending March 2024

November 17, 2023

Event Summary

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[Venue Size]	
[Participants]	

[Number of Speakers]	3	
	Akira Nagai	President and CEO
	Akira Maruyama	Representative Director and Senior Managing Executive Officer, General Manager of Corporate Planning Division
	Kazutoshi Kamijoh	Director and Executive Officer, General Manager of Finance Accounting and Tax Division
[Analyst Names]*	Yuichiro Isayama	Goldman Sachs
	Toshiharu Morota	Okasan Securities
	Hikaru Mizuno	UBS Securities

*Analysts that SCRIPTS Asia was able to identify from the audio who spoke during Q&A or whose questions were read by moderator/company representatives.

Presentation

Moderator: Thank you for your patience. It is now time to commence the quarterly financial results briefing session for 2Q of the fiscal year ending March 2024 of Harmonic Drive Systems Inc.

First of all, let me introduce today's attendees. Mr. Akira Nagai, President, and CEO. Mr. Akira Maruyama, Representative Director and Senior Managing Executive Officer, General Manager of Corporate Planning Division. Mr. Kazutoshi Kamijoh, Director and Executive Officer, General Manager of Finance Accounting and Tax Division.

In today's presentation, Mr. Kamijoh, Director, will provide an overview of the financial results and forecast for the current fiscal year, and Mr. Nagai, President, will provide an outlook for the future. Today's presentation materials are also available on our website. Today's briefing is also available as an audio webcast.

If you have any questions during the Q&A session, please raise your hand and a person with a microphone will come to you. If you are joining us via the web, please press the Raise Your Hand button in the lower left corner of the screen. The questioner will be nominated by me, the moderator. We also welcome your questions via chat. Please understand that we may not be able to answer all questions due to time constraints.

Now, Director Kamijoh, please begin.

Kamijoh: My name is Kamijoh and I was just introduced to you. Thank you for taking time out of your busy schedule today to attend our financial results briefing session for 2Q.

I will now give an overview of the financial results for 2Q and the full-year earnings forecast, in line with the materials uploaded on our website today.

Consolidated results for 1H FY03/24 (Vs. original forecasts)

(millions of yen)

	Original forecasts (announced Aug. 8)		1H FY03/24 (actual)		Vs. original forecasts	
	Amount	Percent (%)	Amount	Percent (%)	Change	Rate (%)
Net sales	28,500	100.0	28,765	100.0	265	0.9
Operating income	900	3.2	872	3.0	▲27	▲3.0
Ordinary income	900	3.2	1,163	4.0	263	29.3
Net income	0	—	313	1.1	313	—
EPS (yen)	0	—	3.29	—	3.29	—

Net income (loss) refers to net income (loss) attributable to owners of parent.

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First, here is a summary of the financial results for 2Q. Now, please see page two on the bottom right.

The consolidated results for H1 of the fiscal year compared to the forecast announced on August 8, 2023, are as shown below. Both sales and profits were generally in line with forecasts.

Consolidated results for 1H FY03/24 (year-on-year change)

(millions of yen)	1H FY03/23		1H FY03/24		Year-on-year change	
	Amount	Percent (%)	Amount	Percent (%)	Change	Rate (%)
Net sales	33,451	100.0	28,765	100.0	▲4,686	▲14.0
Operating income	4,640	13.9	872	3.0	▲3,768	▲81.2
Ordinary income	4,924	14.7	1,163	4.0	▲3,761	▲76.4
Net income	2,938	8.8	313	1.1	▲2,625	▲89.3
EPS (yen)	30.74	—	3.29	—	▲27.45	▲89.3
Capital investment	7,293	—	1,760	—	▲5,532	▲75.9
Depreciation	4,420	—	4,946	—	526	11.9
R&D expenses	1,629	—	1,659	—	30	1.8

Net income (loss) refers to net income (loss) attributable to owners of parent.
Depreciation includes depreciation of tangible assets and amortization of intangible assets and goodwill.

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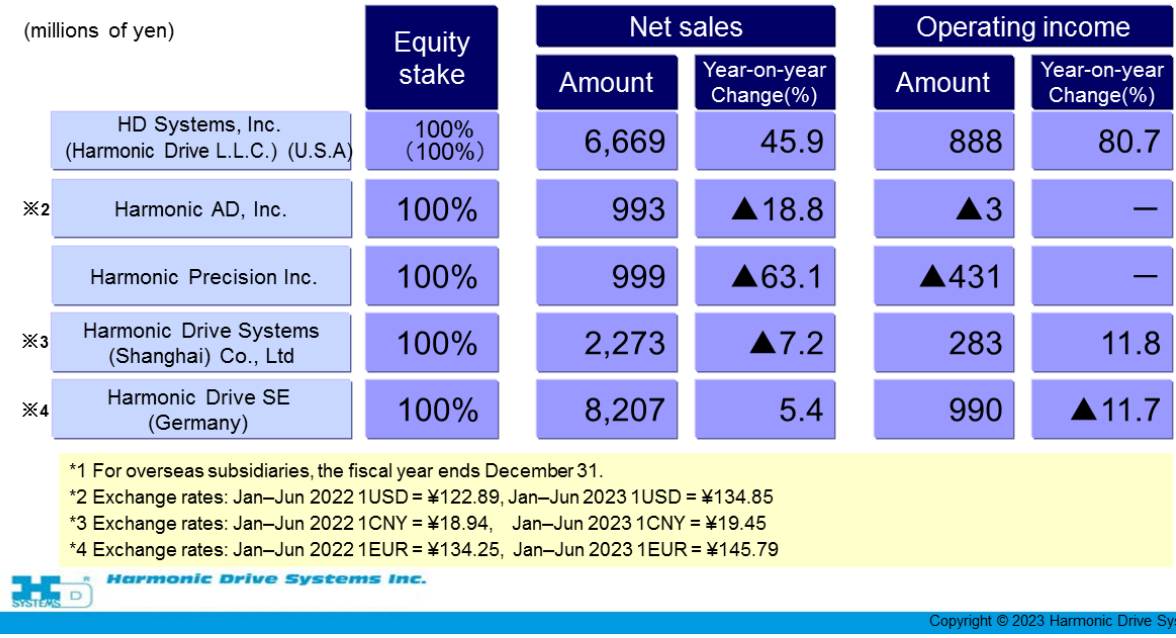
Next, please see page three. Here are the consolidated results compared to the same period last year.

Unfortunately, the results for H1 of the current fiscal year showed a significant decrease in both sales and profits. In H1 of last year, supported by a high level of order backlogs, we maintained high-capacity utilization at our facilities in Japan, the U.S., and Germany. In a complete turnaround, this fiscal year, although the U.S. and Germany maintained strong performance, profitability deteriorated significantly due to lower capacity utilization in Japan, the core of our group's profitability.

Capital investment was high last year due to the addition of a production line at the Ariake Plant in Nagano Prefecture for the purpose of raising production capacity but was low this year due mainly to maintenance and replacement investment.

Performance of main group companies in 1H FY03/24



(millions of yen)

		Equity stake	Net sales		Operating income	
			Amount	Year-on-year Change(%)	Amount	Year-on-year Change(%)
	HD Systems, Inc. (Harmonic Drive L.L.C.) (U.S.A)	100% (100%)	6,669	45.9	888	80.7
※2	Harmonic AD, Inc.	100%	993	▲18.8	▲3	—
	Harmonic Precision Inc.	100%	999	▲63.1	▲431	—
※3	Harmonic Drive Systems (Shanghai) Co., Ltd	100%	2,273	▲7.2	283	11.8
※4	Harmonic Drive SE (Germany)	100%	8,207	5.4	990	▲11.7

*1 For overseas subsidiaries, the fiscal year ends December 31.
*2 Exchange rates: Jan–Jun 2022 1USD = ¥122.89, Jan–Jun 2023 1USD = ¥134.85
*3 Exchange rates: Jan–Jun 2022 1CNY = ¥18.94, Jan–Jun 2023 1CNY = ¥19.45
*4 Exchange rates: Jan–Jun 2022 1EUR = ¥134.25, Jan–Jun 2023 1EUR = ¥145.79

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Next, please see page four. Here are the results of the main group companies.

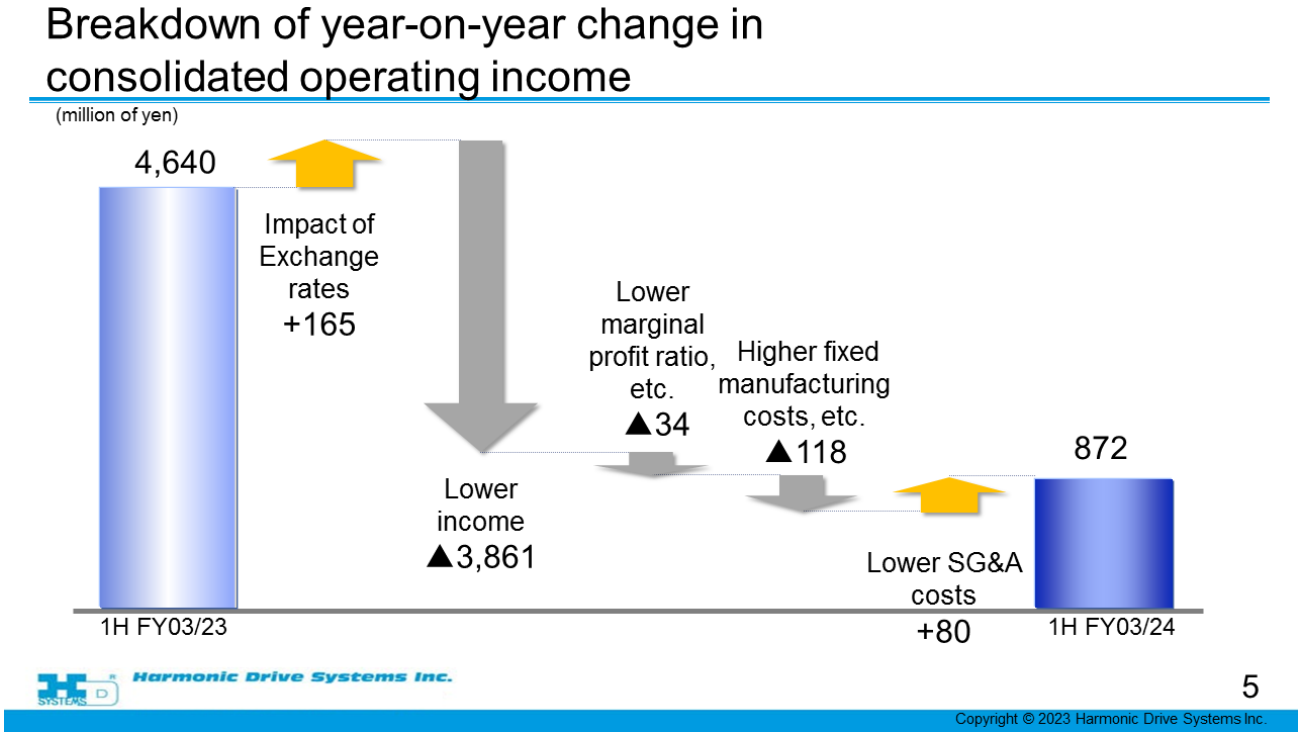
First is the U.S. subsidiary. Sales increased on a US dollar basis due to higher sales for semiconductor manufacturing equipment and medical equipment, combined with the effect of currency translation due to the weaker yen, resulting in a significant increase in sales. In terms of profit, increased production led to higher personnel costs, depreciation, and other expenses, but these were more than offset by increased sales.

Next, Harmonic AD, which manufactures planetary reduction gears, posted declines in both sales and profits as capacity utilization declined due to lower demand for gearheads for motor manufacturers and semiconductor manufacturing equipment.

Next is Harmonic Precision, another domestic subsidiary. This company manufactures special bearings called cross roller bearings, which are essential for our products. This year, the Company was forced to record an operating loss for a turnaround due to the impact of a sharp decline in the requirement for these bearings.

Next is the sales subsidiary in China. Sales decreased due to soft demand from European and Chinese local robot manufacturers, but income increased mainly due to the sales mix.

Finally, there is the German subsidiary. Sales remained at the same level as the previous year, mainly for robots and semiconductor manufacturing equipment. Profits were also down due to higher labor and electricity costs.



Next, please see page five. Here are the factors for the increase/decrease in consolidated operating income.

First, the foreign exchange impact from the weaker yen was JPY165 million in a positive direction. On the other hand, the impact of the revenue decline was a negative JPY3.8 billion, while the impact of marginal profit margin and other factors remained almost unchanged.

Manufacturing fixed costs were JPY118 million on the minus side due to an increase in depreciation expenses resulting from capital investments made in the previous fiscal year and an increase in personnel expenses at overseas subsidiaries. SG&A expenses decreased mainly in packaging and shipping costs and labor costs in Japan and came in at JPY80 million on the plus side.

Non-consolidated results for 1H FY03/24 (year-on-year change)

(millions of yen)	1H FY03/23		1H FY03/24		Year-on-year change	
	Amount	Percent (%)	Amount	Percent (%)	Change	Rate (%)
Net sales	24,361	100.0	15,114	100.0	▲9,246	▲38.0
Operating income	4,207	17.3	503	3.3	▲3,703	▲88.0
Ordinary income	4,633	19.0	3,299	21.8	▲1,333	▲28.8
Net income	2,889	11.9	3,028	20.0	139	4.8
EPS (yen)	30.39	—	31.86	—	1.47	4.8
Capital investment	6,277	—	959	—	▲5,318	▲84.7
Depreciation	1,924	—	2,228	—	303	15.8
R&D expenses	1,173	—	1,087	—	▲85	▲7.3

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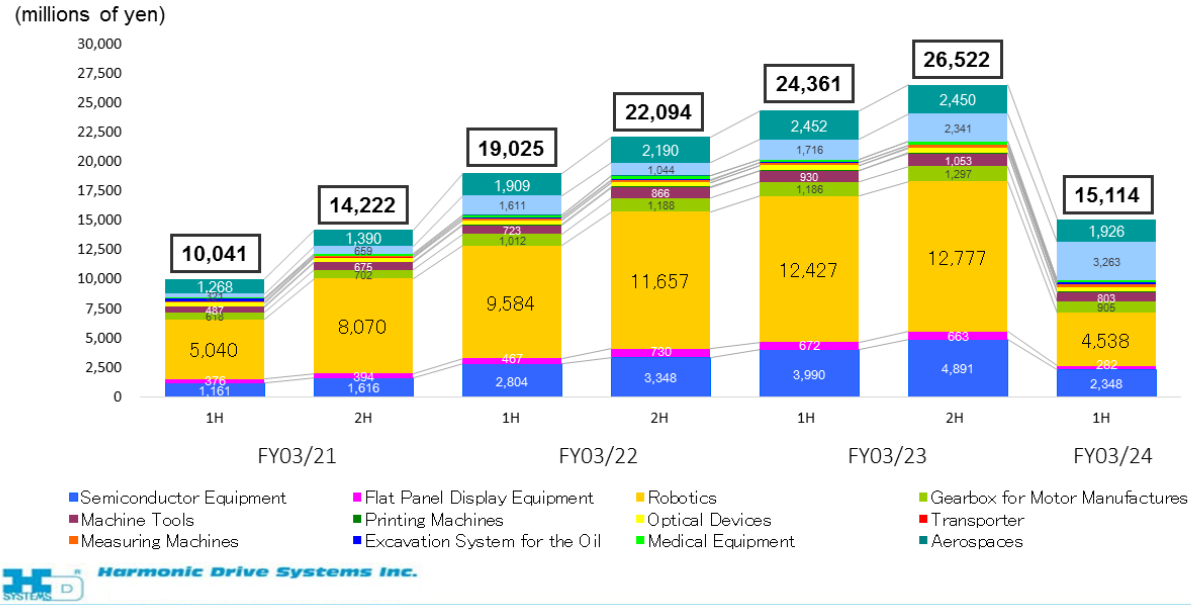
The next page six. As you can see, non-consolidated results also showed a decrease in both sales and profit.

Since both consolidated and non-consolidated operating income were affected in the JPY3.7 billion range, the decrease in non-consolidated income had a significant impact on consolidated income.

Non-consolidated net sales by application



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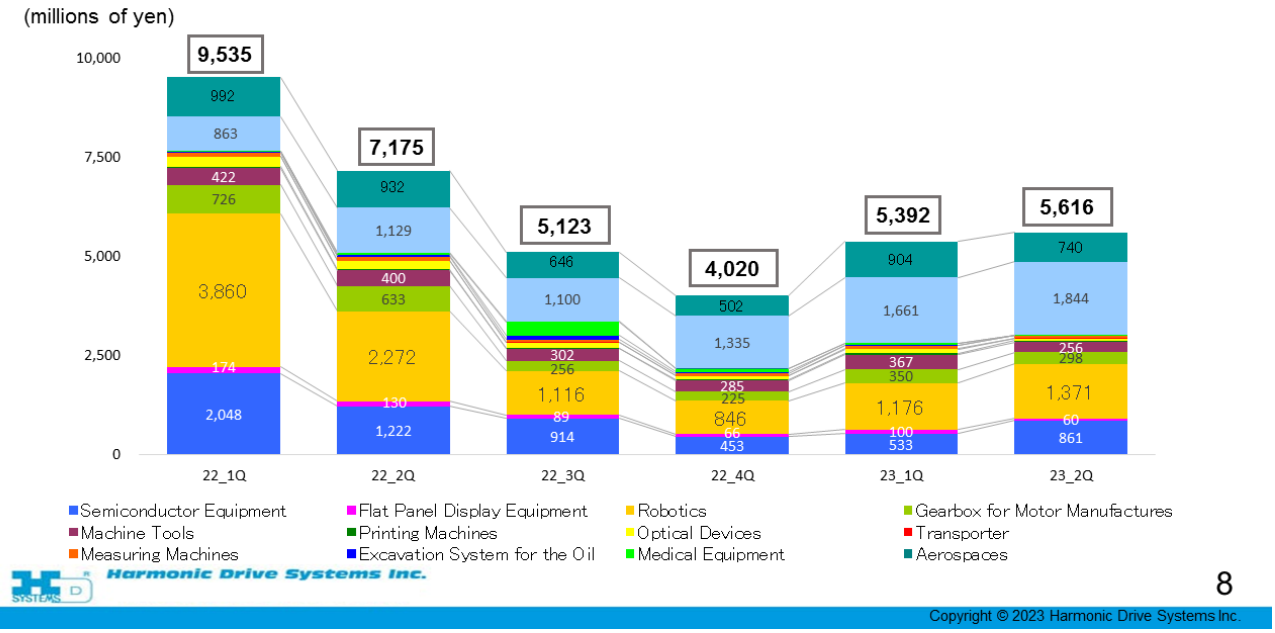
Next, please see page seven. Here are the non-consolidated sales by application. As you can see, H1 of this year resulted in the first revenue decline in six semi-annual periods. The main reason for this is that the backlog of orders has decreased significantly since the beginning of this fiscal year due to the continuous decline in orders since last year, especially sales for industrial robots and semiconductor manufacturing equipment.

As you are all aware, both industrial robots and semiconductor production equipment are in an adjustment phase of demand in the industry as a whole, and inventory adjustments of product inventories related to our products are also taking place, which are the factors that led to the large decrease in sales.

On the other hand, sales to the automotive market grew steadily due to the positive impact of the sequential resolution of our customers' semiconductor procurement issues.

In our plants in Japan, the current capacity utilization rate of production lines for reduction gears for industrial equipment is extremely low, but thanks to this, the capacity utilization rate of lines for automotive equipment has increased compared to the previous fiscal year, contributing to revenues.



Next, please see page eight. This is our non-consolidated quarterly order volume by application.

As you can see, the order trend, which had been in a downward phase throughout the period, bottomed out in 4Q of the previous fiscal year, and orders increased, albeit slowly, in 1Q and 2Q of the current fiscal year.

However, this recovery in orders, with the exception of orders for automotive applications, is not due to a recovery in the overall end-market for robots and semiconductor manufacturing equipment but is mainly due to progress in inventory adjustments of our products at our customers and distributors, and spot orders.

The inventory adjustment situation of customers and distributors varies from customer to customer and from robot model to robot model, using robot manufacturers as an example, and it is difficult to classify them by the differences in business distribution channels, such as direct sales or distributors, or by region, or by vertical or SCARA criteria.

Although a minority of customers have already completed their inventory adjustment, some customers may take up to a year to complete their inventory adjustment based on the current production level.

Although it will depend on future market conditions, we expect that the majority of our customers will complete their inventory adjustments in the spring of 2024 or later, so we anticipate that the trend of our orders will progress gradually for a while as inventory adjustments are completed.

As for cancellations, we do not anticipate a significant risk of occurrence in the future since the backlog of orders with long delivery terms has been decreasing.

Next, page nine is the consolidated balance sheet. Please check later with the earnings report for more details.

The same applies to page 10.

Page 11 is cash flow. The same applies here.

Consolidated performance forecasts for full-year FY03/24

(millions of yen)	FY03/23		FY03/24 (forecast)		Year-on-year change	
	Amount	Percent (%)	Amount	Percent (%)	Change	Rate (%)
Net sales	71,527	100.0	55,000	100.0	▲16,527	▲23.1
Operating income	10,224	14.3	▲400	▲0.7	▲10,624	—
Ordinary income	10,757	15.0	▲200	▲0.4	▲10,957	—
Net income	7,595	10.6	▲800	▲1.5	▲8,395	—
EPS (yen)	79.67	—	▲8.41	—	▲88.09	—
Capital investment	9,236	—	6,300	—	▲2,936	▲31.8
Depreciation	9,574	—	9,900	—	325	3.4
R&D expenses	3,274	—	3,500	—	225	6.9

Assumed exchange rate for FY03/23 forecasts: 1USD = ¥140.00 1EUR = ¥149.50 1CNY = ¥19.50
Net income (loss) refers to net income (loss) attributable to owners of parent.
Depreciation includes depreciation of tangible assets and amortization of intangible assets and goodwill.

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I will now continue to explain our full-year forecasts.

Now, please see page 13. Here is a comparison of the previous year's results with the newly announced forecast.

We have been undecided about the full year forecast for the current fiscal year and consolidated earnings forecast mainly because of the difficulty in forecasting the future of orders, but we have recently announced the forecast figures you see.

Regrettably, we expect to record a loss in the operating income segment. As was the case in H1, we expect our overseas subsidiaries to remain profitable for the full year. On the other hand, the Japan region, which is the main earnings driver, is facing a difficult business environment and is expected to post a loss for the year.

Performance forecasts on main group companies for full-year FY03/24

(millions of yen)

		Equity stake	Net sales		Operating income	
			Amount	Year-on-year Change(%)	Amount	Year-on-year Change(%)
※2	HD Systems, Inc. (Harmonic Drive L.L.C.) (U.S.A)	100% (100%)	13,000	19.5	1,500	4.8
	Harmonic AD, Inc.	100%	1,900	▲17.9	▲100	—
	Harmonic Precision Inc.	100%	1,800	▲65.8	▲1,000	—
※3	Harmonic Drive Systems (Shanghai) Co., Ltd	100%	4,100	▲15.7	400	12.8
※4	Harmonic Drive SE (Germany)	100%	16,500	3.3	2,050	▲2.7

*1 For overseas subsidiaries and affiliates, the fiscal year ends December 31.
*2 Exchange rates: Jan–Dec 2022 1USD = ¥131.43, Jan–Dec 2023 1USD = ¥140.00
*3 Exchange rates: Jan–Dec 2022 1CNY = ¥19.48, Jan–Dec 2023 1CNY = ¥19.50
*4 Exchange rates: Jan–Dec 2022 1EUR = ¥138.04, Jan–Dec 2023 1EUR = ¥149.50

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Next, please see page 14. Here are the full-year forecasts for the major groups.

The U.S. subsidiary will continue to show a robust performance and is expected to achieve YoY increases in both sales and income for the full year. By application, sales growth is expected to be driven by medical equipment and semiconductor manufacturing equipment.

Next is Harmonic AD, Inc. Following H1 of the fiscal year, we expect demand for planetary gear reducers to remain flat in H2 of the fiscal year, so we anticipate lower sales and profits compared to the previous fiscal year.

Next is Harmonic Precision Inc. in Japan. Since the production volume of cross roller bearings is expected to decrease significantly from the previous fiscal year, it is inevitable that sales will remain below the break-even point in H2 of the fiscal year, and an operating loss of JPY1 billion is projected for the full year. On the other hand, the bearings manufactured by this company will be an essential part of our products, so we will maintain the basic production capacity and prepare for the coming phase of increased production.

Next is the Chinese subsidiary. Although we expect the FA market in China to continue to face difficult conditions in general, we expect to achieve the same level of performance in H2 as in H1 by accumulating orders from European and Japanese robot manufacturers, Chinese robot manufacturers, and other spot orders.

Finally, there is the German subsidiary. Although demand is in a gradual adjustment phase in general for industrial robots, human-collaborative robot manufacturers, and machine tools, we expect to maintain the same level of performance as the previous year by focusing on accumulating small-lot orders and other efforts.

Non-consolidated performance forecasts for full-year FY03/24

(millions of yen)

	FY03/23		FY03/24 (forecast)		Year-on-year change	
	Amount	Percent (%)	Amount	Percent (%)	Change	Rate (%)
Net sales	50,883	100.0	28,000	100.0	▲22,883	▲45.0
Operating income	8,927	17.5	▲500	▲1.8	▲9,427	—
Ordinary income	9,378	18.4	2,300	8.2	▲7,078	▲75.5
Net income	6,880	13.5	2,300	8.2	▲4,580	▲66.6
EPS (yen)	72.17	—	24.19	—	▲47.98	▲66.5
Capital investment	7,557	—	4,400	—	▲3,157	▲41.8
Depreciation	4,408	—	4,700	—	291	6.6
R&D expenses	2,430	—	2,400	—	▲30	▲ 1.2

Assumed exchange rate for FY03/23 forecasts: 1USD = ¥140.00 1EUR = ¥149.50 1CNY = ¥19.50
Depreciation includes depreciation of tangible assets and amortization of intangible assets and goodwill.

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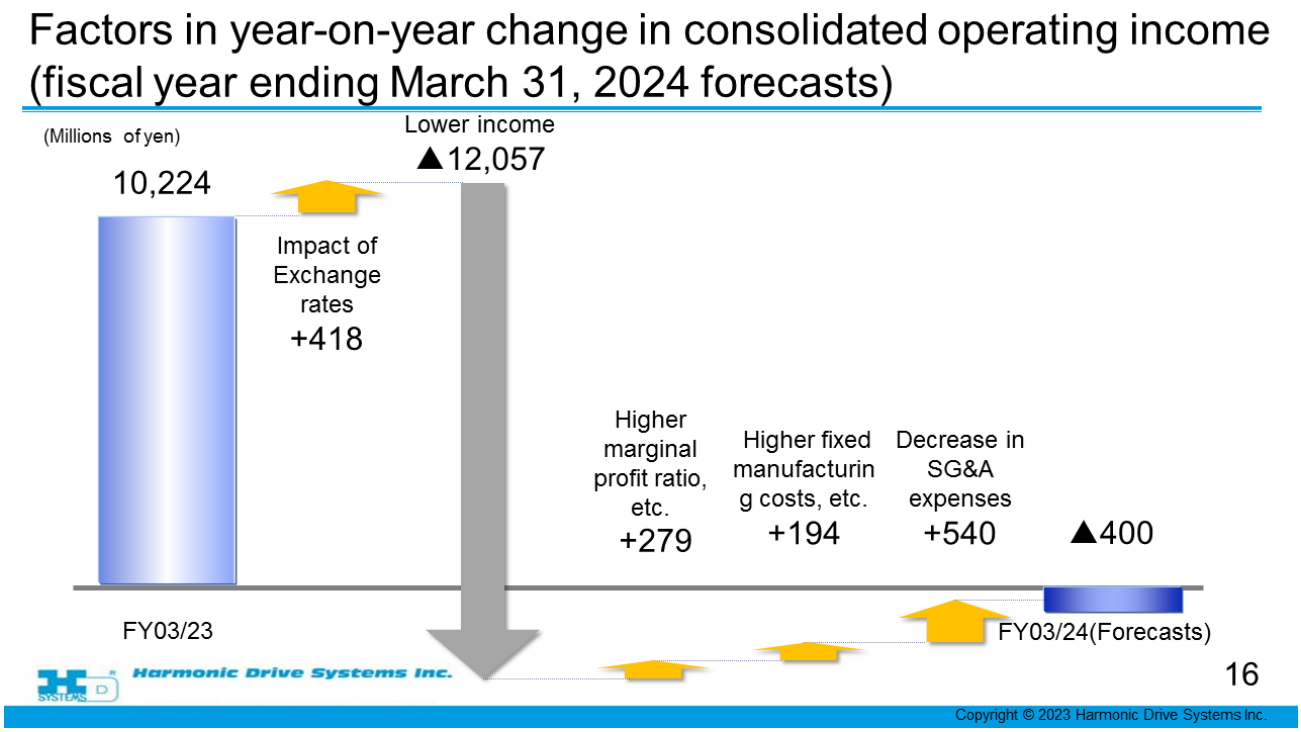
Next, please see page 15. This is a non-consolidated comparison with the previous fiscal year.

Given the significant 45% decrease in sales expected from the previous fiscal year, we reluctantly forecast a loss of JPY500 million at the operating income level.

Regarding order trends, which are the premise for the full-year forecast, we expect orders to continue to increase, albeit at a slower pace, in 3Q and 4Qthe following H1. Unfortunately, the speed of inventory adjustment has been slow due to the low level of production plans of many customers, and it is still difficult to predict the timing of a full-fledged recovery in orders, but we feel that we are making steady progress toward the exit from the tunnel.

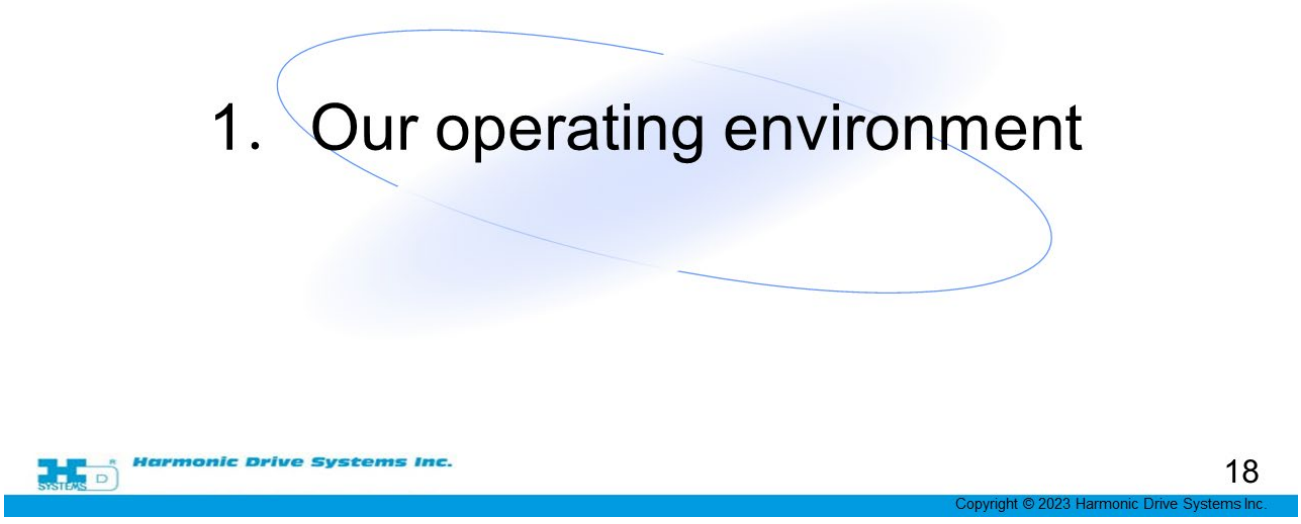
We will take this opportunity to improve production efficiency and quality, as well as raise our front-line capabilities through human resource training, so that we can show a solid increase in profits and improved margins in the next phase of revenue growth.



Finally, page 16 shows the factors that contributed to the increase or decrease in consolidated operating income.

The current fiscal year is expected to be significantly impacted by a decrease in profits associated with an increase in revenues. The marginal profit margin and the impact of inventory changes are expected to decrease by JPY279 million, mainly due to a decrease in the unfavorable impact of the sales mix and semiconductor procurement price increases. Manufacturing fixed costs are expected to decrease by JPY194 million due to a decrease in personnel and other expenses, although depreciation and amortization expenses will increase. SG&A expenses are expected to decrease by JPY540 million.

This is the end of my explanation, although it has been rushed. Thank you for your attention.

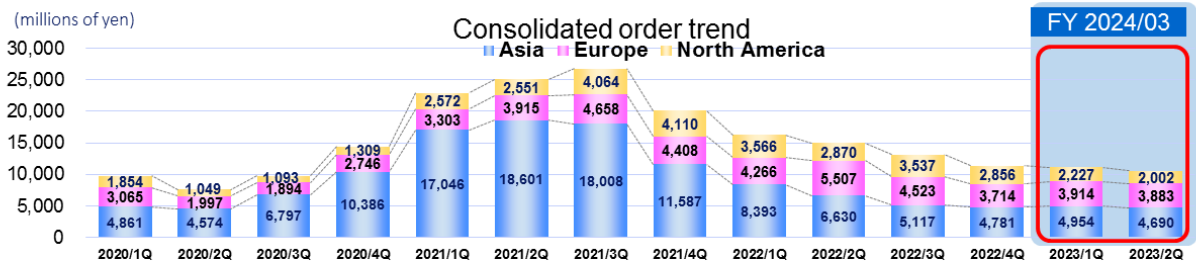


Moderator: Next, President Nagai, please begin.

Nagai: I am Mr. Nagai, the president. I would like to continue by explaining the outlook for the future. See page 18.

1-1. Demand for HDSI's products

- Orders in Japan set a major bottom, but…
- Robotics inventory has not adjusted as we expected owing to stagnation in the Chinese market



Asia	Excessive buildup of inventory held by distributors and customers has been partially cleared
Europe	Orders are down in line with an economic slowdown, but remain firm
North America	Orders for medical market are strong, while orders for semiconductor manufacturing equipment are undergoing adjustment

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First, on page 19, the demand environment for our products. As Kamijoh mentioned earlier, there is a sense that orders have finally bottomed out, but the recovery is expected to be very gradual due to the fact that China, our largest market, is still sluggish.

2.Trends in Main Fields of Application

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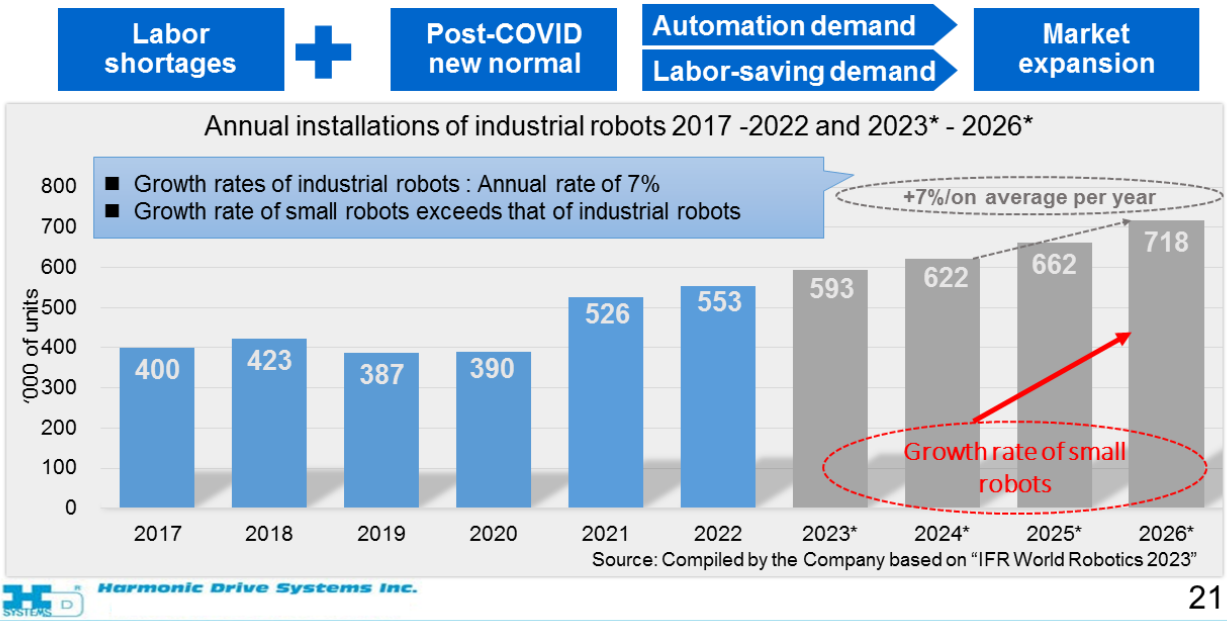
Continued on page 20, trends in our major applications.

2-1. Factory automation robot market forecast



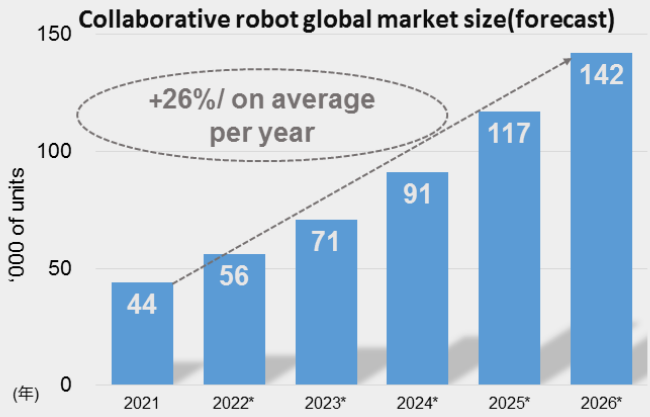
The data from the International Federation of Robotics, which we have been showing you for some time, basically indicates that demand for robots and the factory automation environment are strong. Although there will be peaks and valleys from time to time, we are confident of steady growth of 6% to 7% per year due to automation and labor saving. Moreover, we believe that the growth rate of small robots will be higher than that of large robots, so our small reduction gears will have many opportunities to play an active role.

2-2. Collaborative robot market forecast

Resolve labor shortages Enhance corporate → **Orientation towards autonomy through AI development** → **Automation Labor-saving** → **Market expansion**

■Labor management:
Application expected even for tasks that can be completed by a single individual
■Through the utilization of AI, operations will become simpler, even for beginners
■Production nationalism: A shift away from reliance on China

Courtesy of NEURA Robotics GmbH



Note: Figures for 2022 are estimates, figures for 2023 and beyond are forecasts, based on the number of units shipped by manufacturers
Source: Compiled by the Company based on "Survey on the Global Market for Collaborative Robots (2023)" published by Yano Research Institute Ltd. on March 01, 2023

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Please continue on page 22. Collaborative Robot. This is one market that has been created before with the birth of the Danish Universal Robots on the market. As a result, major robot manufacturers from both companies have entered this market, and as I mentioned earlier, they have grown at a much stronger rate than general industrial robots.

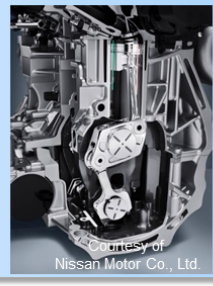
2-4. Semiconductor equipment and Automotive

Semiconductor equipment

- End of semiconductor industry downcycle nears
  - ➡ Closely monitoring the timing of recovery for large-scale investments over the medium to long term.
- Demand for semiconductors will grow as long as technology continues to evolve
  - ➡ Generative AI, digitalization, and shift to green energy
- Heightened economic and security risks prompt governments to support their own semiconductor industries

Automotive: Used in variable compression ratio (VCR) engines

- Production volume increased owing to a recovery in vehicle production following the easing of the semiconductor shortage
- Solid performance from 2H FY03/23, contributing substantially to FY03/24 earnings



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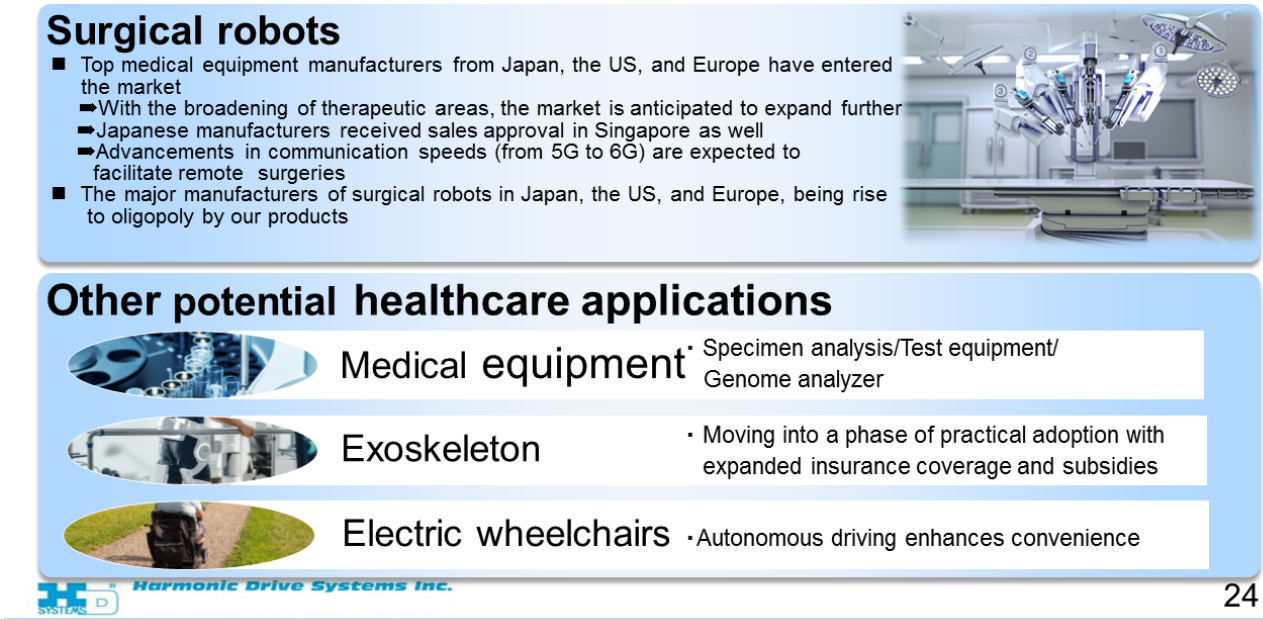
Continuing on page 23, semiconductor manufacturing equipment and automotive.

As you know, semiconductors always go through a silicon cycle, and I have the impression that the down cycle is finally coming to an end. I also heard that investment in storage by Quantum-related companies is very active when I went to an exhibition in Taiwan in the summer, because technologies using various semiconductors, especially AI, require a great deal of server capacity. As new technologies emerge, applications are increasing in this way, and as I mentioned earlier, I think we are nearing the end of the downtrend.

As for the on-board engine, it is clearly a VCR engine for Nissan. The supply shortage of semiconductors for automobiles, which was reported in the newspapers last year, has eased, and Nissan's production volume is increasing. In line with this, our shipments have been improving steadily and steadily.

2-4. Medical and health care

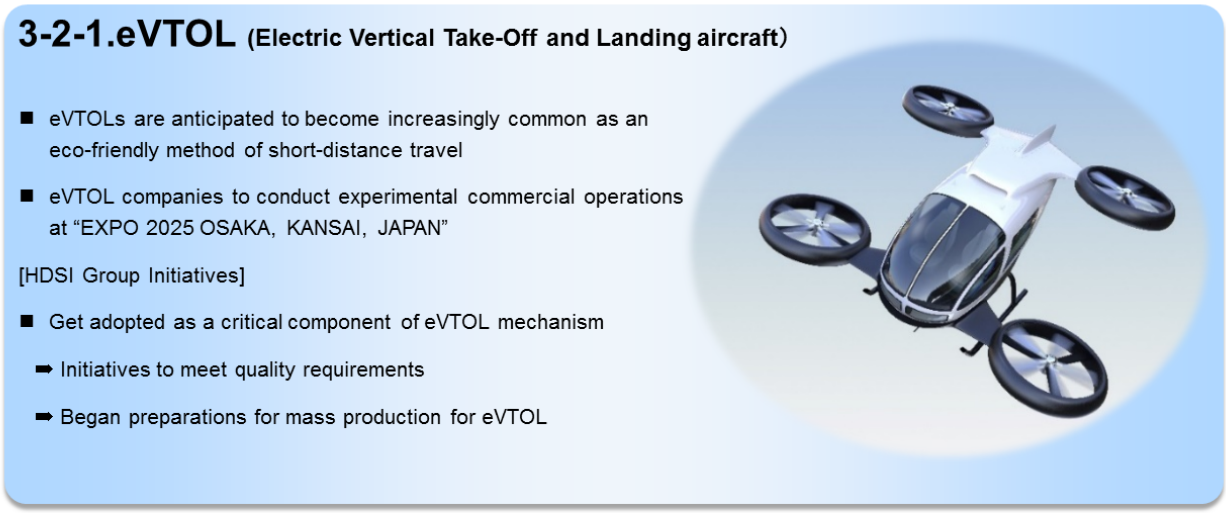


Continued on page 24, Medical/Healthcare. Since around 2010, our reduction gears have been used by pioneering robot manufacturers in the U.S., and since the basic patent expired, major medical equipment manufacturers have also entered the market, and our reduction gears are used by most users, or rather, all surgical robots.

In other health care, one unexpected area is the analysis of reagents. Our equipment is also used to separate specimens in test tubes.

Electric wheelchairs are also becoming more multifunctional, and some are even designed to run autonomously. This would require precise control in the steering section, and we are in discussions with a company that is currently developing electric wheelchairs.

3-1. Aviation and Space



Continuing on page 26 and beyond, a new application is the eVTOL (electric vertical takeoff and landing) aircraft, which was introduced in the previous issue. You can think of it as a smaller electric version of the Osprey.

In particular, in our case, the decelerator will be used in the eVTOL, which is said to be test operated at the Osaka Expo in 2025, and I would love to ride on it.

I also think that this is not something that can be operated simply if a flying cab can be built, and that full-scale commercial flight is not yet possible without the development of V-ports, vertical ports, and infrastructure, as they are commonly referred to. We hope that you will look forward to it, as it will undoubtedly be used in the future for short-distance commuter equipment.

3-2. Amusement

Animatronics

- Harmonic Drive® helps to realistically replicate the movements of people, animals, and fictional creatures
- Amusement companies are now using animatronics in their attractions and shows to provide immersive entertainment in order to differentiate themselves
- Proactive capital investments in theme parks being made mainly by major amusement companies
  - ➡ Creation of a full-fledged animatronics market
    ～Moving into a growth phase

Source: Harmonic Drive SE website

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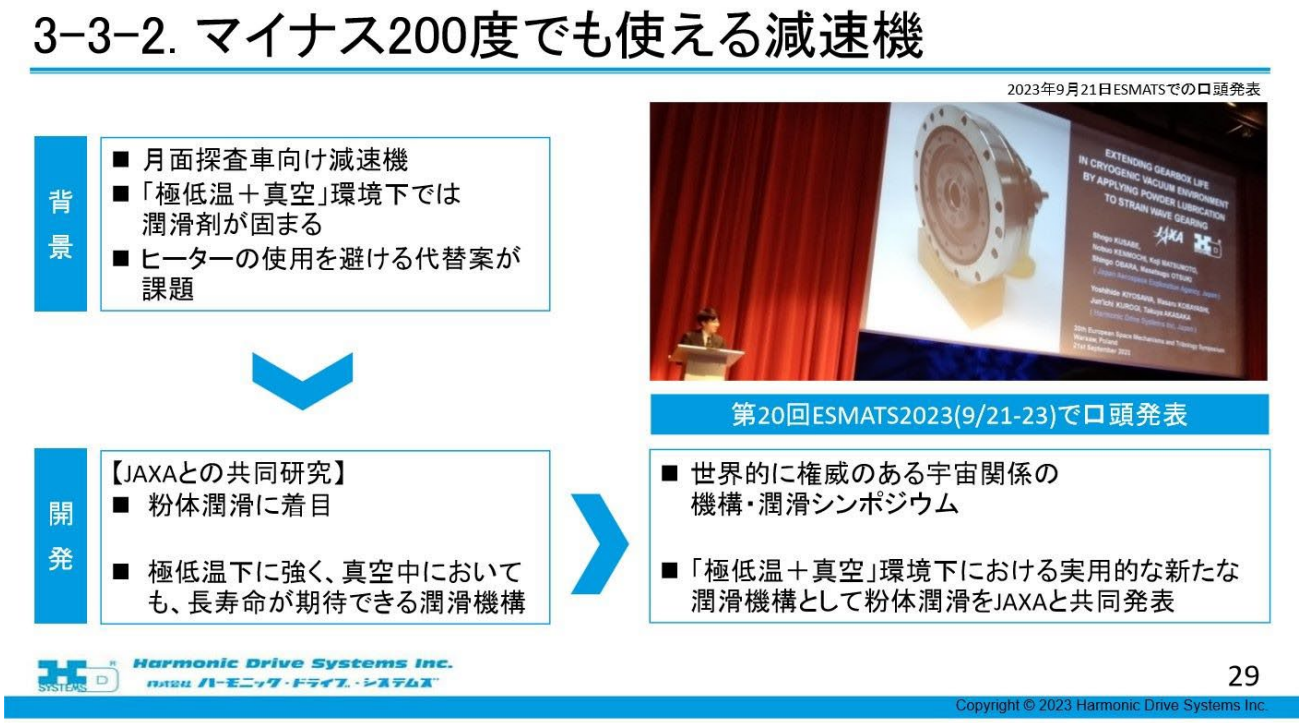
Continued on page 27, Amusement. As we have introduced for the past several years, amusement companies, especially those that operate theme parks, are trying to make their events more attractive than conventional ones. In order to differentiate ourselves from our competitors, we are working on the development of immersive entertainment, closer to reality. In such cases, our reduction gears are used in a large number of applications.

In the past, the term "animatronics" itself did not exist. I understand that major theme parks in the U.S. have started this, and on a large scale, and of course the competition is doing it, and this has created a new business segment of animatronics. We are proud to say that our products have contributed greatly to this.

3-3-1. Space

Continued on page 28, Space. As has been mentioned here before, and this is a newspaper advertisement, we, Harmonic Drive, were first used in space in 1971. And although it says, "Never Ends.", there are still many technical problems that need to be solved in the universe.



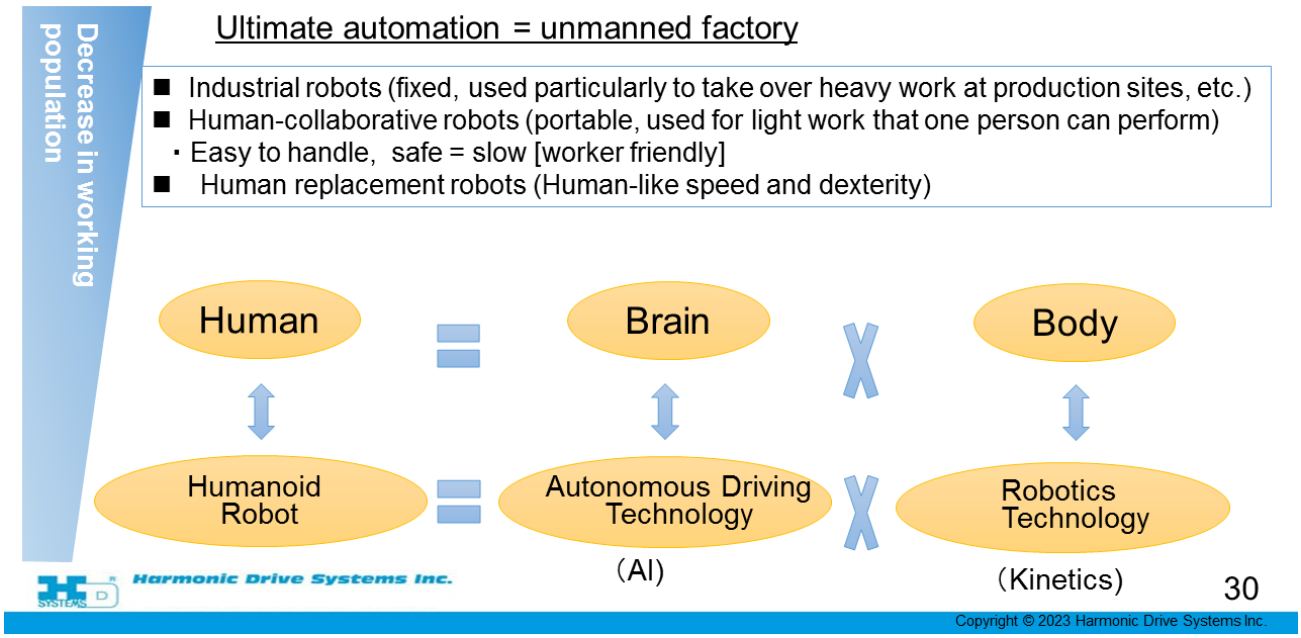
Continuing on page 29, one of the issues is lubrication. Friction is an inherent part of speed reducers, and we have to deal with it for the rest of our lives. This is the challenge.

How this can be used to demonstrate the performance of speed reducers in space. As you can see in the background, space is a very cold place, and moreover, it is a vacuum. In that environment, all conventional lubricants are volatilized and cannot be used. We then asked ourselves whether fluid lubricant or solid lubricant would be better, and we decided to focus on solid lubrication.

Furthermore, we focused on powder lubrication because it can be finely applied to surfaces. In collaboration with JAXA, we have developed a lubrication mechanism that is expected to have a long life even at cryogenic temperatures and in a vacuum. The results were presented at a conference called ESMATS in Warsaw this September, which is a very maniacal conference.

So, although we are facing very challenging issues in space, we are working very hard to make progress in terms of mechanisms and lubrication as in the past.

3-4-1. Necessity and feasibility of humanoid robots



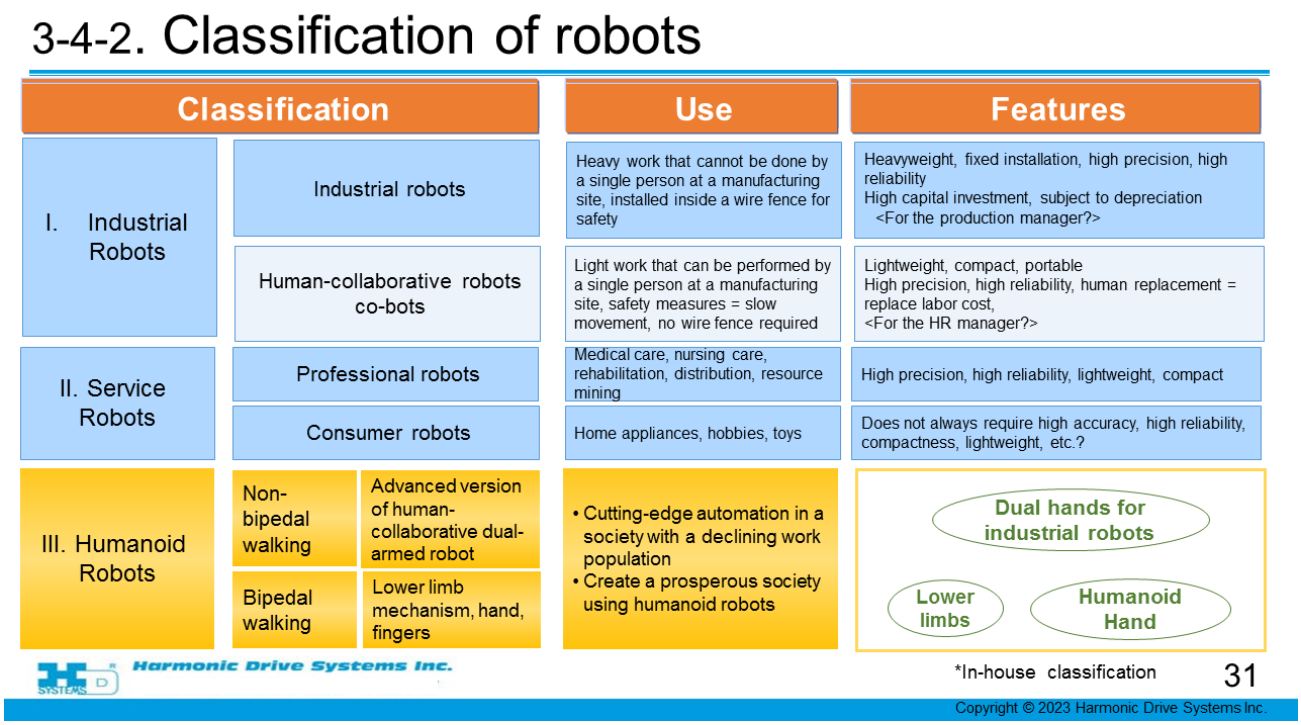
Please continue to page 30. We have spoken in the past in a rather literal way about the growing demand for humanoid robots, but after much thought and discussion with robot manufacturers, we have concluded that the ultimate goal of automation is unmanned factories.

The idea is that a humanoid robot working 24 hours a day, even in a pitch-dark factory, is probably the ultimate form of work. In fact, Tesla announced in newspapers and other media that it would create a humanoid robot, and I have been aware of such a trend.

Conventional industrial robots are permanently fixed to the factory floor and are used for heavy work that cannot be done by a human alone. That's where the human-collaborative robot comes in, which is basically portable. A human-collaborative robot can be placed wherever and whenever it is needed, or conversely, a human-collaborative robot can be made to perform tasks that can be done by a single human being. I think it is more like a human replacement robot.

However, this is not used in a wire mesh and is very slow moving to ensure safety. This is very unproductive. So humanoid robots as human-replacement robots, where they are as fast and dexterous as humans. This would be a humanoid robot, in other words. However, this was not quite a reality because the body part, or in human terms, a human being is made up of a brain and a body, and I think the body part is already well done, but the brain has not been able to keep up.

However, as Elon Musk has said on YouTube, he is convinced that robots can be driven using AI through self-driving. It seems that the brain and body are nowadays also ready for robots.



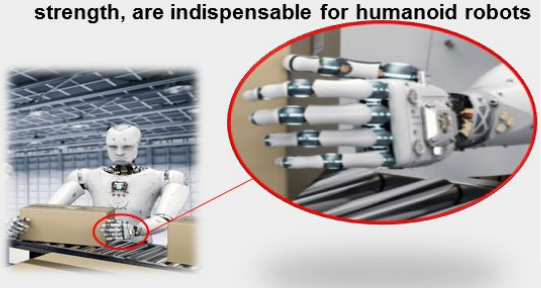
Continuing on page 31, this is our own version of what I said earlier in a few words.

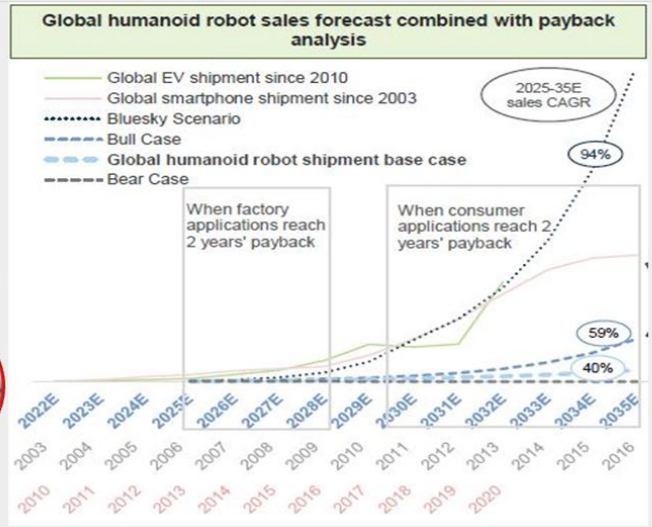
The 1 and 2 places in blue are classifications based on the International Federation of Robotics' definition. In the industrial robots section of 1, only the co-bots are in light gray, which means that we have taken the liberty of dividing the industrial robots into two categories.

The yellow section at the bottom is our interpretation of how we classify humanoid robots, what they are used for, what category they belong to, and what they are supposed to do. If you have any comments, please let us know.

3-4-3. Anticipating growing demand for humanoid robots

- Growing interest in humanoid robots
  - Various companies from start-ups to major corporations have entered the market
  - Operational test of warehouse work by a humanoid robot
- Difference from co-bots: "Humanoid Hand"
- Despite the high technical and cost barriers, the ultra-compact speed reducers, which are our strength, are indispensable for humanoid robots





Source : The Goldman Sachs Group, Inc. "Global Automation_ The investment case for humanoid robots"

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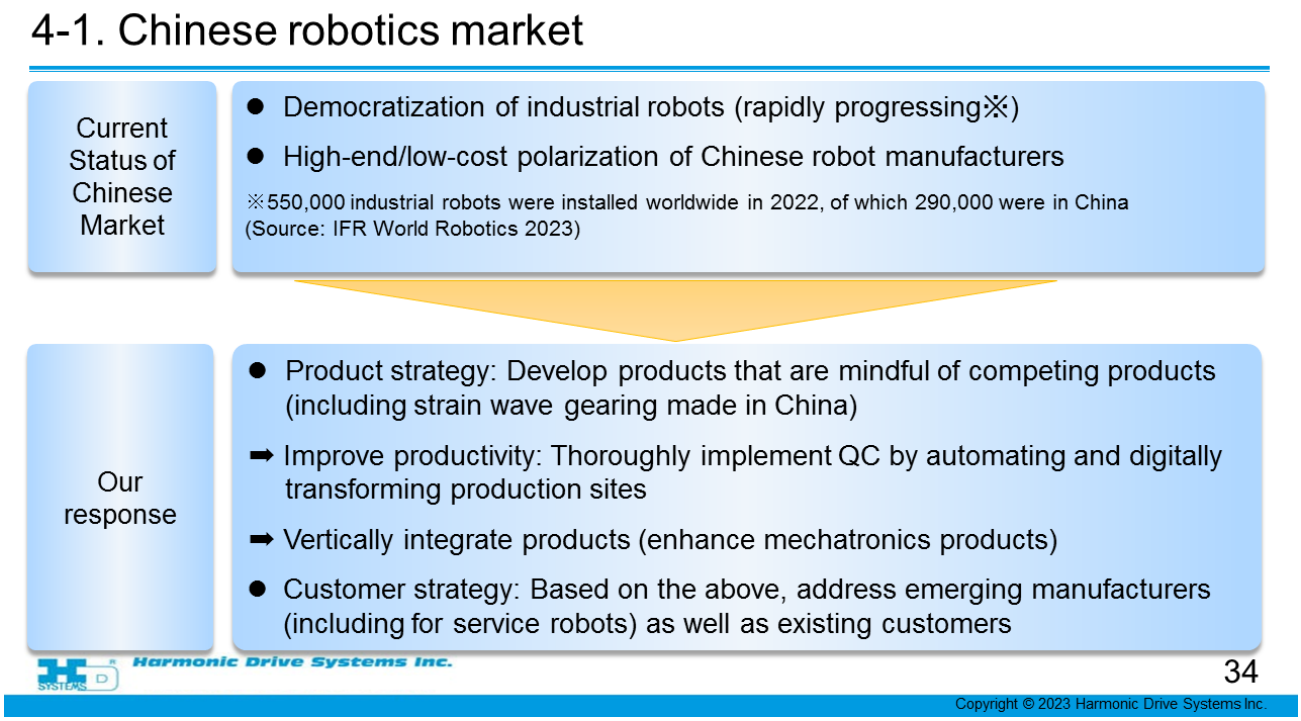
Next, page 32. The graph on the right side is a forecast of 0 to 100 compiled by Goldman Sachs about two years ago, but it is a prediction that demand will expand in the future. I have a feeling that this is going from 0 or 100 to at least 50 or 100.

And the most important difference from cooperative robots is the wrist. We used to call this a finger module, but we call it a humanoid hand, the same as a human hand. There are many ways to do this. It can be reproduced with pneumatic, electromagnetic or wire, but to generate a certain amount of force, a hand with a built-in actuator using electric or motor power would be necessary. We have received inquiries from an engineering company and have shipped a considerable number of products.

The good thing about this is that a robot has at most 6 axes, which means 6 reducers, but this one use 3 reducers for each finger if it has 5 fingers, so 15 reducers for one hand alone. However, it is a small one, so we will have to consider the structure for its creation. This will be a positive project, and we will be proactive in this area.

Continued on page 33, Overseas Business Strategy.



Page 34. As I mentioned earlier, the Chinese robotics market, which is still the largest robotics market in the world, had the greatest impact on our business performance. I would like to explain how we see this and how we will respond to it in the future.

The current Chinese market is the democratization of industrial robots. The threshold has been lowered and is spreading rapidly. This includes both high-end and inexpensive products. There is a polarization between high-end and low-cost Chinese robot makers.

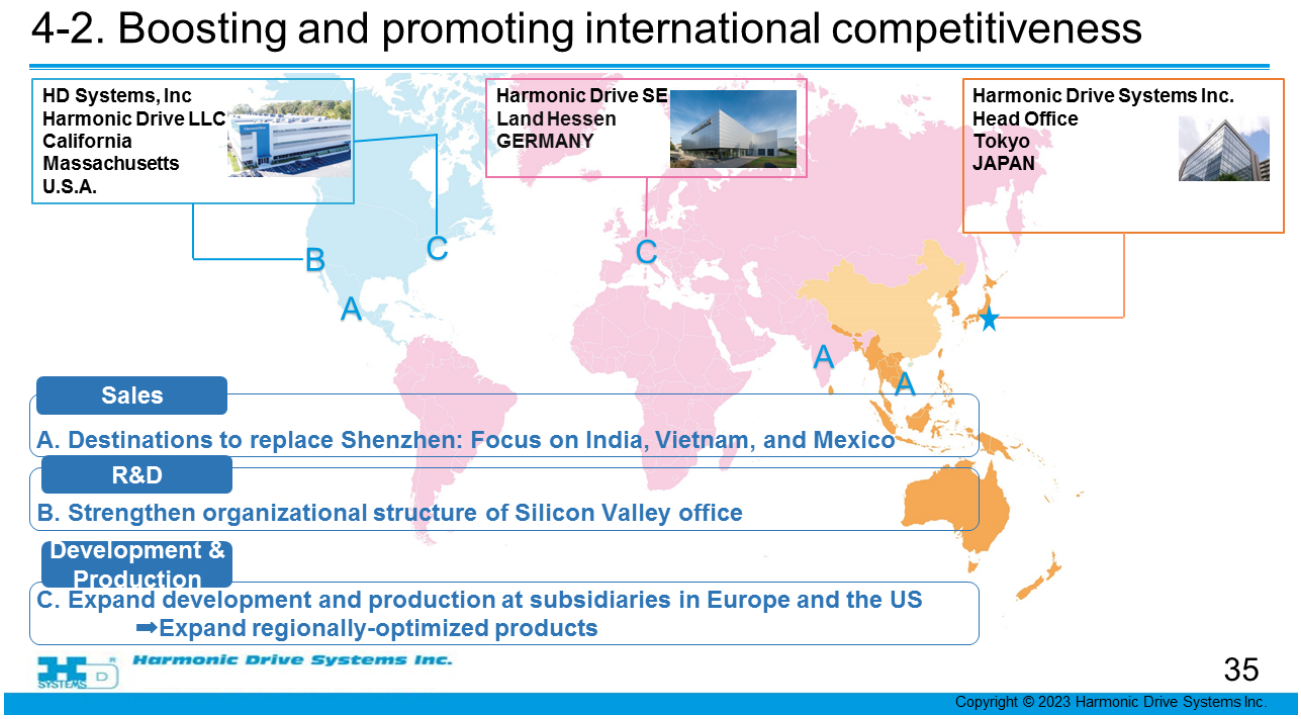
We have always been able to respond to high-end manufacturers of industrial robots, but we have not been able to respond to robot manufacturers who have emerged like bamboo shoots after rain, partly because of the volume of robots they produce. However, the Chinese side has been eliminated to a greater or lesser extent here, and is becoming much more active, including in the area of service robots.

Unfortunately, due to the U.S.-China problem, China's exposure to industrial robots, co-bots, and some humanoid robots that contribute to domestic production in China is still low. In any case, the robot makers that could be our customers have become largely polarized into two groups.

Our response is, first of all, our product strategy. This includes product development with an awareness of competing products, Chinese wave gear manufacturers. To put it bluntly, cost comes first. To this end, we will thoroughly pursue quality and cost through automation and DX on our side of the production floor. This is now steadily progressing at the Hotaka and Ariake plants in Japan.

We will continue to focus on reducers as we have in the past, but we need to consider how our customers use them. We are focusing on the vertical integration of our products in order to meet the needs of our customers in China, as well as in the rest of the world, unless we can provide a full range of mechatronics products, including motors, encoders, and reduction gears, which are all vertical integrated.

Then, in terms of customer strategy, we would like to secure volume by taking into account the situation, as in the past, while firmly protecting our high-end customers as in the past and responding to emerging manufacturers in terms of cost if possible.



Continued on page 35, Strengthening and Promoting International Competitiveness. This is a map of our existing overseas bases, but in terms of sales, there has been movement in Taiwanese EMS, which used to be concentrated in Shenzhen.

First, there is the issue of U.S. taxation on made-in-China items and import tariffs, so EMS companies are moving to India, Vietnam, and Mexico. How do we cover this on the sales side?

We are thinking of building a sales force that can provide local services and support, rather than manufacturing locally.

Then R&D. As I mentioned earlier in the section on vertical integration and space, our reduction gears are products that must deal with friction for the rest of their lives. We have a drive called "Abacus," which is a pure rolling friction drive. This is zero friction. However, due to its structure, it is inevitably heavier, but we are continuing our research on this issue, as we believe that there may be applications where heavier weight is desirable.

For your information, SRI International will have its own booth at the International Robot Exhibition from November 29 to December 2. “Abacus” will be exhibited there as a joint research project with us, and SRI's own research will also be presented. If you visit the Robot Exhibition, I urge you to visit not only our booth, but also the SRI booth.

With that in mind, we headhunted one researcher to our Silicon Valley office. As our American consultant, he will be at this exhibition as well. Please talk to him if you would like.

In addition, since the demand in each country is different, we have always left the semiconductors, except for industrial robots, to the various players, especially in the upstream and downstream areas, based on the needs of each country. Rather than having Japan develop everything and disseminate it, we would rather have local people develop it on their own.

That's why the amusement system that was mentioned earlier, that is a completely integrated actuator, and it is also ultra-compact. Our company in the U.S. has developed actuators of this size and has been delivering them to amusement companies for years. We will continue to allow this approach for locally optimized products, and we are working on a system to respond to more local transmission.

Continuing on page 36, this is an unavoidable problem.

5-1. Second Mechatronics Exhibition held jointly by Three Companies

Dates: Aug 31- Sep 1, 2023
Venue: Tokyo Metropolitan Industrial Trade Center
Visitors: Approx. 880 people

- Joint private show by three leading companies (SMC, THK, and HDSI)
- Co-create customer solutions for labor saving, energy saving, and carbon neutrality: Presented three-company collaboration robot system
- Held recruiting event: Presented "Cutting-Edge Automation" to job-hunting students who will be the future of automation

Three-company collaboration robot system

HDSI booth

Company information session for job-hunting students

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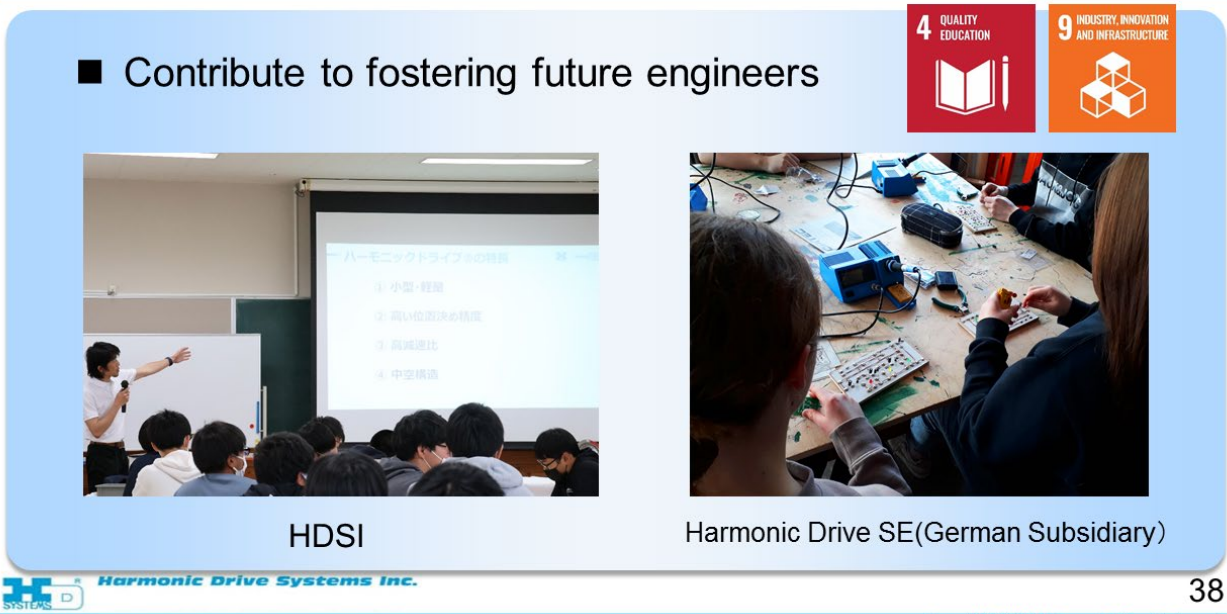
As part of our efforts toward a sustainable future, at the end of August this year, SMC, THK, and we held a joint private show with three companies on the theme of sustainable society and labor saving.

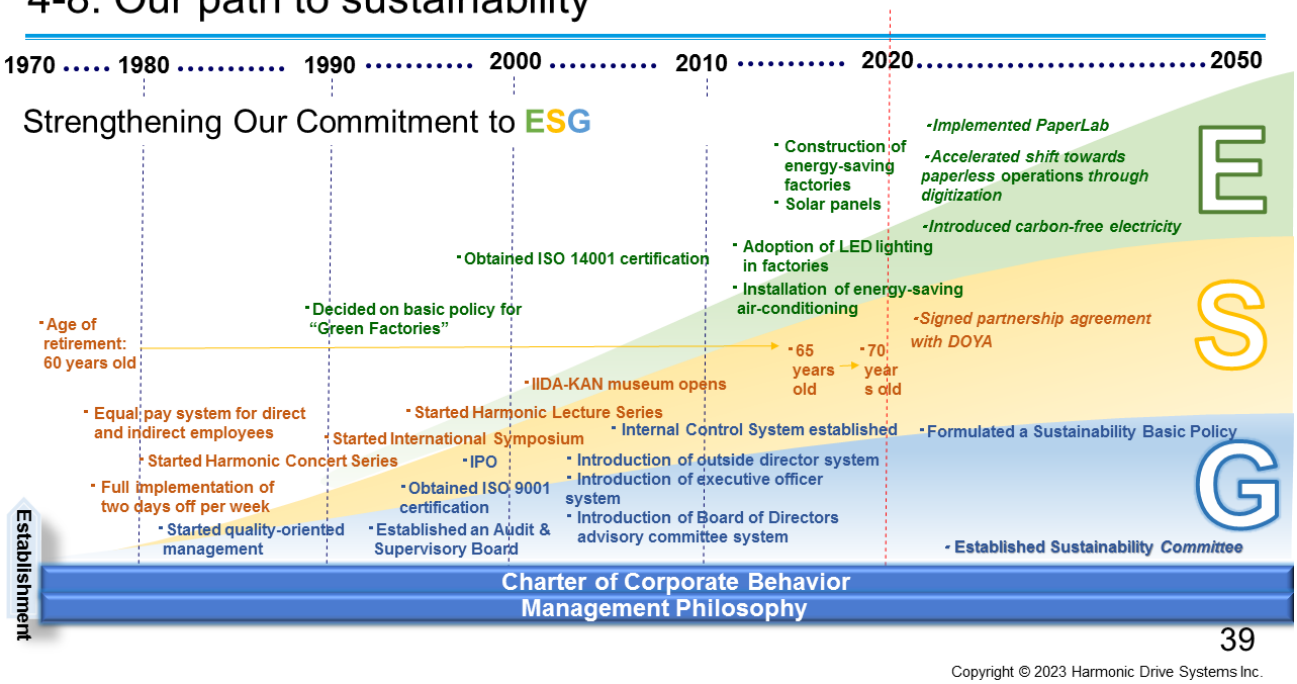
As some of you may have seen, we exhibited a dual-armed robot that integrates the technologies of the three companies, and each company made a presentation on how eco-friendly their technologies are.

5-2. Sustainability activities: On-site high school lectures



Continued on page 38, sustainability activities.

One is to travel to high schools to teach classes. This fits with number four and number nine of the SDGs goals. This is also very useful for us in terms of recruitment, so we visit local technical high schools and other technical high schools in various regions to give classes. This is the same thing we are doing at our German subsidiary.



The next page 39, shows our sustainability history, mapping our activities since the 1970s that would be applicable to any of the SDGs.

The ones we did this year in particular are written in bold letters on the right side of the page. It may be a little difficult to see, but we have introduced Paper Lab to recycle copier paper, carbon-free electricity, and as you may have seen at the exhibition, we have partnered with DOYA to support their independent project to educate people in Africa and help them to become self-reliant.

We have also established a Sustainability Policy and formed a Sustainability Committee, and the committee is currently working on this.

Finally, on page 40, you will find the topics for H1 of this fiscal year. We hope you will read it.

This concludes my explanation. Thank you for your attention.

Question & Answer

Moderator [M]: I will now move on to the question-and-answer session. If you are present in the audience and have questions, please raise your hand. I, the moderator, will nominate the questioner, so please state your affiliation and name.

Now, please ask your question at the front row on the wall side.

Isayama [Q]: Thank you for your explanation. Thank you for all your help. My name is Isayama, Goldman Sachs. I would like to ask you two questions. The first point is a short-term story and the second is a medium-term story.

On the first point, as Mr. Kamijoh explained, I am wondering if you could talk again about the current situation, considering the trends in orders on page eight. Looking at end users, there are signs of a slight upturn in notebook PCs and smartphones, and listening to President Nagai's explanation, I am wondering if the outlook will gradually improve.

Once again, as I have often asked Representative Director Maruyama, I am hoping that you will tell us how your customers' inventory situation has been developing and that you have seen the end of the tunnel. The actual change in distribution inventory trends, especially from your company's perspective, is the future of smart phones, notebooks, and SCARA robots. I am very concerned about whether there is a turnaround here, and I wonder if you could talk to me about this.

Also, semiconductors seem to be returning quite well, so I would like to have a word about this as well, if you have one. This is the first. Thank you for your cooperation.

Maruyama [A]: Thank you for your question. I am Maruyama. Regarding what Mr. Isayama just said about short-term trends in orders, as explained by Mr. Kamijoh at the beginning of the presentation, it is true that some smartphone manufacturers are actually making moves.

We are naturally heavily involved in this area, but right now, including SCARA manufacturers, we have stock of speed reducers and some robots on hand. A good portion of the cost can be covered by such things. However, there are some models that cannot be covered by this system, so we are taking orders on a spot basis to make sure that we are capturing orders.

We believe that such a feeling will probably continue for the time being, but we do not think that there will be another downturn in orders in the short term. The way in which the sales will increase is that orders will gradually increase as a result of inventory adjustments and orders to supplement what is lacking, and some customers have begun to place normal orders, but the current demand environment itself is still not very exciting. Therefore, we have made our forecast for the current fiscal year, taking these factors into consideration.

For semiconductors, the 2Q figures on page eight show that orders received by application seem to be recovering a little, but this is due largely to spot orders and delivery deadlines that are quite far in the future. I would like to keep a close eye on the prospects for a while longer. That is all.

Isayama [Q]: Thank you very much. I am sorry to be persistent, but is it correct to say that the distribution inventory trend has run its course, although there are some lamenesses?

Maruyama [A]: Unfortunately, I don't think we can call it a round yet. Depends on the customer.

Isayama [Q]: Thank you very much. Second, President Nagai made a comment that caught my attention, so I would like to ask you about it.

I am very much looking forward to hearing about the humanoid project, but you mentioned that you have already had business negotiations or made progress. Even if it is difficult to disclose the amount of money, is the environment already such that we can see these stories as a track record of orders? Since we recognize that your company is the leader in this area, could you tell us again a little about the progress you have made in terms of actual orders, sales, etc.?

Nagai [A]: In reality, we have already shipped our small size for humanoid robot fingers. It is already in this order.

In addition, I went to Silicon Valley in September and October, and it was amazing to see humanoid robots in America. There are definitely three companies, including Tesla, that are quite realistic. Two of these companies are making prototypes with our products. That is all.

Isayama [M]: Thank you very much.

Maruyama [A]: Tesla has been mentioned, but that does not mean that there is a direct link to it. We have received several such enquiries, but they are still at the prototype level. Based on this, we and our customers are now looking at what kind of developments we can expect in the future.

Isayama [Q]: I'm sorry, you mentioned that much. The name of the manufacturer is totally fine, but as for the region, I guess it would be the U.S? There is a lot of talk about China, Europe, the Middle East, etc. What kind of expansion do you see for your company?

Nagai [A]: To elaborate, the last I mentioned, American companies will make their products in the US. We are engineering and we will create. However, we do not know where the final destination will be.

Also, I have heard that some of the places that have already been released are designed in Europe and the U.S., but assembled in other places, and that there are multiple final destinations.

Isayama [M]: Thank you very much.

Moderator [M]: Are there any other questions? Thank you very much. Now, the middle person in the front row, please.

Morota [Q]: Morota, Okasan Securities Co. Thank you very much for all your help. Two points related to China, please.

First, I think the negative period after the peak-out was longer in this cycle than in the previous one. It's fine to give us a rough idea, but I would like to get some idea of the extent to which the rise of Chinese robot manufacturers is having an impact here.

Specifically, I have heard that Estun is increasing its market share in China, and I have several people who were stationed in China until last year who happen to be working in robotics-related companies. I don't think they see Estun as a competitor, as if it is just a robot with a few joints or an app maker. So, how does your company think about that? Please tell me this on the first point.

Nagai [A]: Among Chinese robot manufacturers, companies such as Estun, Step, Inovance, and Shenyang Xinsong, which have long had engineering and manufacturing capabilities to produce robots, are steadily growing as in the past.

The number of manufacturers is increasing here. It is a high-end and low-cost kind of manufacturer. The reason for the increase in the number of low-cost manufacturers is the abundant subsidies provided by government policy, which also goes to reduction gear manufacturers. Then they go to robot makers. However, what happened just recently is that Japanese, Western, and American robots swept the market before such a second group could be nurtured.

However, because capital investment has declined slightly due to the U.S.-China problem, inquiries from Japanese firms are naturally sluggish at the moment. As Maruyama mentioned earlier, some Japanese robot manufacturers still have robots in stock. This is where low-cost manufacturers are growing again, and because of China's domestic industry, even industries that do not contribute to exports are adopting robots because of manpower issues.

In this sense, we are not talking about Japanese companies losing ground. The Chinese economy itself is stagnating a bit, and the presence of high-end products, i.e., Japanese, and Western products, is waning a bit. However, we have been aggressively marketing to robot manufacturers who have established their own brands and seem to be able to survive, even in China, and I think we are getting a lot of business from them.

Morota [Q]: In conclusion, I think you are referring to the negative period after this peak-out and the next recovery period, but would it be correct to say that the rise of Chinese manufacturers has not had much impact here?

Nagai [A]: My understanding is that the biggest impact is still the decline in overseas exports from China. China's domestic GDP is also down, so that is the biggest factor.

Morota [Q]: Okay, thank you. Regarding the second point about China, I don't think there are many Japanese robot makers, such as Fanuc and Yaskawa Electric, that would switch from your reduction gears to other companies, but I have been talking with Estun about your reduction gears. But I don't think they are using them very much.

If these places rise to prominence, I think you will end up losing market share as a result. I have talked with Mr. Maruyama and Mr. Kamijoh about this issue on page 34, but in short, what has happened in the Chinese construction equipment market. Komatsu and Hitachi Construction Machinery used to dominate the market with caterpillars, of course, but Japanese manufacturers have fallen out of the market, but there is a view that the reason caterpillars are still around is because they have launched a second line.

When the president explained the product strategy and competitive products, is he referring to the second line? I wonder if the strategy of a second line, not for construction equipment, not for the main unit, but for reducers and parts, including those parts, is effective. Can you tell us a little more about your strategy toward China?

Nagai [A]: We do not know whether FANUC or Yaskawa will launch a second-brand low-cost product, but we can imagine that they will prepare a product line that matches the price of the Chinese market, just like cars. I don't expect Japanese robot makers, and then famous Western makers, to use a robot that breaks down in two years by using a cheap reducer without worrying about brand damage at that time.

Our biggest fear in China is that the government will adopt a policy of 100% local content, so we are examining the extent to which we can use local materials and are providing them to a certain manufacturer on a trial basis.

Therefore, I believe that the leading robot manufacturers are also considering the possibility of offering product lines in the mid-priced range, and rather than suddenly using Chinese-made speed reducers for these products, they will probably ask us to lower the price.

As I wrote here, this is not about responding to Chinese-made products, but rather about how we can improve costs while maintaining quality by automating and DXing our workplaces.

Morota [Q]: When should we expect this to appear in concrete terms?

Nagai [A]: In a sense, we have already sent it out to a certain robot manufacturer on a trial basis. However, the Chinese market itself is sluggish, so the volume is not that high.

What I think will also be helpful is that we have been able to automate the production of a limited size of products for automotive use at our Ariake Plant, and we intend to apply this to industrial use as well. We have already begun to develop a method of diversion, which does not mean diversion of production lines, but rather horizontal development of methods so that we can respond to the needs of industrial robot parts in terms of price.

Morota [M]: I understand the direction. Thank you very much.

Moderator [M]: Now the person in the back who just asked a question. Go ahead.

Mizuno [Q]: Thanks for your help. I am Mizuno of UBS Securities, please. Two please.

I would like to ask you one question in terms of measures to deal with the current situation in China. Mr. Nagai said that cost is the key, and I have just received some hints.

How much of the price difference between the Ariake Plant and local players and rivals actually exists, and how much of the price difference can be reduced if the Ariake Plant's automation or production efficiency is improved and the production efficiency of reduction gears for industrial applications is increased, and if, as a result, the price difference between the Ariake Plant and rivals is reduced? How much do you think the measures on slide 34 will work? What are the calculations in your mind about that?

Nagai [A]: First of all, regarding the price difference, as you all know, when Japanese competing manufacturers make their sales pitches, they usually say that their products are 30% cheaper than ours, so naturally local reducer manufacturers in China are also at that level.

In fact, I think the price difference between Chinese reducer manufacturers is a little less for us. We have heard that Chinese reducer manufacturers are also having a hard time competing with us in Japan. Therefore, although it would be nice if the target could be lowered by 30%, this is not so easy to achieve.

Since we have to maintain quality, it is of course impossible for us to allocate 30% at once, but we can offer 10% or 15% at a time, depending on the customer's design, to some extent based on the trust we have built up over the years.

This may not be an answer to your question, but when the automation developed at the Ariake Plant for automotive equipment is horizontally expanded for industrial use, it is easy to automate the line at hand, but it takes much time to automate the entire line, and this is done for each model number.

Mizuno [Q]: Thank you very much. Also, if Mr. Maruyama could give us some tips. Do you have any hints on how much cost reduction is achieved by automation compared to the conventional production process for automobiles? I think it was mentioned before, but I would appreciate a reminder.

Maruyama [A]: One is how much the supply chain and procurement price can be lowered by volume, and the other is internal productivity. This is greatly enhanced by building a line like that. Taking this as a model, last

year we built a separate automated line for so-called factory automation in the same building as the Ariake Plant.

I can't give you a monetary replacement right now, but if we were to make the same product at Hotaka, the productivity would increase from 2.5 times to almost 3 times that of when we made the product in-house. In short, as long as the quantity can be secured, the productivity of introspection, including in other countries, will improve by that much. I cannot say how much that would be, but I think it would have that kind of impact.

Please understand that this is somewhat of an image.

Mizuno [Q]: Thank you for the hint. Second, I also wanted to think about the implications, or should I say implications, for the performance of the human-robot part of the project. So let me ask you a question.

I was wondering if you could give us some hints as to when the system will be put to practical use and how well it will be used in the field if we are not talking about end customers but about those with whom you are in direct contact.

Slide 31 shows the new detailed classifications, but there are some that are often referred to as "upper body only," and I would like to think about the number of units to be used in the future.

So, timing and how it is used. Please give me a hint.

Nagai [A]: In reality, this is a bipedal robot that will be used in places like so-called delivery centers. I think it was in some newspaper. Therefore, the situation is now such that Goldman Sachs's forecast table was 0 or 100 until now, and I mentioned earlier that it was 50 or 100, but at least it is not 0 anymore.

So, our greatest strength is in our hands. I think we are still a long way off from humanoid robots in the form of humanoid hands. It is being tested, but I think they are still going to do various tests.

That said, compared to the 6-axis industrial robots for general use, the humanoid robot market includes a considerable number of joints alone, so it is safe to say that we have high expectations for this market, even for products other than small reduction gears. It is already moving in reality, including at the user level.

Mizuno [Q]: The week after next, there will be an exhibition, and you will be exhibiting samples this time, right, Hand? So, if possible, please give me any final appeal points.

Nagai [A]: The appeal points of the exhibition will be lighter versions of conventional products, and then very small ones, ones that can only be seen with a magnifying glass. This one is also from Germany, but in Japan we will also display one about the size of the tip of a ballpoint pen.

We have already developed a finger module for the humanoid robot I mentioned earlier, so we will demonstrate how to attach it to a tabletop, 2-axis arm and grab an object. Oh, and there will be humanoid robots. Please look forward to it.

Mizuno [M]: Okay, I look forward to it.

Moderator [M]: Then it is time for us to conclude the question-and-answer session. Thank you very much for your kind attention to the end.

This concludes the financial results briefing session for 2Q of the fiscal year ending March 31, 2024. Thank you very much for your participation.

[END]

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