VISUALIZE THE FUTURE

2nd Quarter ended September 30, 2022

Results Briefing

Digital Media Professionals Inc.

November 10, 2022

Tsuyoshi Osawa, President and COO (hereinafter referred to as Osawa): Thank you for attending today's financial results briefing for the second quarter of the fiscal year ending March 31, 2023.

1	**Explanation of Results, 2nd Quarter ended September 30, 2022**
2	**Initiatives and Progress, 2nd Quarter ended September 30, 2022**
3	**Fiscal Year Ending March 31, 2023, Full-Year Business Forecast**
4	**DMP's Advanced Technologies**

Osawa: Here is today's agenda. First, I will explain the financial results for the second quarter ended September 30, 2022, our initiatives and progress, and the full-year earnings forecast for the fiscal year ending March 31, 2023. After that, Yamamoto will introduce our advanced technologies with video clips.

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Company Profile

Leveraging our experience and knowledge as one of the world's leading graphics IP vendors, we have recently been contributing to solving problems for our customers and society by providing a full range of AI services from algorithm/software to hardware , and from the edge to the cloud .

| Company name	Digital Media Professionals Inc. (DMP)
Foundation	July 2002 (Listed on Tokyo Stock Exchange Mothers market in June 2011, Moved to TSE Growth market in April 2022)
Location	Nakano-ku, Tokyo, Japan
Representative	Chairman and CEO: Tatsuo Yamamoto President and COO: Tsuyoshi Osawa
Capital	1,838 million yen
Number of consolidated employees	69 (as of April 1, 2022)
Number of patents	35 cases
Consolidated subsidiary	Digital Media Professionals Vietnam Company Limited

IP core license business
·AI/GPU IP core license
·AI software license

Product business
·Image processing LSI for amusement market
·AI FPGA module
·Vision system for collaborative robot

Professional service business
·AI algorithm/computer vision software contracted development
·FPGA/Board contracted development
·Customer product/service support related to safe driving assistance system and robotics

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Osawa: Before I talk about the financial results for the second quarter ended September 30, 2022, as well as our initiatives and progress, I would like to briefly explain DMP's profile and strengths.

Since our founding as a university-launched start-up in July 2002, we have been engaged in business centered on graphics technology and have achieved significant results, including the adoption of our GPU IP in Nintendo game consoles and the introduction of 2D/3D graphics LSIs for the amusement market.

In recent years, we have been contributing to solving serious issues for our customers and society by providing integrated development systems, products, and services ranging from algorithms/software to hardware, and from the edge to the cloud.

DMP

- Six-month sales reached a record high. Operating loss, ordinary loss, and net loss attributable to owners of the parent also improved year on year.
- Sales by business/field are growing and steady, except for the professional service and the robotics field. Professional service business in the robotics field is expected to recover from Q3 onward.

Overall	Sales by business	Sales by field	
Net sales	IP Core License	Safety	Robotics
¥925M	**¥67M**	**¥49M**	**¥31M**
（YoY* +34%）	（YoY -1%）	（YoY +9%）	（YoY -71%）
Ordinary income	Product	Amusement	Other
¥-94M	**¥798M**	**¥789M**	**¥55M**
（YoY ¥ +14M）	（YoY +59%）	（YoY +58%）	（YoY +34%）
	Professional service		
	¥59M		
	（YoY -50%）		

* YoY :Year on Year

Osawa: Let me start with the six-month highlights ended September 30, 2022. Net sales were up 34 percent year over year, reaching a record high for the first half of a fiscal year, and losses improved year on year.

In addition, sales by business/field, except for the professional service business and the robotics field, increased or remained steady. The professional service business in the robotics field is expected to recover from the third quarter onward.

DMP

Net sales grew mainly due to higher sales in the product business and losses improved

(Unit: million yen)	2nd Quarter ended Sept. 30, 2021	2nd Quarter ended Sept. 30, 2022	Amount change
Net sales	690	**925**	**+234**
Operating income	-109	**-102**	**+7**
Ordinary income	-109	**-94**	**+14**
Net income attributable to owners of parent	-110	**-95**	**+14**

- Net sales increased 34.0% mainly due to growth in the amusement field, despite a decline in the professional service business in the robotics field. Operating loss also improved.
- Ordinary loss and net loss attributable to owners of the parent also improved year on year, due in part to foreign exchange gains.

Osawa: Here is an overview of PL. Net sales totaled 925 million yen, up 234 million yen (34.0 percent increase) year on year, mainly due to higher sales in the product business.

Due in part to foreign exchange gains, ordinary loss was 94 million yen and net loss attributable to owners of parent was 95 million yen, both a 14 million yen improvement year

on year.

• In the safety field, the business domain expanded to a broader safety field in addition to ADAS/DMS using dashcams.
• Robotics business is expected to expand mainly in the product and professional service businesses from Q3 onward.

● Sales by business

IP core license business	¥67 million	Same period last year	¥67 million

● Recorded AI/GPU running royalties for digital equipment, recurring revenues in safety/robotics fields, maintenance/support revenues, etc.

Product business	¥798 million	Same period last year	¥502 million

● Recorded sales from volume shipments of RS1, volume shipments of ZIA C3 kit for peripheral monitoring of commercial vehicles, and Cambrian vision systems

Professional service business	¥59 million	Same period last year	¥120 million

● Recorded revenues from contracted development services in the safety, robotics, and amusement fields
● R&D for robotics customers is in a transitional phase, resulting in a temporary decrease in projects

● Sales by field

Safety field	¥49 million	Same period last year	¥45 million

● Recorded recurring revenues (running royalties and subscription fees) and professional services revenues related to dashcams
● Recorded revenue from volume shipments of ZIA C3 kit for peripheral monitoring of commercial vehicles

Robotics field	¥31 million	Same period last year	¥106 million

● Started to record subscription revenues
● Customer R&D is in a transitional phase, resulting in a temporary decline in sales in the professional service business

Amusement field	¥789 million	Same period last year	¥499 million

● Recorded sales of RS1 for mass production

Other	¥55 million	Same period last year	¥38 million

● AI/GPU running royalties for digital equipment grew

Osawa: Here are sales by business/field. First, by business, IP core license business was 67 million yen, flat year on year, despite a decrease in initial AI license, due to higher AI/GPU IP running royalty income for digital equipment and recurring revenue in the safety field.

In the product business, sales increased significantly to 798 million yen, up 59% year on year, mainly due to strong growth in sales of the graphics semiconductor "RS1" for mass production. In addition, sales of the ZIA C3 kit for peripheral monitoring of commercial vehicles and the Cambrian vision system were recorded.

The professional service business recorded sales of contracted development services in the safety, robotics, and amusement fields, but sales declined 50% year on year to 59 million yen, mainly due to a temporary decrease in projects for customers in the robotics field, who were in a transitional phase in their research and development.

Next, let's look at sales by field. In the safety field, in addition to recurring income, sales of ZIA C3 kit for peripheral monitoring of commercial vehicles were recorded, resulting in sales of 49 million yen, up 9 % year on year.

In the Robotics field, sales of IP core licenses, Cambrian vision systems, and other products were recorded, but as mentioned above, the professional service business declined due to the transitional phase of customer R&D, resulting in sales of 31 million yen, down 71% year on year.

In the amusement field, sales increased 58% year on year to 789 million yen due to mass production shipments in response to large-scale orders for "RS1".

4

Other segment recorded sales of 55 million yen, up 34% year on year, due to strong sales of AI/GPU running royalties for digital equipment.

Equity ratio remains high at 86.2%

(Unit: million yen)	End of March 2022	End of Sep 2022	Amount change	Major factors
Current assets	2,784	3,033	+249	Accounts receivable - trade and contract assets +198, Inventories +46
Non-current assets	688	452	-235	Investment securities -199 Other intangible assets -23
Total assets	**3,472**	**3,485**	**+13**	
Current liabilities	358	462	+103	Accounts payable - trade +122
Non-current liabilities	18	18	+0	
Total liabilities	376	480	+104	
Total net assets	**3,095**	**3,004**	**-90**	Retained earnings -95
Total liabilities and net assets	**3,472**	**3,485**	**+13**	

Osawa: Here is BS at the end of the second quarter. Total assets amounted to 3,485 million yen, up 13 million yen from the end of the previous fiscal year.

This was mainly due to a 198 million yen increase in accounts receivable and contract assets and a 46 million yen increase in inventories, respectively, in line with business expansion, as well as a 199 million yen decrease in investment securities and a 23 million yen decrease in other intangible assets.

Total liabilities amounted to 480 million yen, up 104 million yen from the end of the previous fiscal year. This was mainly due to a 122 million yen increase in accounts payable trade as a result of business expansion.

Net assets were 3,004 million yen, down 90 million yen from the end of the previous fiscal year. This was mainly due to a 90 million yen decrease in retained earnings due to the recording of a net loss attributable to owners of parent.

As a result, the equity ratio was 86.2 percent. We continue to secure sufficient working capital and investment capital to enhance our R&D system.

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2nd Quarter ended September 30, 2022: Initiatives and Progress
Robotics Field

- ■ Expand reach to industries with high robotics implementation effectiveness (manufacturing, transportation, etc.)
- ■ Focus on areas and technologies where the DMP robotics portfolio can demonstrate competitive advantages and add values

● **Refinement and focus of proprietary technologies**
- Improved ZIA SLAM (MOVE) functionality and robustness at the ATC (Asia and Pacific Trade Center) facility with the support of the City of Osaka
- Developed DMP Robot Safety, a digital safety fence that supports collaboration between humans and picking robots, and DMP Picking Check, which measures success and failure of robot picking

● **Expansion of Cambrian vision system business**
Cambrian's strengths such as accuracy, speed, wide range of picking targets, and stability under ambient light have been highly evaluated, leading to increased adoption and high-probability prospects in the manufacturing industry, particularly in the automotive industry

● **Pursuit of high added value**
- Developed advanced AMR that combines AMR (Autonomous Mobile Robot) and robot picking to support complete automation of parts delivery in factories
- Started recording subscription income in the robotics field
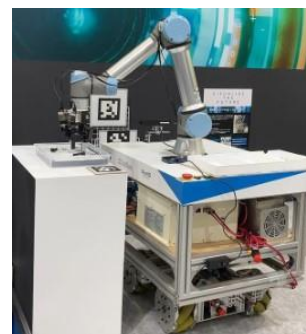
Advanced AMR Demonstration at the RoboDEX Nagoya

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Osawa: I would like to discuss the main initiatives and progress of our focused fields for the second quarter ended September 30, 2022. First, in the robotics field, we are working on expanding our reach to industries where robotic introductions are highly effective, specifically the manufacturing and transportation industries, and focusing on areas and technologies where we can demonstrate the competitive advantage of the DMP robotics portfolio and added value.

In terms of refining and focusing on our proprietary technologies, we improved the functionality and robustness of ZIA SLAM (ZIA MOVE) in a demonstration experiment at the Asia and Pacific Trade Center (ATC), a commercial complex, with the support of the City of Osaka.

We also developed "DMP Robot Safety," a digital safety fence that supports collaboration

between humans and picking robots, and "DMP Picking Check," which measures success and failure of robot picking, and demonstrated them at the RoboDEX Nagoya exhibition. The digital safety fence demonstrates overwhelming cost performance compared to physical safety fences.

The Cambrian vision system, which is the eye of the cooperative robot arm, has been highly evaluated for its accuracy, speed, a wide range of picking targets, stability under ambient light, and other strengths, leading to increased adoptions and high-probability prospects in the manufacturing industry, particularly in the automotive industry. The ability to recognize and pick items that cannot be recognized by other companies' products has been received with positive surprise by customers.

In our pursuit of high added value, we have developed an advanced AMR (Autonomous Mobile Robot) that combines AMR and robot picking, which we demonstrated at the RoboDex Nagoya exhibition. This system supports complete automation of parts delivery that does not generate added value in a factory.

We have also begun recording subscription income in the form of a monthly fee per robot for our software installed in customers' robotics devices. Although the amount is still small, we intend to scale this business up and achieve higher profitability in the same way as we are doing in the safety field.

Osawa: In the safety field, we are working on achieving stable growth by providing new IP core licenses, recurring business, and professional services, and expanding our business from safe driving assistance to a wider range of safety fields.

First, we continued to provide consistent support to existing customers from the edge to the

cloud, which is one of our strengths, and we have also won PoC projects from new customers. We aim to scale this up.

In the recurring business, subscription revenues have been stable, but running royalties have been affected by the shortage of semiconductors, and our revenues have not reached our original plan due to lower-than-expected shipments of dashcams by customers now.

However, from the third quarter onward, we plan to increase revenues from so-called installed-base running royalties, in which our software will be installed in hundreds of thousands of dashcams already installed in end-user vehicles by utilizing OTA (Over-the-Air).

As for business expansion into the broader safety field, we have mass-produced and shipped ZIA C3 kits for peripheral monitoring of commercial vehicles. In addition, we made progress in PoC projects for human flow and traffic volume surveys using edge cameras related to smart cities. We believe that this field will become a very interesting business when scaled up, such as data sales to local governments and road administrators.

2nd Quarter ended September 30, 2022: Initiatives and Progress
Amusement/Other Field

● **Amusement field**
- Continued volume shipments of RS1 in response to large -scale orders
- Despite the shortage of semiconductors and materials, the market for 6.5 -type pachislot machines with expanded game features has been strong. Smart Pachislot and Smart Pachinko machines are expected to be introduced in the market during this fiscal year

● **AI/GPU IP**
- Cumulative shipments of our customers' digital devices incorporating DMP's AI/GPU IPs reached 150 million units Current royalty business also remained strong year -on-year due to license renewals, etc.
- Started recording royalty income in the second quarter from ZIA DV720, the AI processor IP adopted for TVS REGZA's 4K TVs for Its balance of computing performance and silicon size

  Article appeared in " TechanaLye Report No. 632" on DV720 being adopted for "HV8107 image processor" for TVs jointly developed by HISENSE and TVS REGZA

Osawa: Here are other initiatives and progress. First, in the amusement field, we continued volume shipments of RS1 in response to large-scale orders.

In terms of market conditions, although the shortage of semiconductors and components has had a certain impact on the production of machines, 6.5-type pachislot machines, with improved gaming performance, are selling well. In addition, the market launch of smart pachislot and smart pachinko, which also offer improved gaming performance, is scheduled for November and January next year, respectively.

In the AI/GPU IP field, cumulative shipments of our customers' digital devices incorporating

our AI/GPU IPs reached 150 million units. More than half of them were for Nintendo's 3DS, but the use of AI/GPU IP in digital cameras, surveillance cameras, office automation equipment, TVs, etc. continues, and the business in the current fiscal year has been more successful than the same period last year due to new adoption and license renewal.

In addition, we started recording royalty income from the AI processor IP "ZIA DV720" used in TV REGZA 4K TVs in the second quarter. The "TechanaLye Report," in which TechanaLye disassembled equipment and conducted chip analysis, chipset analysis, system analysis, trend research, and material analysis, featured the article on the use of "ZIA DV720" in the HV8107 image processor for TVs jointly developed by HISENSE and REGZA. We are very much looking forward to the opportunity to expand the number of TV models incorporating ZIA DV720, including HISENSE's TVs, which have the leading market share in the world.

1 Explanation of Results, 2nd Quarter ended September 30, 2022

2 Initiatives and Progress, 2nd Quarter ended September 30, 2022

3 **Fiscal Year Ending March 31, 2023, Full-Year Business Forecast**

4 DMP's Advanced Technologies

Fiscal Year Ending March 31, 2023
Business Forecast

No change in the full-year earnings forecast announced on May 13, 2022

(Unit: million yen)	FY 03/2022 (Actual)	2nd Quarter ended Sept. 30, 2022	FY 03/2023 (Forecast)
Net sales	1,667	925	**2,370**
Operating income	-126	-102	**25**
Ordinary income	-122	-94	**25**
Net income attributable to owners of parent	-157	-95	**20**

● Net sales progress (vs. full -year forecast) remained 39% in 2Q cumulative, but growth in IP core license, products, and professional service business is expected from 3Q onward

• Safety: Royalty income from OTA and professional service revenue are expected to grow

• Robotics: Sales of Cambrian products and professional service business for low   -speed autonomous driving are expected to grow

• Amusement: Continue volume shipments of "RS1" image processing semiconductors

• Other: AI/GPU running royalties from newly adopted digital devices are expected to grow

Osawa: The full-year consolidated earnings forecast for the ongoing fiscal year ending March 31, 2023 remains unchanged from the forecast announced on May 13, 2022. Although the percentage of net sales to the full-year forecast for the first half of the fiscal year remains at 39%, we expect growth in the IP core license, product, and professional service businesses from the third quarter onward.

By field, as I have mentioned, we expect royalty income from OTA and professional service business to grow in the safety field. In the robotics field, we expect sales of Cambrian products and professional service business for low-speed autonomous driving to grow. In the amusement field, we will continue volume shipments of the RS1 image processing semiconductor. In other field, we expect AI/GPU running royalties for newly adopted digital devices to expand.

We will steadily implement key measures to achieve the targets of net sales of 2.5 billion yen and operating income of 200 million yen for the fiscal year ending March 31, 2024 as our medium-term business plan.
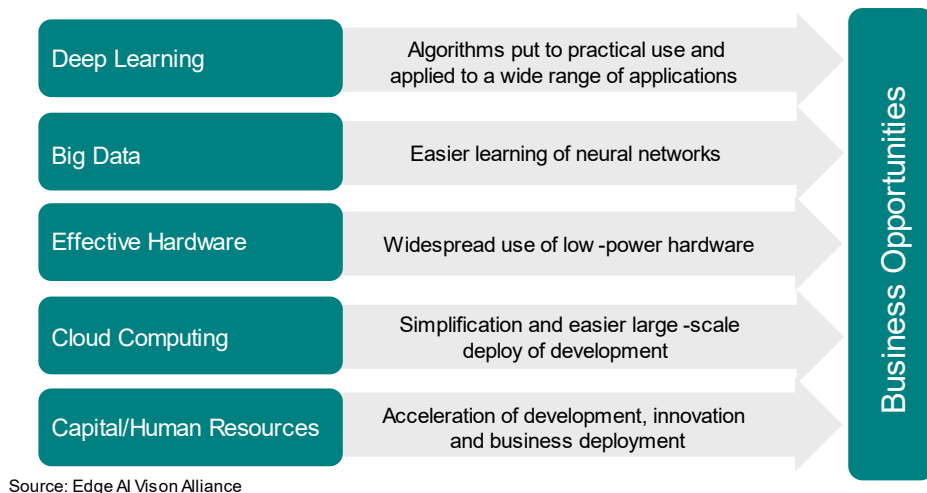
This concludes my part of the presentation. Thank you very much for your attention.

1	Explanation of Results, 2nd Quarter ended September 30, 2022
2	Initiatives and Progress, 2nd Quarter ended September 30, 2022
3	Fiscal Year Ending March 31, 2023, Full-Year Business Forecast
4	**DMP's Advanced Technologies**

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Tatsuo Yamamoto, Chairman and CEO (hereafter referred to as Yamamoto):
First of all, thank you very much for joining us today. Now let me talk about DMP's advanced technologies.

Deep Learning	Algorithms put to practical use and applied to a wide range of applications	
Big Data	Easier learning of neural networks	
Effective Hardware	Widespread use of low -power hardware	
Cloud Computing	Simplification and easier large -scale deploy of development	
Capital/Human Resources	Acceleration of development, innovation and business deployment	

Source: Edge AI Vison Alliance

Business Opportunities

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Yamamoto: With regard to the AI and vision computer fields in which we operate, there are many factors going on in parallel. By merging them together, we believe that the technology has become something that will be widely deployed in a practical manner in the future.

First is deep learning. Until now, it has been difficult to solve specific problems at low cost because separate algorithms or software had to be developed for each problem, but deep learning has made it possible.

Deep learning has also made it possible to efficiently process and learn big data, i.e., large amounts of data, so that data can be utilized.

In terms of hardware, hardware that can efficiently process large amounts of data and algorithms is emerging, and breakthroughs are now possible using GPUs, which we have been working on since our founding. In addition, there emerged new processors dedicated to AI, making it possible to widely deploy deep learning. Actually, we have developed one of them.

As for cloud computing, in the past, critical applications that required real-time performance, for example, had to be processed on edge computing, i.e., on devices close to the event.

However, with the development of cloud computing, large amounts of data can now be processed through high-speed networks, making the development of such systems much easier, and allowing for easy maintenance and upgrades through OTAs and other means.

In addition, the enormous amount of capital invested in people and technology has accelerated development innovation in this area.

I believe that the combination of these factors has brought about unique and enormous business opportunities to use AI and visual computing to solve real-world problems.
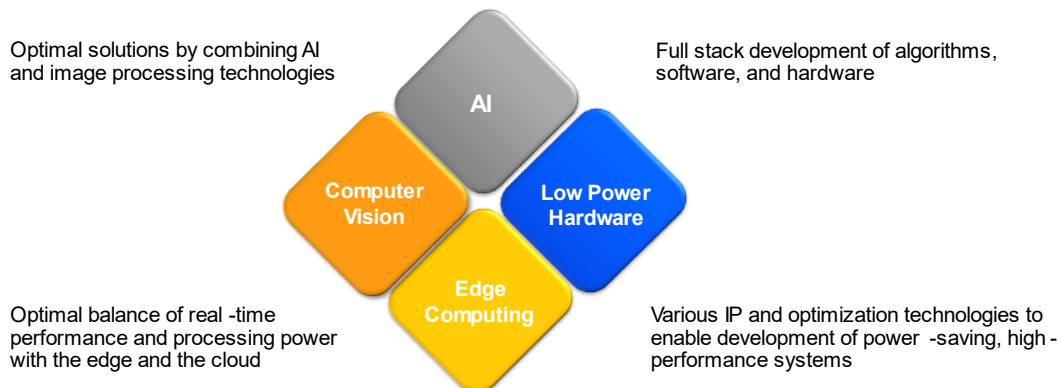

Source: Edge AI Vison Alliance
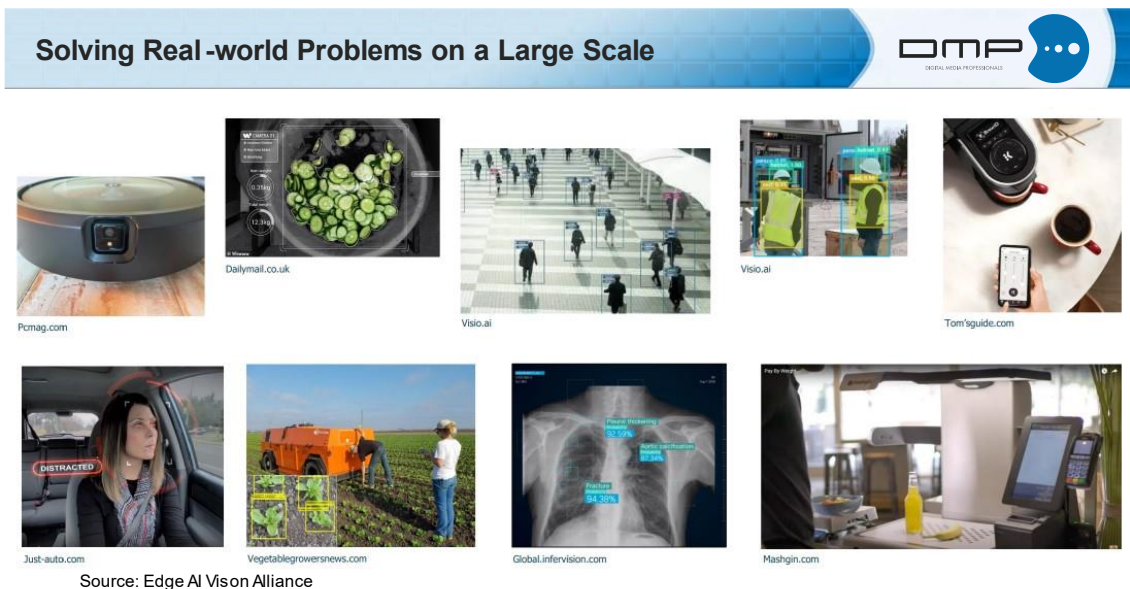
Yamamoto: Here are examples of applications using AI and visual computing, now enabling solutions for a wide variety of social problems ranging from household, automotive, agricultural, medical, retail, construction sites, transportation, and waste management.

The second image from the left in the top row is a system that analyzes food waste. It analyzes food thrown away at restaurants and hotels to help eliminate wasteful consumption. It is already on a commercial basis in Europe.

We believe that AI and visual computing can now solve various social problems such as food crises, aging population, labor shortages, environmental disasters, and pandemics on a large scale, while at the same time generating economic profits.

Domain optimization through AI and image processing technologies backed by GPU development and a wide range of products and services

Optimal solutions by combining AI and image processing technologies

Full stack development of algorithms, software, and hardware

AI

Computer Vision

Low Power Hardware

Edge Computing

Optimal balance of real -time performance and processing power with the edge and the cloud

Various IP and optimization technologies to enable development of power -saving, high - performance systems

Yamamoto: As we work in this field, we leverage our strengths, which include the ability to provide optimal solutions by combining AI, computer vision, and image processing.

In addition, we can develop a full stack of algorithms, software, and hardware. We have a very strong base through the process of tackling the extremely difficult technology of GPUs, the fact that we have worked on image processing and AI in stages, and the fact that we have created a system that allows us to develop algorithms, software, and hardware in a consistent manner.

For example, only about one-third of a customer's specific problem can be solved by AI today. The remaining two-thirds require the use of conventional technologies such as image processing, and solutions cannot be created without an optimal combination of these technologies. We believe that there are very few vendors that can do this on a global basis, so we have a great advantage in this area.

In terms of balancing real-time performance and processing capacity between the edge and the cloud, we have been working on edge computing since the early days. For example, in systems such as ZIA SAFE, which is designed to support safe driving, we have a system that can optimally deploy various functions both at the edge and in the cloud.

ZIA SAFE provides various functions such as driver status monitoring, lane departure, and head-on collision detection. For example, driver monitoring can be handled either on the edge or in the cloud, depending on the application. In addition, real-time requirements such as head-on collisions and lane deviations are handled on the edge side.

We also provide functions such as near-miss analysis related to accidents, but the amount of processing for these is extremely large, so they are performed on the cloud side. Thus,

one of the important points is the ability to distribute functions in the right places for the right applications.

We also have development and optimization technologies for various hardware IPs that enable power-saving and high-performance systems.

It is important that we can provide AI and image processing technologies that we have built up step by step, backed by the development of such GPUs, in a full stack through a wide range of products and services, and optimize them for the customer's domain or our target domain rather than so-called general-purpose technologies, which we believe is our strength.

Priority Measures

- Increase added value in the amusement business
- Develop next generation AI processor IP
  - Expand licensing to other fields by levaraging mass production results of TVs and cameras
- Promote robotics business with a focus on autonomous driving and picking
- Expand business in the safety field and continuously improve value proposition
- Focus on next-generation sensor technology for the next stage of growth
- Improve continuously quality and development process

Yamamoto: We are currently working to increase added value in the amusement business. We have developed our business with the "RS1" graphics processor, which has a very highly competitive edge, and we would like to increase the added value by incorporating peripheral technologies as well.

As for next-generation AI processors, as I mentioned earlier that the ZIA DV720 has been adopted for TVs, we have customers in TVs and cameras. Based on our mass production results to date, we are developing new processors that far exceed the performance of the current DV700 series like the DV720 and DV740. We hope to use them to expand our licenses in new fields.

In the robotics field, where we are focusing our efforts, we will promote businesses such as autonomous driving, "ZIA MOVE," and picking, and at the same time, we plan to create new values by combining them.

In the safety field, we would like to expand our application fields to infrastructure, smart cities,

and other areas, and provide upgrades through OTAs and other means to continuously improve our value proposition.

Sensor technology is also an important area for us, so we will work on developing new sensor technology for the next stage of growth and lead the industry. We will also continue to improve our quality and development process, which is the number one priority for technology-based companies like us and ones that deal with products at the mass production level.
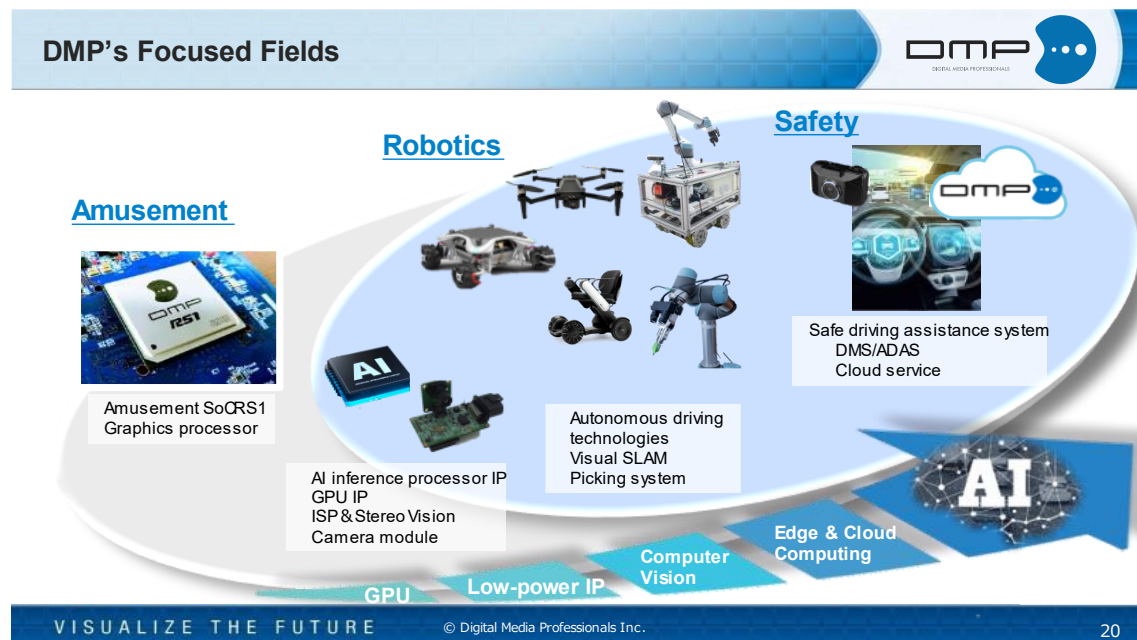
Yamamoto: Based on the before mentioned, we are currently focusing on three fields: amusement, robotics, and safety. These three may seem different from each other, but they all share the same underlying technologies.

That is, GPU, power-saving IP technology, computer vision, cloud and edge computing, and even AI. Using these common platforms, we created a very competitive technology as a one-of-a-kind graphics processor that combines 2D and 3D, for example, in the development of GPUs for the amusement market.

In the robotics field, you can see images of an AI inference processor IP and a camera module at the bottom left of the slide. We will develop such eyes and brains of the robot, and apply them to and realize industrial robots, drones, wheelchairs, picking robots, or a fusion of these to create new robots, and provide our customers with licenses and even final products.

In the safety field, we are currently developing DMS/ADAS as a safe driving assistance system, and offering it to device manufacturers like JVC Kenwood, DENSO TEN, and Sumitomo Mitsui Auto Service, as well as customers who provide services in the automotive industry, or in the leasing and insurance industries.

We will further expand it to infrastructure, transportation, robotics, and other fields, and provide services including cloud service.

Yamamoto: Here is one example of use cases of our AI. As I mentioned earlier, our "ZIA DV720" has been installed in REGZA 4K TVs launched in May this year.

As you know, TVS REGZA is a subsidiary of HISENSE in China, and the combined market share of the two companies is the second largest in the world and the first in Japan, making them very strong customers in this industry. The use of AI not only on TV broadcasts but also on devices that play any content on the Internet will enable a variety of new things.

The image on the top left of the slide shows focus based on the perspective of the scene; AI can determine the content and match it accordingly, for example, in this case, focus on the person's side and blur the focus on the background side to create an image with a very strong sense of perspective.

In the image below left, the skin expression is changed to match the content reflected in the image. In addition, content on the Internet can have noise or stripe noise called banding noise, depending on the speed and bandwidth of the Internet. In the upper right example, AI determines it and automatically uses a technology called super-resolution to smooth the image.

For the above-mentioned plus reducing various types of noise in the below right example, our AI technology is utilized to open a new era in the expressive power of display devices.

Cambrian vision system — DMP

Realize optimal configuration and layout of flexible production lines and 24-hour operation

Attaching the camera to a commercially available robot arm enables various tasks such as picking, welding, and inspection

UNIVERSAL ROBOTS / KUKA / ABB
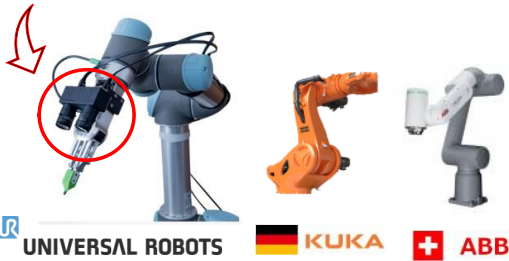
Can be attached to robot arms of major manufacturers (Also compatible with robot arms of Japanese ones)

Compatible with various parts
Capable of picking a wide range of parts, including transparent parts, plastics, and shiny metals

Speed
- Setup time of 2-3 days instead of several weeks required so far
- Recognition time is about 0.2 seconds. With the use of a high-speed industrial robot, a pick cycle time of 2-3 seconds can be achieved.

Robust to ambient light
Unaffected by ambient light and applicable to all external light conditions

Accuracy
Capable of detecting and picking parts with an accuracy of 1 mm or less

Yamamoto: The "Cambrian Vision System" is a vision system that serves as the eye of the picking robot, and has been marketed by DMP since last year with exclusive sales rights in Japan.

There has been a shift from conventional mass production lines to flexible or cell production lines for high-mix low-volume production, and in such places, cooperative robots work together with people, and those robots operate 24 hours a day to perform a variety of tasks.

In this field, European robot manufacturers are by far the strongest, for example, there is a robot manufacturer called Universal Robots. By attaching a camera to the arm of a robot, which until now has been computer-controlled, it is now possible to perform complicated tasks very efficiently and at high speed, and we are providing this system. Cambrian integrates for major robot manufacturers other than Universal Robots as well as for major Japanese robot manufacturers through us.
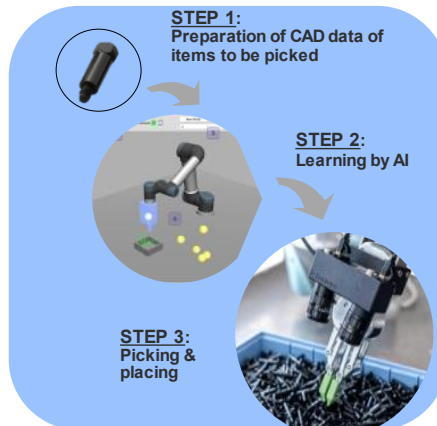
One of the features of the Cambrian system is that it can handle a very wide variety of parts. It can handle a wide range of parts, including transparent ones and shiny metals, which is probably almost impossible to do with any system other than Cambrian's today. It can also be set up in two to three days, about one-fifth the time of conventional systems. Recognition time is also so short that the work is completed in a very short cycle.

In addition, the system is not affected by various types of ambient light and can work stably under a variety of conditions. In terms of accuracy, it can detect and pick up parts with an accuracy of less than 1 mm.

Cambrian vision system

DMP

Bin picking

Cable insertion

STEP 1:
Preparation of CAD data of items to be picked

STEP 2:
Learning by AI

STEP 3:
Picking & placing

Kitting

Assembly/ Welding/Inspection

Setup time 2-3 days total (less than one -fifth the time of conventional systems)

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Yamamoto: Examples of work with the Cambrian Vision System include cable and connector insertion, assembly, welding, and inspection.

Let me show you some videos.

(Videos were played)

This video shows the bin picking of transparent and black-surfaced parts, which are usually very difficult to handle. Furthermore, the conditions are very bad with light, but the picking can be done in a stable manner. This is a unique point.

Next is connector insertion. Simple tasks such as connector insertion are actually a very large part of the manufacturing process, and automation by robots is an important issue, which is requested by many customers. The robot with the Cambrian system can also insert connectors with great dexterity, even small ones such as USB connectors, for example.
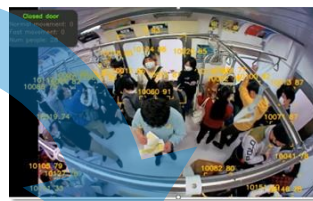
Next is kitting. As a pre-process for assembly, various parts are kitted.

Finally, there comes the actual assembly. Besides inserting connectors, it can be used to assemble various parts.

Application of ZIA SAFE to infrastructure and robotics

Safe driving assistance system

Infrastructure: Analysis of dangerous behaviors in trains

Robotics: Digital safety fence "DMP Robot Safety"

Yamamoto: Next is "ZIA SAFE," an integrated software platform for safe driving assistance system for our customers, mainly in the automotive industry.

This is applied, for example, to infrastructure and transportation. The image on the upper right of the slide shows an application for analyzing the risky behaviors of a person in a railroad vehicle. In the robotics field, we are working on a digital safety fence. When a cooperative robot works with a human, the system using an AI camera determines the skeletal structure of the human and robot and gives an alarm to prevent interference.

We are looking to expand our business by making the most of the platforms we have now, in such a variety of fields.

Smart Pole - Approach to Realizing Smart Cities

Prophesee's event-based camera

DMP's ZIAC3 AI processor module

Source: Restar Holdings

· Surveillance camera viewer
· Road Anomaly Detection
· Human and vehicle flow measurement data
· Generate big data, etc

Event sensor detectable in the dark

Normal camera   Event sensor

- Detects moving people and vehicles at night and in backlight
- Record day and night with low-capacity data
- Utilize accumulated big data for urban development and resilience

DMP's AI processor and event-based camera (neuromorphic sensor) that imitates the function of the human retina/brain to detect people and cars in dark areas

Yamamoto: Regarding sensors, we are currently working on an event-based sensor with a

French-based company called Prophesee. The example on the slide is a smart pole developed by DMP, Restar Holdings, and Prophesee.

Let me explain the features of Prophesee's event-based sensor. While ordinary sensors always output images, event-based sensors produce images only when something changes. It imitates the movement of the human retina and brain, and is a very advanced technology so-called neuromorphic sensor.

Using this technology, images can be taken even in very dark places and high-speed movements can be tracked. Furthermore, it is characterized by low power consumption. The three companies are working together to provide a system that uses this technology to analyze the movements of people and vehicles 24 hours a day in the areas of smart cities and the like.
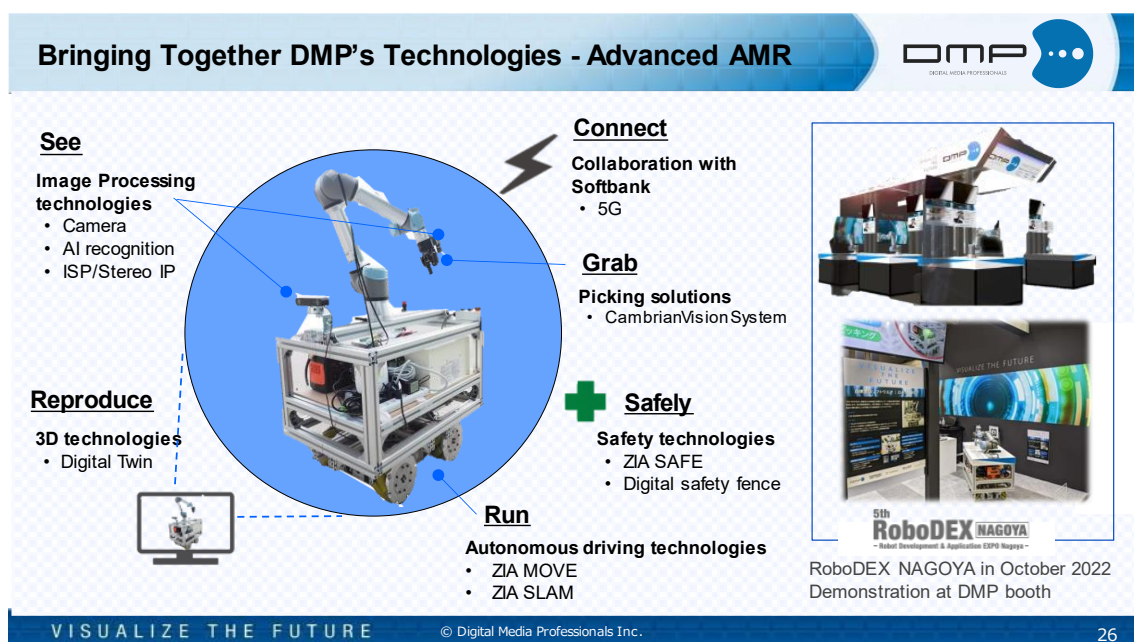
Yamamoto: I think it is not too much to say that this is the culmination of our technologies. It is an advanced AMR (Autonomous Mobile Robot) by combining an AMR that can move autonomously with picking technology. It can perform a variety of tasks, such as picking things up as it moves. In a sense, I believe this is the next generation of robots, which can "see," "run," and "grab" by utilizing our technologies.

For "seeing," we use our image processing, camera, and AI technologies. For "running," we use our autonomous driving technology called "ZIA MOVE", and for "grabbing," we use "Cambrian Vision System."

For "connecting," we are currently working with Softbank to connect the robot's environment to a 5G network and enable it to do various things from the cloud. Furthermore, to "safely" use such robots, we use our "ZIA SAFE" safety technology.

For "reproducing," we use our 3D technology. We construct such robots and an environment including the robots in a virtual space, which is often referred to as a "digital twin" these days. By doing so, we would like to build a system whereby the development, testing, and verification of the robot system, as well as handling problems as they arise, can be done in a virtual space.

We demonstrated an actual working model at "RoboDEX" held in Nagoya, Japan, from October 26 to 28, 2022.

(The video was played)

This is a system in which an AMR using our autonomous driving system called "ZIA MOVE" moves, and a Cambrian picking robot on top of it picks bolts from among the items in the tray.

In addition, the picked items can be transported to another location for kitting or unloading, which is called placing. This system was developed by a group consisting of three companies and a group: DMP, Cambrian, Softbank, and iRooBO.

We will continue our efforts to realize the competitive advantage we have established in graphics LSI in other areas. Thank you very much for your kind attention.

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Q&A Session

Question 1: You mentioned advanced AMR, do you have plans to sell finished products?

Answer 1:

Osawa: Selling finished products is naturally an option. However, we do not think it is possible for us to do it on our own, and we believe that collaboration with partners is necessary.

A realistic solution would be to provide a combination of products and services with elemental technologies related to autonomous driving and picking, in accordance with customer needs.

Yamamoto: For example, if a customer is developing an AMR, we can develop a robot for that application with the customer and provide the necessary technologies. In addition, we could also provide professional services, including integration.

Besides, we would like to invest in sales of hardware products in addition to licenses, such as sales of picking robots themselves or camera modules that we have developed.

Question 2: For professional service in the robotics field, you explained that your customers' R&D is in a transitional phase. What do you mean by that?

Answer 2:

Osawa: While our customers are conducting PoC and R&D, they ask us to provide professional services (contracted development services) for them.

When the PoC is over, whether to go on to full-scale development or to stop and find a new theme depends not only on the success or failure of the PoC itself, but also on the customer's various circumstances.

In this sense, please understand that our professional services have temporarily decreased because some customers have made such a choice for PoC projects. We believe that expanding our customer base as much as possible will help mitigate the risk.

Question 3: In terms of sales, there remains a high dependence on the amusement field, and sales in the safety and robotics fields, which are your focused areas, are rather small. How do you plan to expand it?

Answer 3:

Osawa: We have launched RS1 in the amusement field, and our approach is to earn stable income from this field and invest it in the AI field, such as robotics and safety, to grow those fields.

In order to expand the safety and robotics fields, in addition to expanding our customer base, we would like to focus on leading customers' projects and scale them.

In terms of profit, as we have stated as a KPI in our mid-term business plan, we will increase the sales amount or ratio of our IP core license business with a relatively high profit margin. With this in mind, we would like to further grow our focused areas by expanding our customer base and deepening collaboration with leading customers.