



Quarterly Financial Results Briefing 3rd Quarter of FY2022

QD Laser, Inc.
February 2023

Mission

**With the power of the semiconductor laser,
“I can’t” becomes “I can”.**

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What was once thought to be impossible is now a reality; we have become the only company in the world to successfully mass produce Quantum Dot LASERs.

Our laser technology will enable dramatic improvements in our ability to process information, support visually impaired people, prevent eye diseases, and enhance vision, continually pushing the boundaries of human possibility.

01

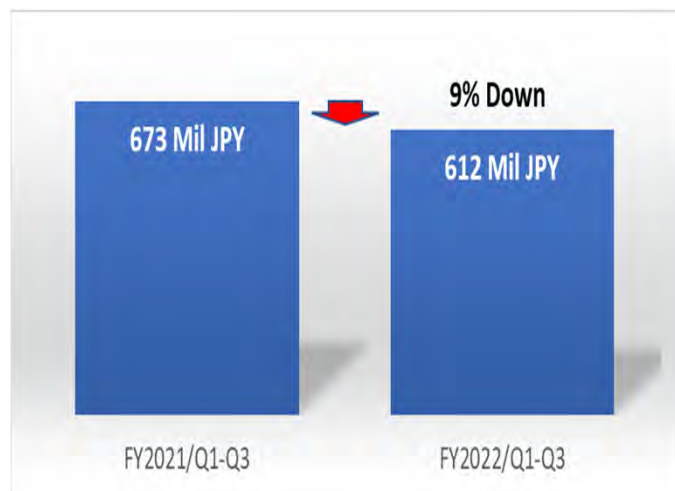
Financial Results for FY2022-Q3

Financial Results Highlights for FY2022-Q3 vs FY2021-Q3

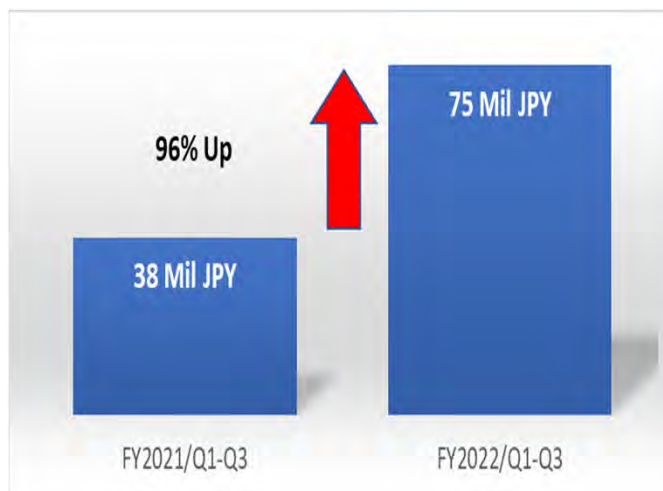
01 **LD business parts sales decreased 9% YoY to 612 million yen, while LEW business sales increased 96% YoY to 75 million yen. Company-wide sales decreased by 16% YoY.**

In the LD business, sales of compact visible lasers increased by 31% year-on-year to 166 million yen. The sales reduction of high-power lasers due to the COVID-19 countermeasures in China and quantum-dot lasers due to the developmental delay and the transfer of NRE to the LEW business resulted in the overall sales decrease of the LD business. The LEW business increased significantly by 96% due to contract development and the start of optometry services. Owing to the sales of three new products starting in the fourth quarter, full-year sales are expected to achieve the planned sales of 239 million yen.

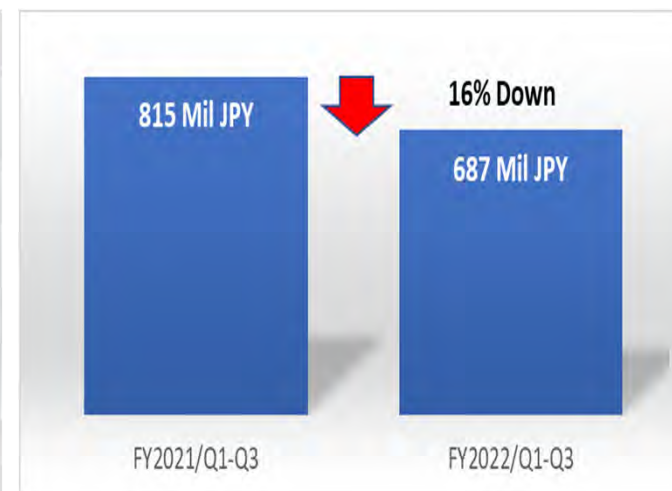
LD Parts Sales



LEW Sales



Total Sales

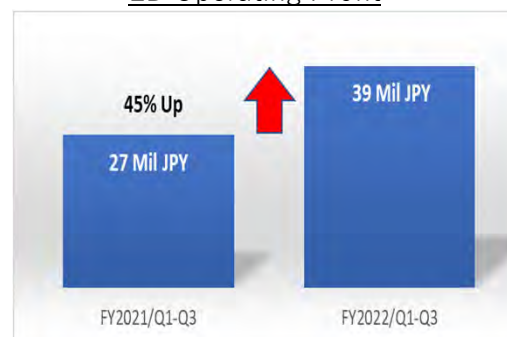


Financial Results Highlights for FY2022-Q3 vs FY2021-Q3

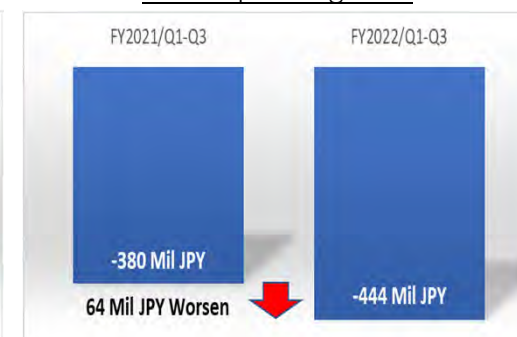
02 LD business operating profit increased by 45% YoY to 39 million yen. Company-wide operating loss worsened by 64 million yen (17%) YoY.

The LD business's operating profit increased by 45% YoY to 39 million yen despite a gross profit decline due to lower sales since SG&A expenses decreased significantly. In the LEW business, the operating loss worsened by 74 million yen YoY due to development costs related to three new products. Company-wide operating loss declined by 64 million yen due to SG&A expenses increase by the development costs mentioned above. The full-year operating loss is expected to be within the plan.

LD Operating Profit



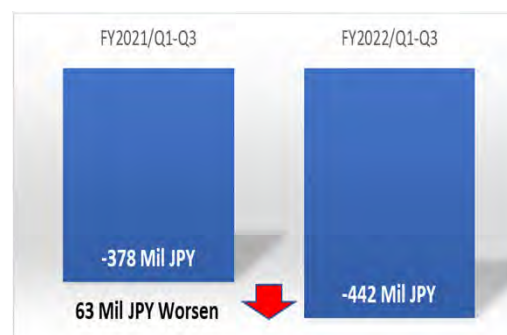
Total Operating Loss



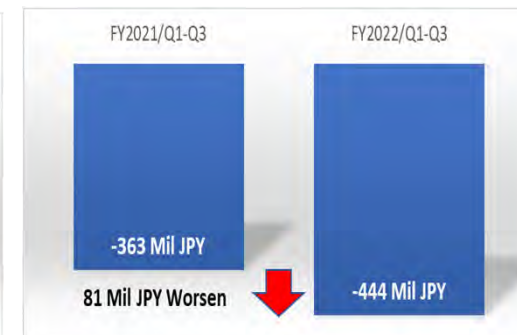
03 Ordinary loss worsened by 63 million yen (17%) YoY, and net loss worsened by 81 million yen (22%) YoY.

Ordinary loss worsened by 63 million yen YoY, on par with an operating loss. In the same period of the previous year, there was an extraordinary profit of 21 million yen due to the reversal of asset retirement obligations, so the quarterly net loss worsened by 81 million yen.

Ordinary Loss



Quarterly Net Loss



Financial Result Highlights for FY2022-Q3 vs FY2021-Q3

Decrease in sales and increase in losses compared with the same period of the previous year

Sales in the LEW business increased by 96% YoY, but parts sales decreased by 9% YoY in the LD business. Combined with the decrease in NRE, the company sales fell by 16% YoY. Operating profit in the LD business increased 45% YoY to 39 million yen. However, company-wide operating loss worsened by 17% (64 million yen) YoY due to development costs related to three new products in the LEW business.

Performance Summary

| (Million JPY) | FY2022 Q1-Q3 | FY2021 Q1-Q3 | YOY |
|---------------------------------|-----------------|-----------------|----------------|
| Sales | 687 | 815 | △16% (△127) |
| (LD) | 612 | 776 | △21% |
| (LEW) | 75 | 38 | +96% |
| Operating Profit or Loss (△) | △ 444 | △380 | △64 |
| (LD) | 39 | 27 | +12 |
| (LEW) | △ 268 | △194 | △74 |
| Ordinary Loss (△) | △ 442 | △378 | △63 |
| Quarterly Net Loss (△) | △ 444 | △363 | △81 |



Sales by Product Group

| (Million JPY) | FY2022 Q1-Q3 | FY2021 Q1-Q3 | YOY |
|-----------------------|-----------------|-----------------|-------|
| DFB Laser | 222 | 251 | △11% |
| Compact Visible Laser | 166 | 127 | +31% |
| High-Power Laser | 155 | 211 | △26% |
| Quantum Dot Laser | 67 | 83 | △19% |
| LD Parts Total | 612 | 673 | △9% |
| NRE | — | 102 | △100% |
| LD Total | 612 | 776 | △21% |
| LEW Total | 75 | 38 | +96% |
| Grand Total | 687 | 815 | △16% |

Balance Sheet

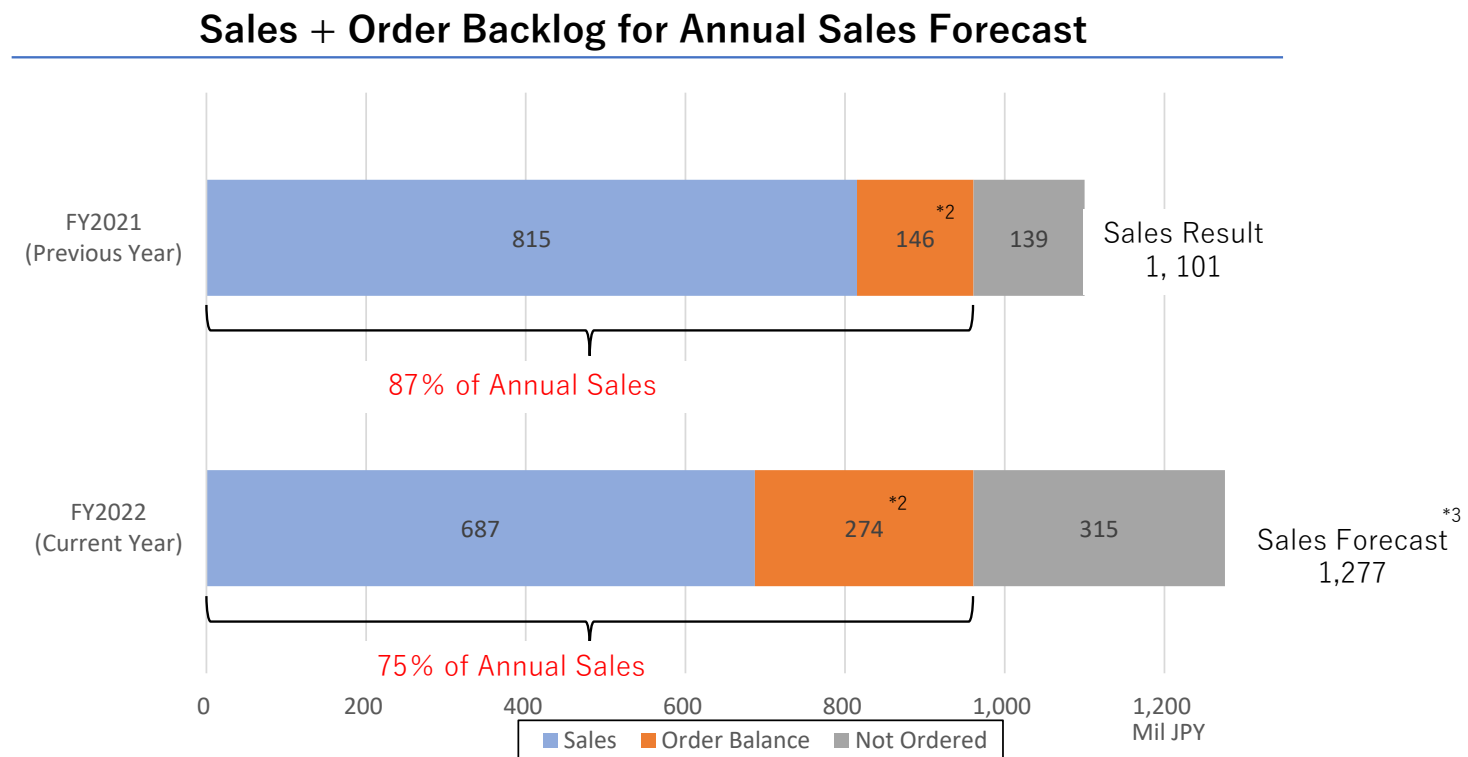
Total assets decreased by 165 million yen due to cash, deposits, accounts receivable decreases, etc. Total liabilities decreased by 33 million yen due to reductions in long-term loans payable within one year. The equity ratio was 89.2% (88.9%^{*1} at the end of the previous term).

Balance Sheet

| Million JPY | End of September 2022 | End of March 2022 | Increase/Decrease |
|---|-----------------------|-------------------|-------------------|
| Current Assets | 3,595 | 3,729 | △133 |
| Fixed Assets | 256 | 288 | △31 |
| Total Assets | 3,852 | 4,018 | △165 |
| Current Liabilities | 356 | 383 | △27 |
| Fixed Liabilities | 45 | 51 | △6 |
| Total Liabilities | 401 | 434 | △33 |
| Total Net Assets | 3,450 | 3,583 | △132 |
| Total Liabilities and Net Assets | 3,852 | 4,018 | △165 |

Order Status

As of the end of the 3rd quarter, sales + order backlog^{*1} (planned sales^{*3} for the current fiscal year) is 75% of annual forecast sales.



DFB Lasers for Precision Machining and Measurement : Sales in FY2022-Q3

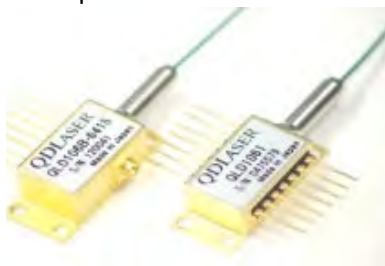
222 million JPY sales, decreased by 11% YOY.

- North America: Sales of lasers for processing equipment decreased by 16% YOY due to overstocks.
- Europe: Sales of lasers for processing equipment decreased by 37% YOY due to overstocks.
- Europe: Sales of light sources for inspection equipment in the semiconductor wafer process increased by 29% YOY.
- North America: Sales of light sources for sensors increased by 18.06 million JPY YOY.
- Japan : Sales of light sources for ophthalmic diagnosis increased by 20% YOY
- JAPAN : Sales of light source prototypes for inspection equipment in the semiconductor wafer process increased by 3.55 million JPY YOY.

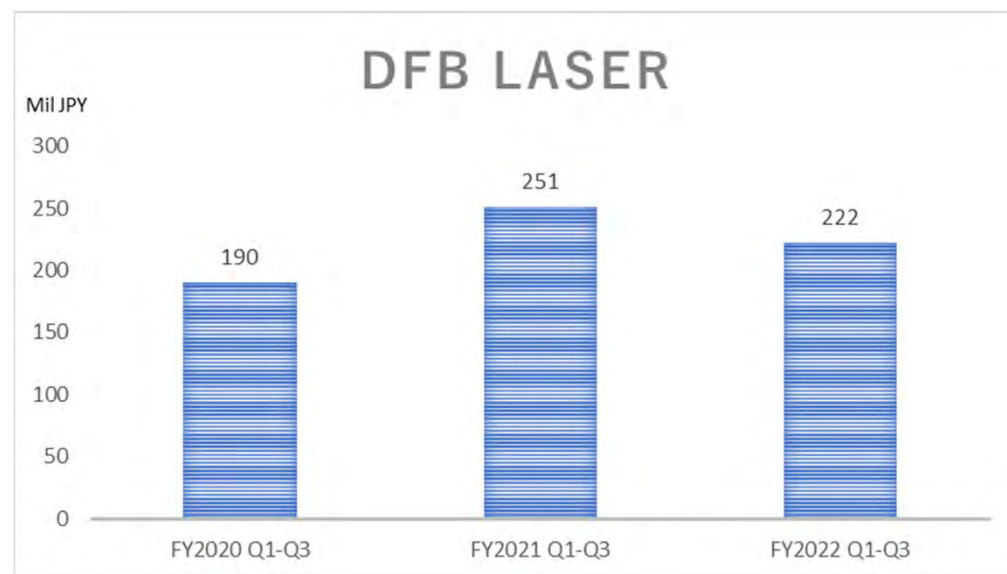
DFB lasers

Left : for 15 ps pulsed operation

Right : for 50 ps pulsed,
ns pulsed, and CW operations



Cumulative Sales of Q1 - Q3 in
FY2020, 2021 and 2022



Compact Visible Lasers : Sales in FY2022-Q3

166 million JPY sales, increased by 31% YOY.

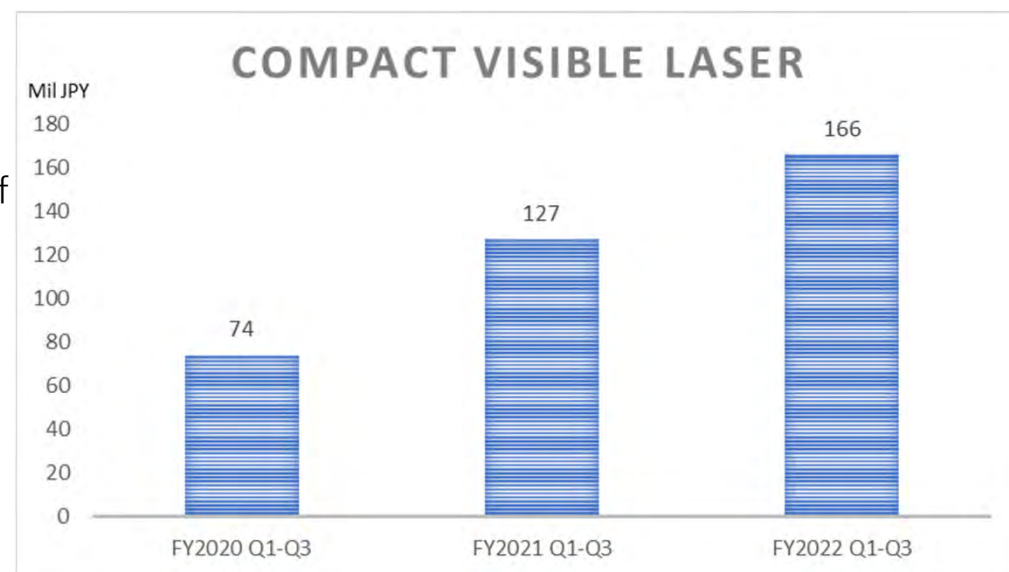
- China: Sales increased by 22% YOY with the expanding mass production, including a new application (cell sorter*1) in the biomedical equipment manufacturer.
- Europe: Orders from a biomedical STED*2 microscope manufacturer resumed last fiscal year, with a forecast of 100pcs in 2022-2023. The sales of this term were 3.24 million JPY.
- Europe: Newly certified by one customer for microscope applications last fiscal year, with this term sales increased by 289% YOY.
- North America: Sales increased by 599% YOY with starting of mass production for biomedical applications
- Japan : Sales increased by 93% YOY with starting of mass production for biomedical equipment.

Compact visible lasers

Left: green,
Middle: yellow-green, and
Right: orange.



Cumulative Sales of Q1 - Q3 in
FY2020, 2021 and 2022



High-Power Lasers : Sales in FY2022-Q3

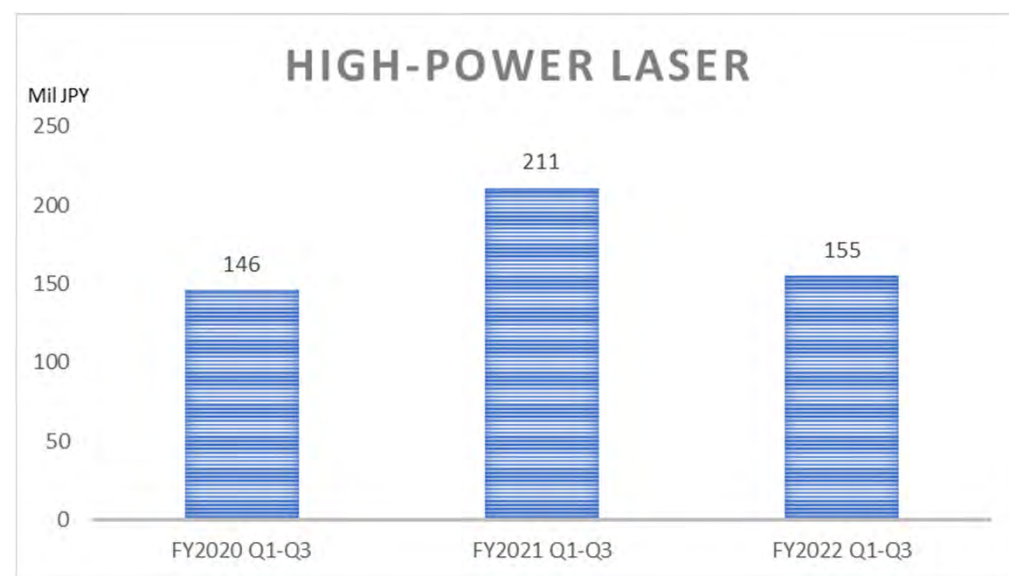
155 million JPY sales, decreased by 26% YOY.

- China: Orders of light sources for sensors and levelers decreased by 57% YOY due to the suspension of factory operations under COVID-19.
- Europe: Increased sales of light sources for sensors by 5.74 million JPY YOY.
- North America: Increased sales of light sources for particle counters in semiconductor factories with 4.33 million JPY.
- Japan : Sales of light sources for sensors of wafer transfer machines to be used in semiconductor factories increased by 23% YOY.
- Japan : Sales of light sources for particle counters in semiconductor factories increased by 11% YOY.



High-power lasers
TO package

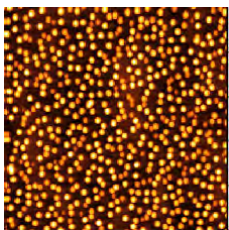
Cumulative Sales of Q1 - Q3 in
FY2020, 2021 and 2022



Quantum Dot Lasers^{*1} : Sales in FY2022-Q3

67 million JPY sales, decreased by 19% YOY.

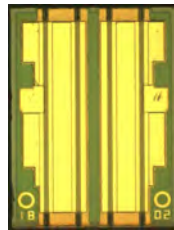
- QD Laser is working on quantum-dot lasers for silicon photonics with nine customers in Japan, the US, and Europe.
- Japan: Completed the development of highly efficient chips for the optical connector and chip-to-chip communication customer. Shipped chips to prepare for mass production. Continuing activities to reduce costs. Mass production is scheduled to start in 2023.
- North America: Shipped to customers working on LiDAR and the optical connector and chip-to-chip communication.
- North America: Under discussion about the following order from the customer of optical connector/ chip-to-chip communication shipped in the previous fiscal year.
- Seven universities and research institutes in Europe, the US, and Asia : Received orders and shipped quantum dot wafers for research.



Quantum dot

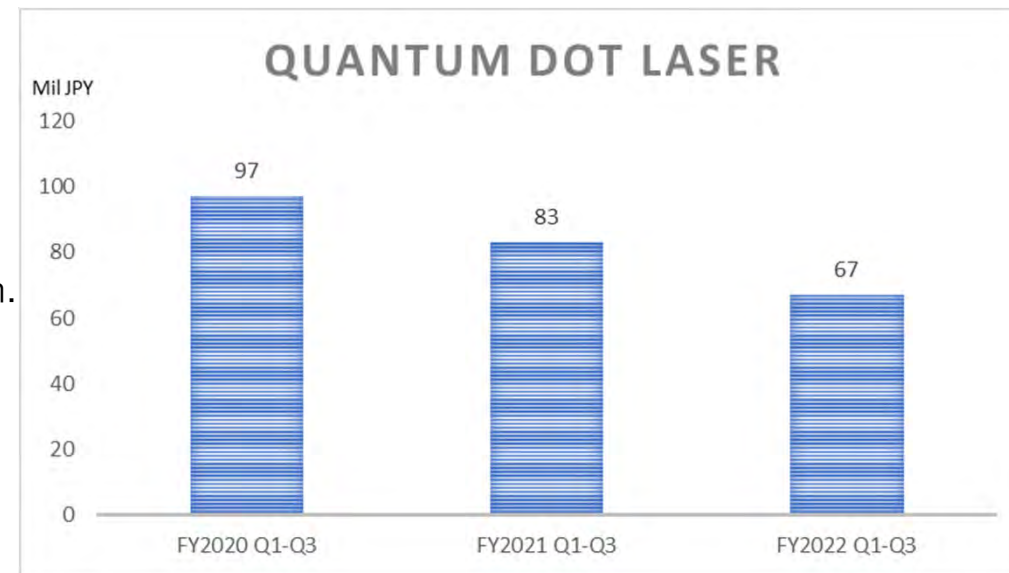


Quantum dot wafer



Quantum dot laser chip

Cumulative Sales of Q1 - Q3 in
FY2020, 2021 and 2022



Laser Eyewear (LEW) : Sales in FY2022-Q3

75 million JPY sales, increased by 96% YOY.

■ RETISSA Medical

- Introducing RETISSA Medical, together with Display II and ON HAND to about thirty medical institutions interested in retinal imaging under collaboration with SEED.

■ RETISSA Display II /CAM (Consumer Product)

- Started support for an NPO institution named “Albino Donut Society” under collaboration with MIRAIRO :
- Local Municipality Subsidy with 90% benefit registered in 11 areas in Tokyo Plan to expand to many cities nationwide.
- Resumed sales in China with a Chinese agency, and is currently applying for a bid for a school for the blind in Xi'an

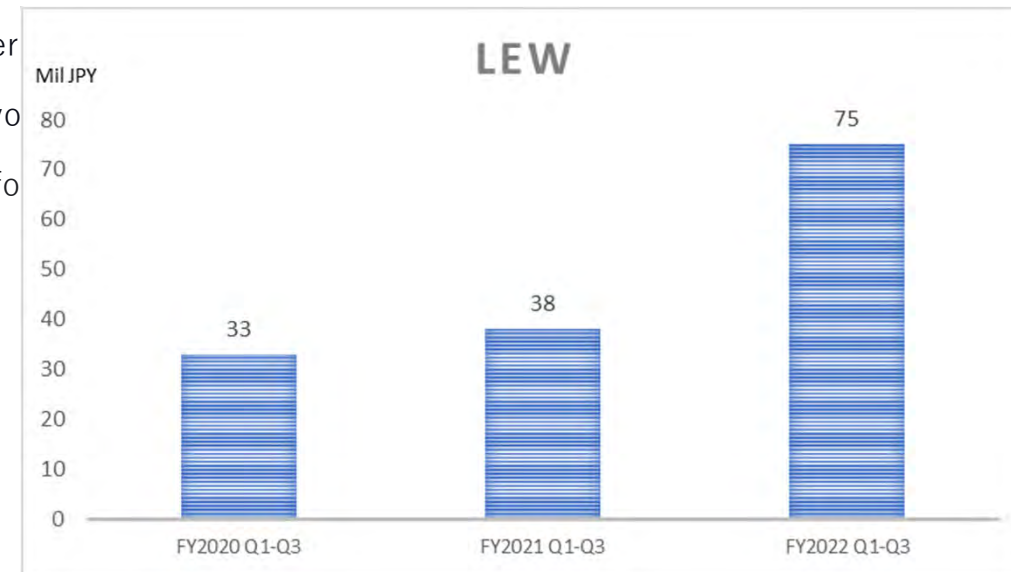
■ NRE

- A retinal projection device under joint development was exhibited at the TDK booth of CES (January 5-January 8) held in Las Vegas, USA.
- Developed MEOCHECK with a commission of an ophthalmic medical equipment agency.

■ New three products

- ONHNAD: Received an order of 240 units from a domestic distributor.
- Exhibited at "Book Fair for Libraries 2022" held in various parts of Japan
- RNV: Expected to receive orders for 120 units in February.
- Progress in business collaboration with digital camera manufacturers.
- MEOCHECK: Concluded a general agency agreement with an ophthalmic medical equipment agency. Received an order for 150 units.
- Conducted a trial to introduce it into the regular health checkup of Nihon Kotsu taxi drivers.

Cumulative Sales of Q1 - Q3 in
FY2020, 2021 and 2022



RETISSA Display II



RD2CAM



RETISSA Medical

Revision of Annual Forecast

Annual forecast is revised on February 14, 2023.

Revision of Annual Forecast

| | Sales | Operating Loss | Ordinary Loss | Net Loss | Net Loss per Share |
|---|---------|----------------|---------------|----------|--------------------|
| | Mil JPY | Mil JPY | Mil JPY | Mil JPY | JPY |
| Previous announcement ^{*1} forecast (A) | 1,277 | △567 | △558 | △562 | △15.73 |
| (LD) | 1,037 | 100 | | | |
| (LEW) | 239 | △367 | | | |
| Revised forecast (B) | 1,129 | △567 | △558 | △562 | △15.61 |
| (LD) | 889 | 64 | | | |
| (LEW) | 239 | △348 | | | |
| Increase / decrease amount (B-A) | △147 | — | — | — | |
| (LD) | △147 | △35 | | | |
| (LEW) | — | +18 | | | |
| Increase / decrease ratio (%) | △11.5 | — | — | — | |
| (LD) | △14.2 | △35.7 | | | |
| (LEW) | — | +5.1 | | | |
| Previous year result | 1,101 | △931 | △893 | △880 | △25.17 |
| (LD) | 1,006 | 43 | | | |
| (LEW) | 94 | △693 | | | |

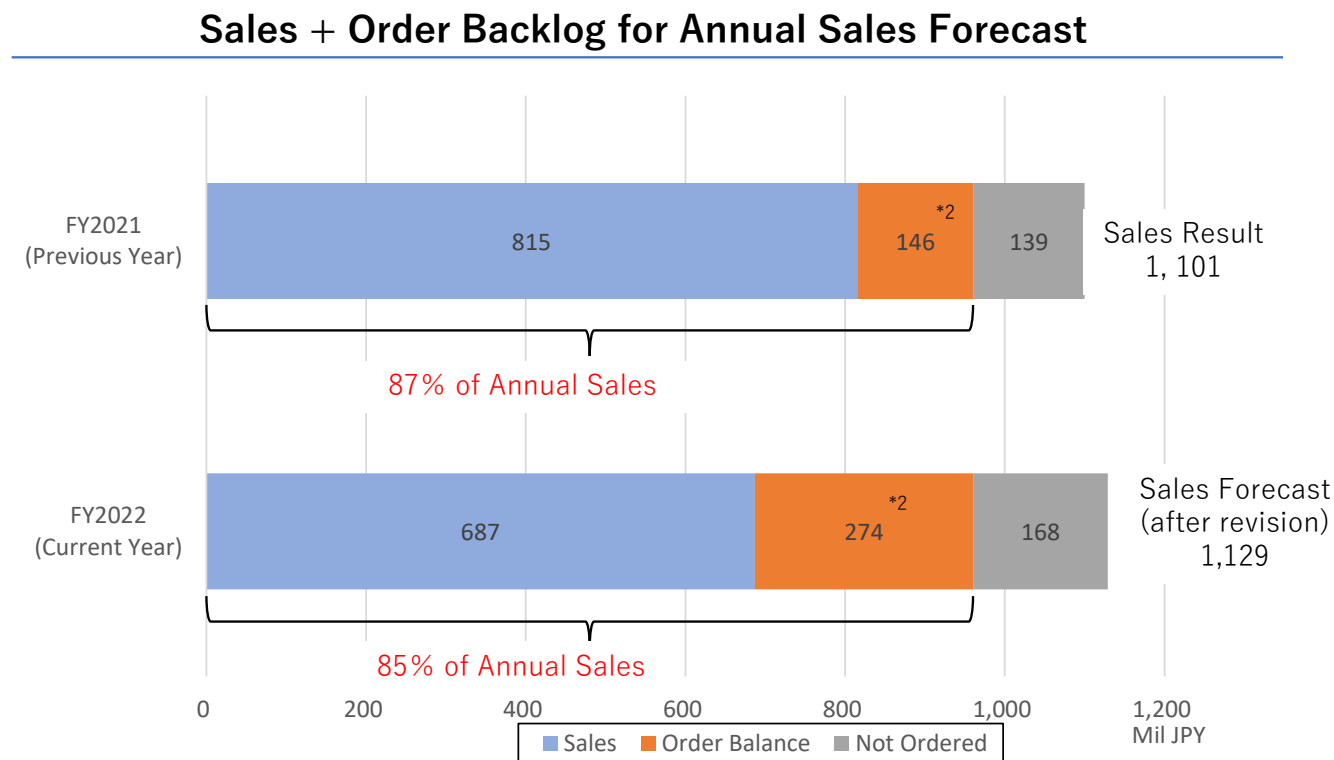
In the business environment surrounding the laser device business, demand for high-power lasers has declined due to the continued lockdown associated with the COVID-19 countermeasures in China. Even after the zero-corona policy ended, demand remained low. In addition, regarding quantum dot lasers, there are delays in the schedule due to consideration of updating specifications for joint development other than mass production projects.

We have determined that the impact will continue during the current fiscal year with unexpected recovery, so we have revised our earnings forecast. Although sales decreased by 147 million yen, operating income, ordinary income, and net income are expected to align with initial projections because selling, general and administrative expenses are to decrease, mainly commissions and personnel expenses.

We will continue to actively develop markets where our unique products can be applied and continue activities aimed at steady growth while monitoring the market recovery. At the same time, we will continue to develop new products and services.

Order Status (after revision of sales forecast)

As of the end of the 3rd quarter, sales + order backlog^{*1} (planned sales for the current fiscal year) is 85% of annual forecast sales



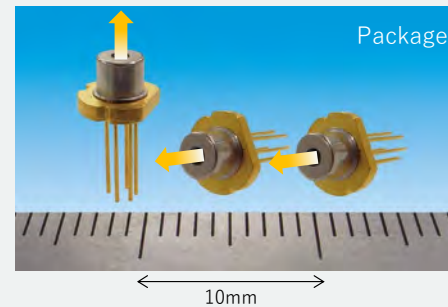
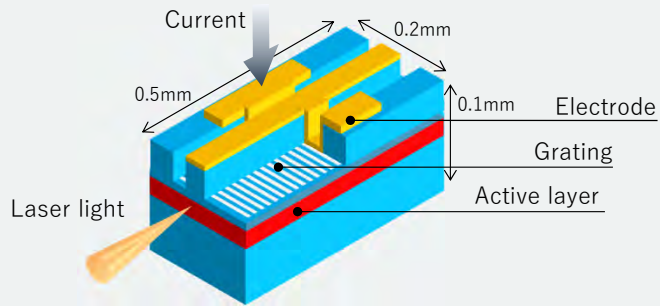
02

Semiconductor Laser Devices

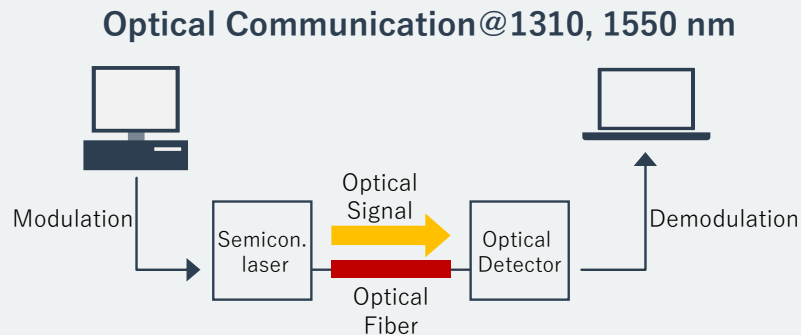
Solid Earnings Base and High Growth Potential
under Global Laser Market Expansion

What is a Semiconductor Laser?

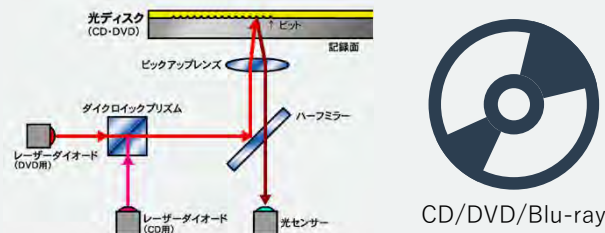
A tiny device to provide laser light by injecting an electric current through a semiconductor.



First Large-Scale Applications of Semiconductor Lasers: Optical communication and optical recording have significantly contributed to the global information and communication infrastructure.



Optical Recording@660nm, 450nm



Expected Role of QD Laser, Inc.

Semiconductor Laser History and Our Position in the 3rd Phase

1st phase

Proposals of Scientific Principles and Invention of Laser (1960s)

Laser

A technology used in recording, communication, processing and sensing.

Applied in various industries such as medicine, home appliances, automobiles, manufacturing and entertainment.

2nd phase

Invention of Semiconductor Lasers, Building out Optical Communication and the Internet (1995~)

Semiconductor lasers and packaging



Semiconductor laser:

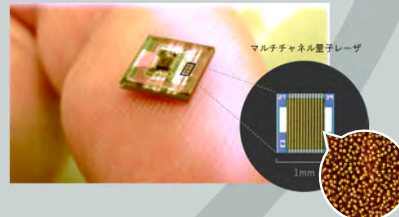
A small element with a length of about 1 mm that causes a laser to oscillate by passing a current through a semiconductor. Compared with other lasers, possesses excellent properties such as ultra-small size, high-speed modulation characteristics reaching several 10s of GHz, high power-to-light conversion efficiency (in several 10s of %), and wavelength controllability, etc.

3rd phase

Accelerating the Integration of Humans and Information(2020s~)

Nanotechnology of QD laser to generate and control laser light

Image of quantum dots taken by an atomic force microscope and a quantum dot laser equipped on fingertip-sized silicon chip as 100Gbps optical transceiver



Quantum Dot Laser:

A semiconductor laser adopting a quantum dot structure which has a semiconductor nano-sized microcrystal in its active layer. Compared with existing semiconductor lasers, these lasers are superior in temperature stability, temperature resistance, and low noise.

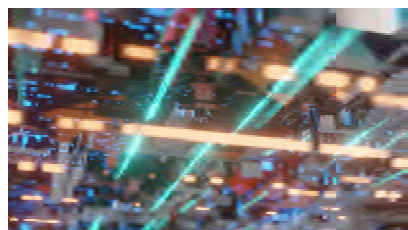
Fields where our lasers are applied (being Developed or Commercialized)

- 5G base station
- Supercomputer
- Visual Aid
- Smart Glass
- Optical Interconnect
- Facial recognition
- Fundus photography
- Micromachining
- In-Vehicle communication
- LiDAR for autonomous cars
- Biophotonics
- Visual field testing

New Era for Semiconductor Lasers

We are developing products for all applications shown below and have launched a part of them.

- Optical interconnect ⇒ enhancing the computing and data processing power



- Display ⇒ AR/VR/XR

Smart Glasses

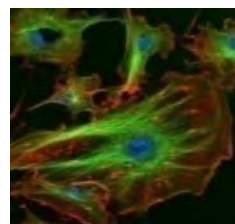


Head-up display



- Sensor ⇒ Precise detection of human and material (shape, position, velocity)

Biomedical



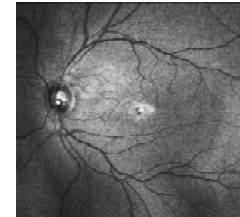
Motion recognition



Face recognition



Fundus, Sight, Field of view



LiDAR (Automotive, Robotics, Drone)



- Micromachining ⇒ Highly functional/high precision device manufacturing



Cutting Edge Semiconductor Laser Technology with Several Unique Features

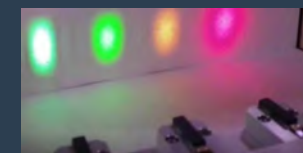
Quantum Dot

Succeeded in the mass production of quantum dot lasers with **world's highest operating temperature**^{*1} and developed **world's smallest silicon-based optical transceiver**^{*2}

Diffraction Grating

Technology to form periodic refractive index change inside the laser enabling arbitrary wavelength control.

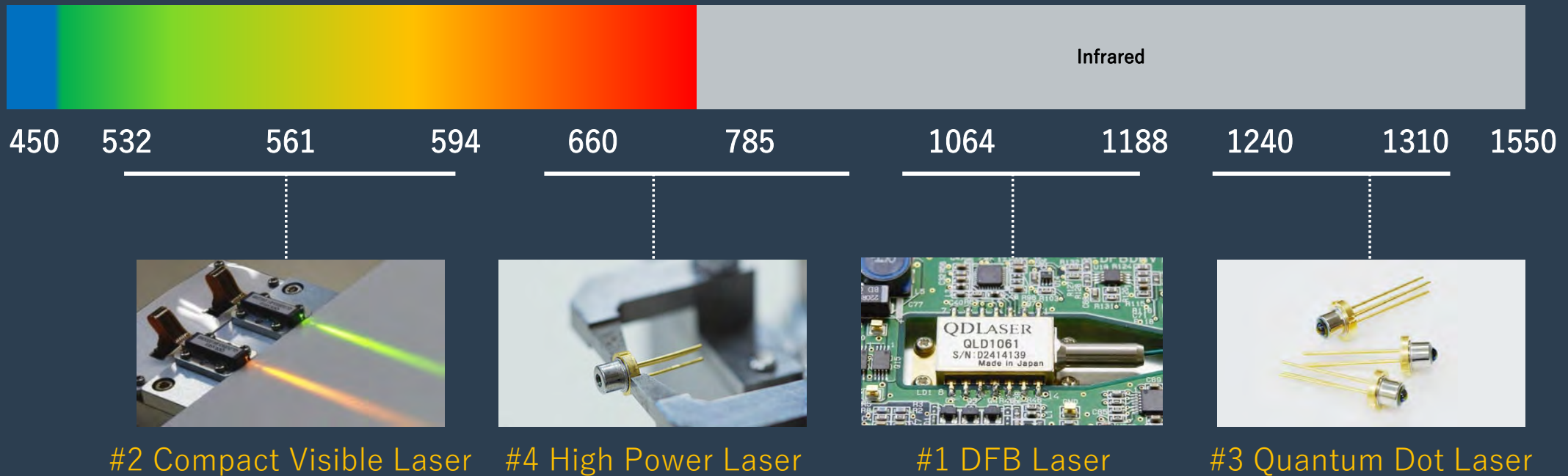
World's first*⁵ commercialization of yellow/orange semiconductor laser



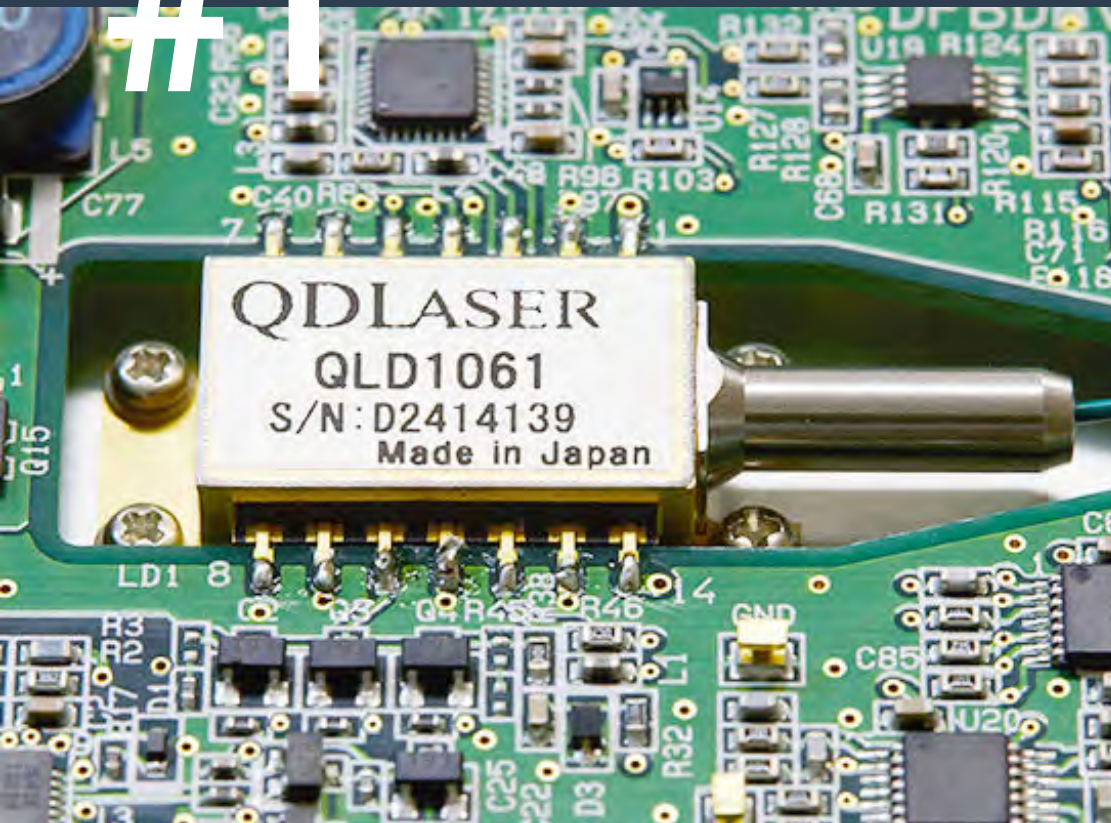
- *4: Prism Awards honour photonic innovations at Photonics West 2019
- *5: Japan/U.S. PATENT JP5362301/US8896911

Variations on semiconductor lasers developed and sold by QD Laser

QD Laser provides a wide range of semiconductor lasers with wavelengths suitable for each application



#1



DFB Laser

- Applications: Laser processing, measurement, and LiDAR.

Amplifies only the wavelength selected by the diffraction grating. **High output power, high stability, and low noise.** Provides the optimum wavelength for a wide range of applications and required performance.

- **Wavelength lineup of** 1030, 1053, 1064, 1080, 1120, 1180nm
- **Provided in 1nm unit**
- Non-heated processing is possible by **short-pulse operation in picoseconds.**
- **Highly stable and low noise** enables high-precision machining and measurement.
- Only a few companies worldwide can manufacture DFB lasers in this wavelength band.

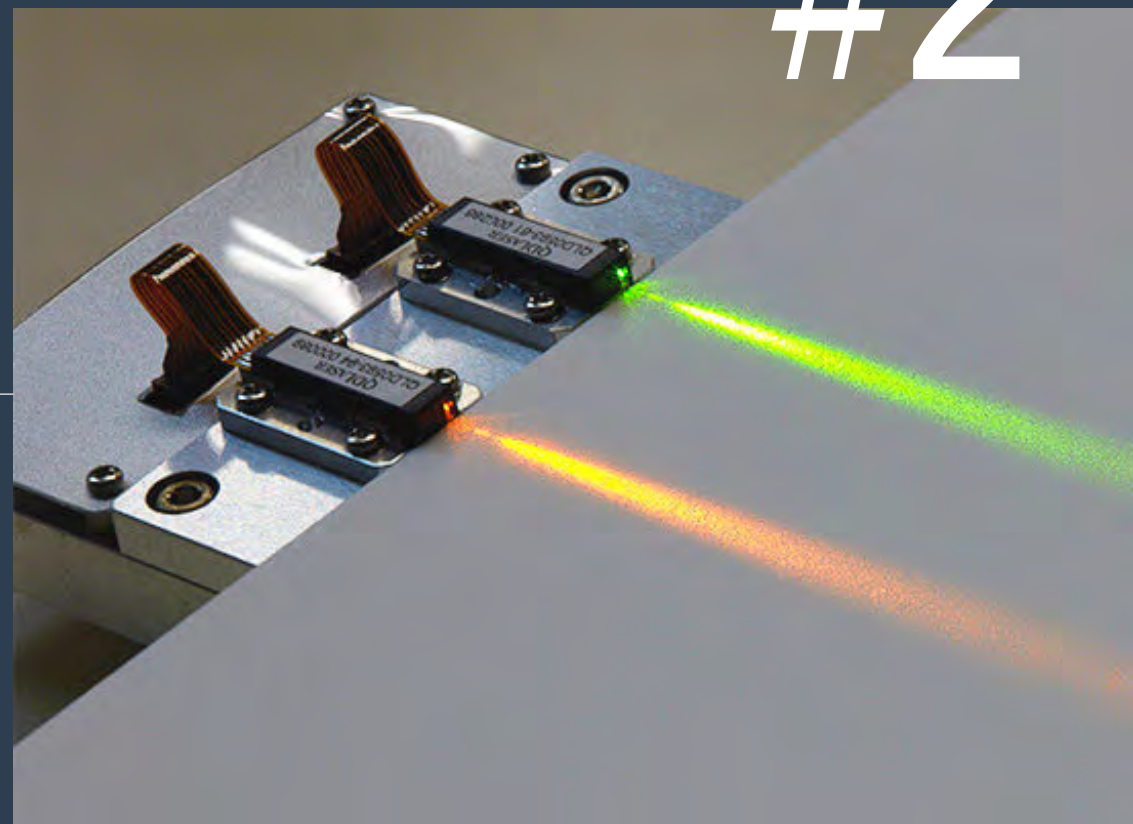
Compact Visible Laser Small Multi-Color Laser Light Source

- Application : Biomedical

Green, Yellow-Green, and Orange visible laser

The **patented technology** * 1 realizes a **small device that other companies cannot manufacture**.

- Wavelength lineup of **532, 561, and 594nm**.
- Used for **"flow cytometer", "cell sorter", "laser microscope", "fundus diagnostics"** etc.
- Wavelength range where there is no direct emitting semiconductor lasers.
- Wavelength doubling with a nonlinear optical crystal.
- Unique semiconductor laser chip and wavelength conversion crystal package achieves miniaturization.
- **Low noise and excellent pulse stability**.



*1 : Japan/U.S. PATENT JP5362301/US8896911

Growth Strategy of Compact Visible Laser

● Current product sales volume and market share

| Wavelength (nm) | Color | FY2021 Sales in units | FY2022 Planned Sales in units | Number of customers | Market share |
|-----------------|--------------|-----------------------|-------------------------------|---------------------|--------------|
| 532 | green | 17 | 17 | 2 | ※ |
| 561 | Yellow green | 1,055 | 1,308 | 6 | 33% |
| 594 | Orange | 13 | 13 | 1 | ※ |
| Total | | 1,085 | 1,338 | 8 | 17% |

※less than1%

● Aiming for annual growth of 30% from FY2011 ⇒ 3 measures ⇒ Market share 44% @ FY2027*

1. Promotion

- Increase in client companies: 8 ⇒ 13 companies
- Increase of introduced equipment: 9 ⇒ 26 models

2. New laser development

- New wavelengths (488nm, 552nm): Market of 11,500 units
- High output power(30 ⇒ 50mW): Market of 3,800 units

3. Solution

- Box module : Market of 10,600 units



- Multicolor light sources(next page) : Market of 12,500 units

*1For all the devices with the power of less than 50mW

Launch of Palm-Sized Multi-color Compact Laser Light Source for Biomedical Equipment

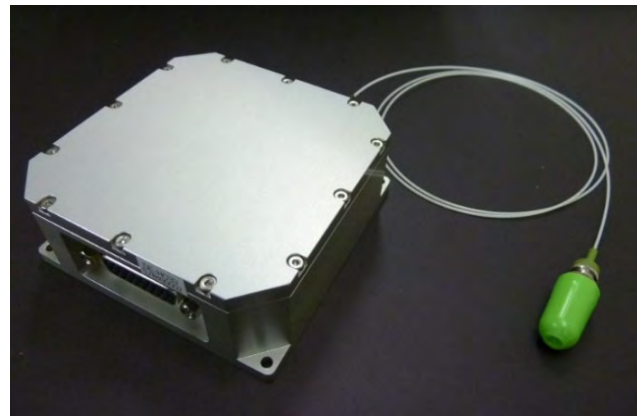
High value-added solution for biomedical equipment *1

- This light source provides manufacturers with all laser wavelengths required for any biomedical equipment in one palm-sized compact module *2 with stable output power and plug-and-play operation.
- This product enables manufacturers to miniaturize their equipment and shorten the development and production period as a new solution.
- Under testing by equipment manufactures.
- QD Laser aims for an industry share of *3 20% in light sources for biomedical equipment in five years.

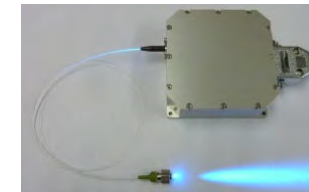
Compact Visible Lasers



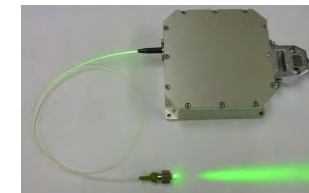
Integrated
into



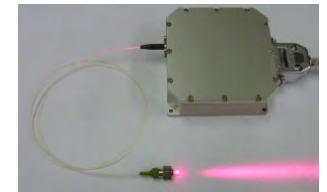
**Palm-Sized Multi-color
Compact Laser Light Source
(80 x 80 x t30mm)**



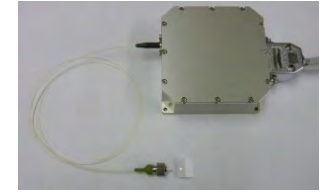
488nm



561nm



660nm



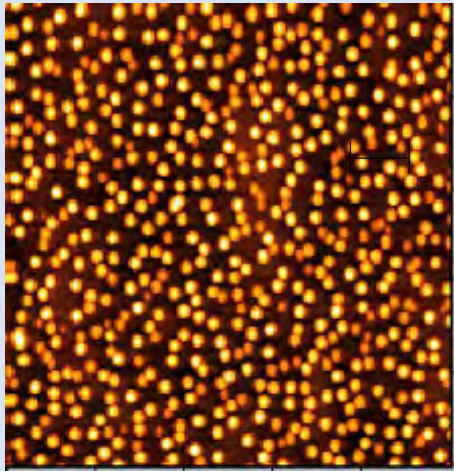
785nm

*1: Biomedical equipment is flow cytometers, ophthalmic examination equipment, fluorescence microscopes, and the like.

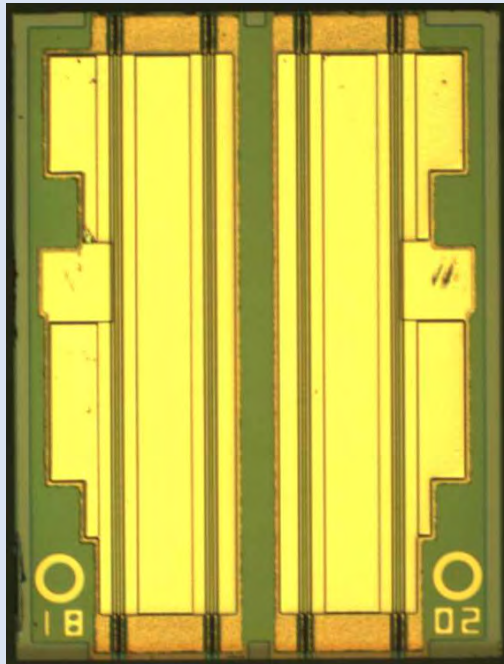
*2: The total volume of the driver integrated light sources is less than 50% of other company's products.

*3: Estimated annual accessible market size is 12,500 units. (8,000 out of 16,000 units for flow cytometer based on the "Global Flow Cytometer Market 2020-2024", and 4,500 units for an ophthalmic medical device)

#3



100 nm



Quantum-dot laser

- Application : Optical communication, LiDAR, and Silicon photonics.

Mass-produced by our world's only technology.

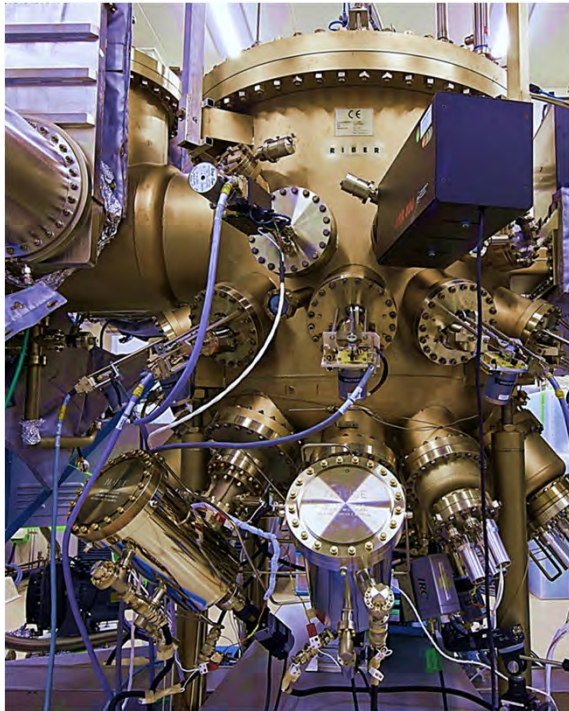
Achieved the **world's highest operating temperature** with excellent temperature stability at 1300nm.

- The wavelength lineup is **1200-1330nm**.
- **Silicon photonics** (optical connector-chip communication, LiDAR) is evolved by quantum dot laser.
- Can operate even in a high temperature environment **of 150-200 ° C** . The operating limit temperature of a normal semiconductor laser is 80-100 ° C.
- Can be used in **high-temperature environments such as servers, wireless base stations, and automobiles**.
- **Excellent reflected return light resistance**, leading to miniaturization by eliminating isolators.

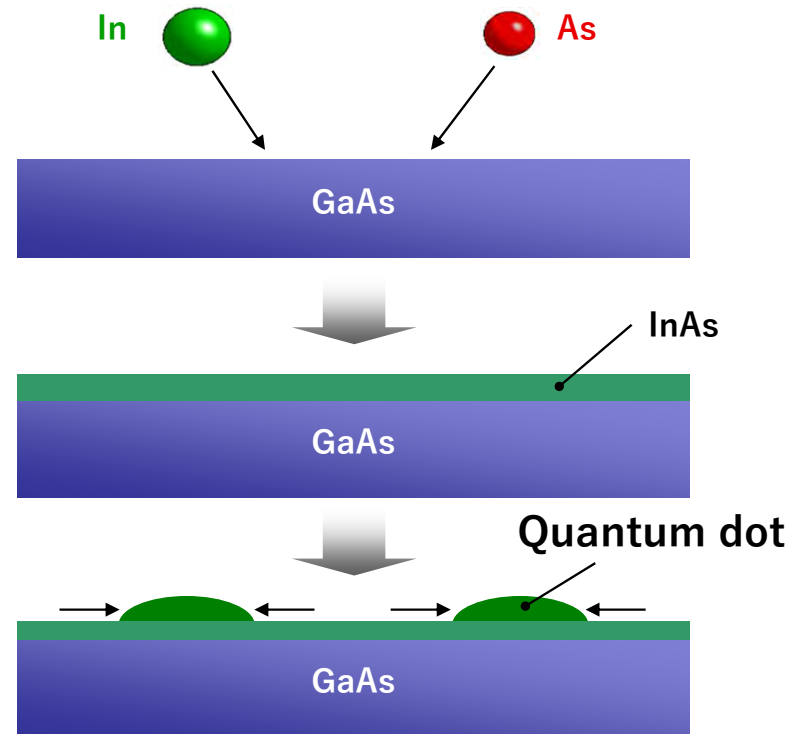
QDLaser's World Only-One Mass-Production Technology of Quantum Dot Lasers

- Introduction of mass-production MBE (Molecular Beam Epitaxy) system
- Control of temperature, indium source supply, and arsenic pressure at each second.
- Material recipe and know-hows for optimum growth conditions with several-tens-of-years experience (secret internal techniques which are intentionally not patented)

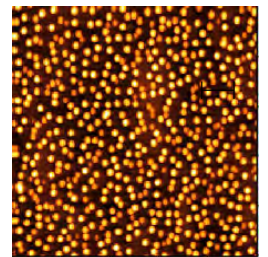
Mass production MBE system



Growth sequence of quantum dots (illustration of side view)



Atomic force microscope (top view) of quantum dots



100 nm

Tangible Silicon Photonics Market as Electronic / Optical Integrated Circuit Technology Platform

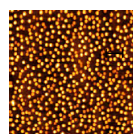
Customizing quantum dot lasers for Japan/US/EU silicon photonics vendors.

Starting mass production in FY2021-2023.

Development and production

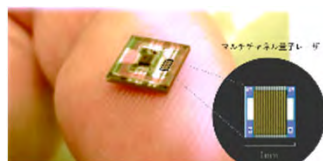
- 2010**
World's first mass production of quantum dot laser for optical communication
- 2012**
Started development of quantum dot laser for silicon photonics
- 2017**
Established mass production system of quantum dot lasers for silicon photonics (supplied to AIO core)
- 2019**
Our products installed in the "Ultra-thin connector integrated active optical module (I-PEX EOM)" developed by I-PEX
- 2022**
Working on joint development with silicon photonics vendors around the world. Starting mass production for chip-to-chip optical interconnect and Lidar during FY2022 to FY2023.

Quantum Dots

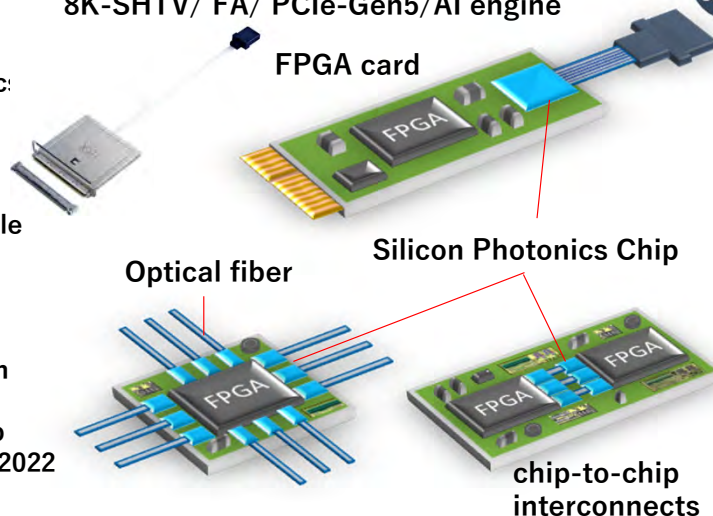


100 nm

100Gbps optical transceiver with quantum dot lasers as light sources



Optical Connector(EOM^{*1},CPO^{*2}) : 8K-SHTV/ FA/ PCIe-Gen5/AI engine



Increased data and power consumption to be solved by Silicon Photonics

Problem
Increasing demand for global data in turn creates a global issue of increasing power consumption

World total amount of data is estimated to multiply 5 times⁴ within 7 years

33ZB
CY18

175ZB
CY25E

World IT-related power consumption is estimated to multiply almost 35 times⁵ within 15 years

1.170TWh
CY16

42,300TWh
CY30E

Solution
Silicon photonics with quantum dot lasers mounted on silicon chips enable dramatic improvement in semiconductor performance⁶

Power consumption reduction
90%

Footprint
1/100

Processing speed
100x

Huge information processing application that requires high-temperature operation

Date Centers

80°C

5G base stations

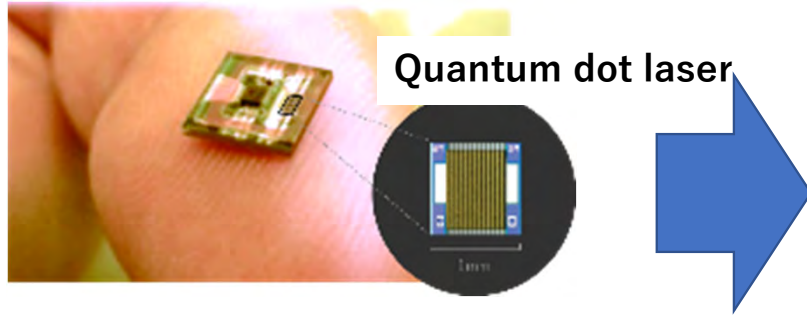
105°C

Automatic Driving/LiDAR

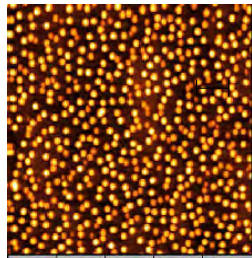
105°C

I/O core with Quantum-Dot Lasers Ready for Commercialization

100Gb/s Silicon photonics chip
named **I/O core of AIO Core** with
QDLaser's 4-channel quantum dot lasers

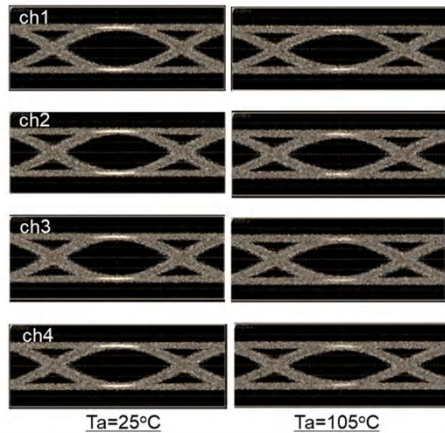


Quantum dots



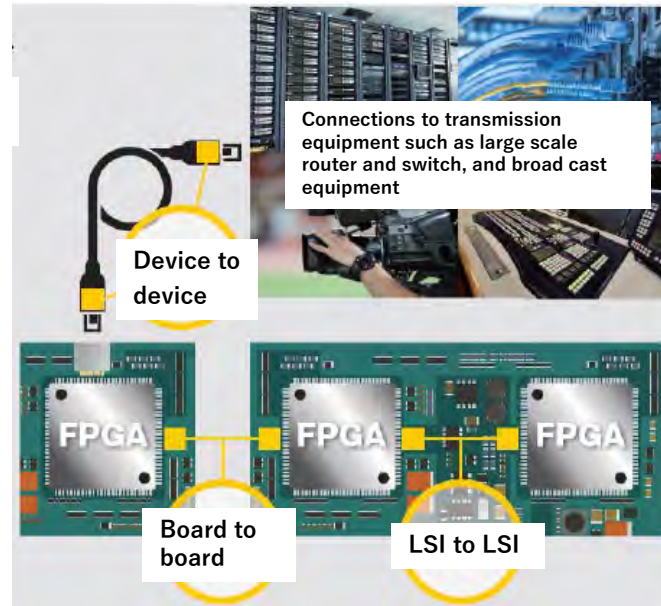
100 nm

Optical eye diagrams at 25Gbps



Ta=25°C

Ta=105°C

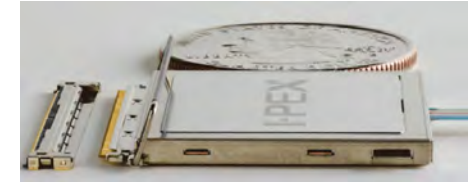


Courtesy of AIO Core Co., Ltd.

Note: Yellow squares show 100Gb/s transceiver
Silicon chip

Applied modules
(Sample shipment)

IPEX: LIGHTPASS™



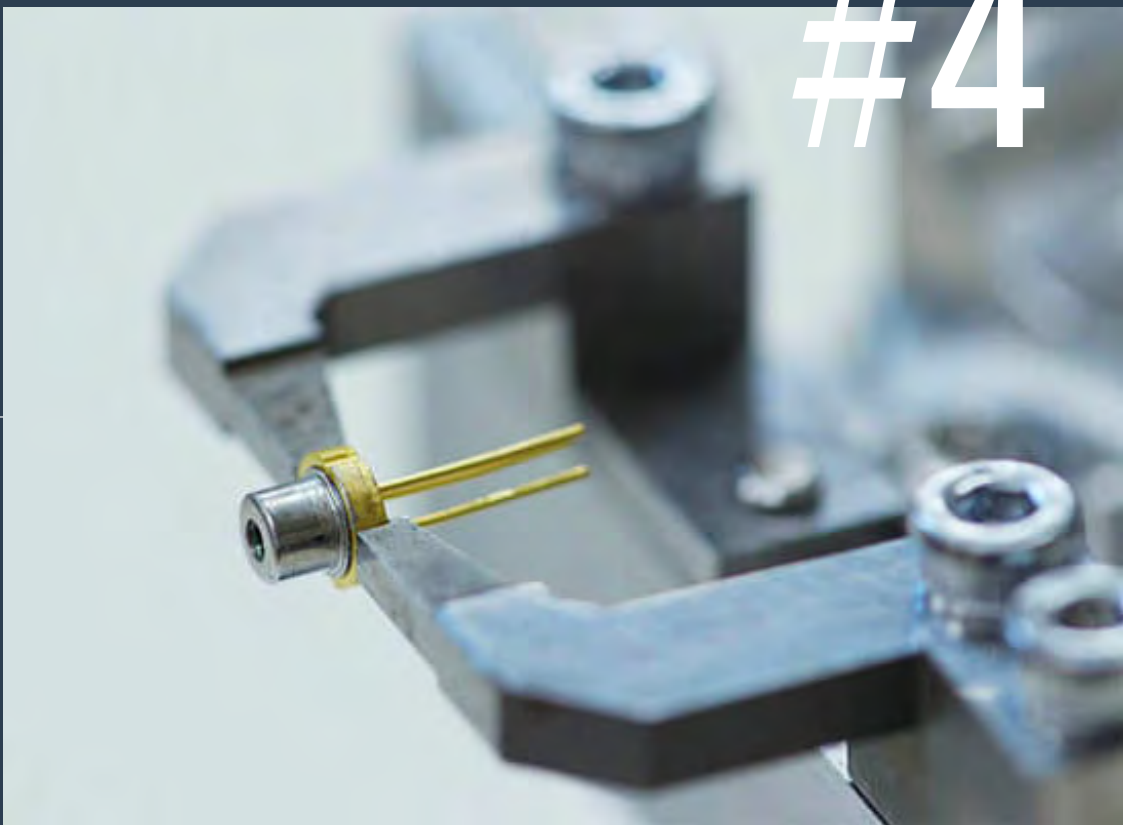
High Power FP Laser

- Applications : Particle Counter, Leveler, Machine Vision and Factory LiDAR.

Highly reliable and high-quality CW / nanosecond pulse high power laser.

Providing services that meet customer requirements, such as usage conditions and small-quantity support.

- The wavelength lineup is 640-940nm.
- CW and high-power nanosecond pulse drive for a wide range of sensor applications.
- Hearing customer needs on pulse, optical output, reliability, wavelength, and control method to propose optimal products and solution.
- Small quantity production possible.



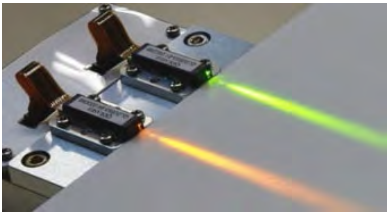
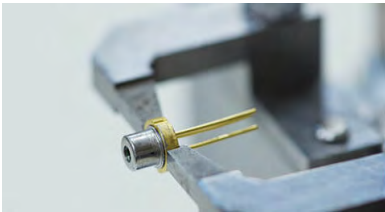


Our Major Laser Device Products, Wavelengths, Features, and Uses

Compact visible lasers

High power laser

DFB laser

Quantum dot laser

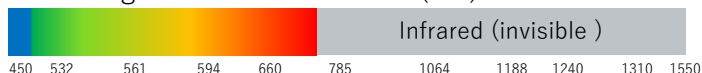
| Products |  |  |  |  |
|------------|---|---|--|---|
| Wavelength | 532, 561,594 nm | 640-940nm | 1030, 1053, 1064, 1080, 1120, 1180nm 1020-1120nm provided 1nm by 1nm | 1200-1330nm |
| Features | <ul style="list-style-type: none"> Miniature size, low power consumption, stability, short pulse generation, and high-speed modulation, etc. World's first current injection yellow-green and orange lasers | <ul style="list-style-type: none"> High power Fabry Perot laser Providing products and solutions according to applications. Supports various wavelengths, small quantities, and custom production. | <ul style="list-style-type: none"> Precise control of wavelength with stable operation under continuous, nanosecond, and picosecond modes. High beam quality, small size, lightweight, high electricity-light conversion efficiency, and long life compared to existing solid-state lasers. Extensive product lineup that meets the various needs of customers. | <ul style="list-style-type: none"> Quantum dots are used for the active layer (light-emitting part) of semiconductor lasers. Excellent temperature stability, high-temperature resistance, and low noise performance compared to existing semiconductor lasers. |
| Use | <div>Measurement</div> <div>Bio.</div> <div>Processing</div> <div>Communication</div> <div>Silicon photonics</div> | <div></div> | <div></div> | <div></div> |

Semiconductor Laser Devices : Our Competitive Advantages / Barriers to Entry

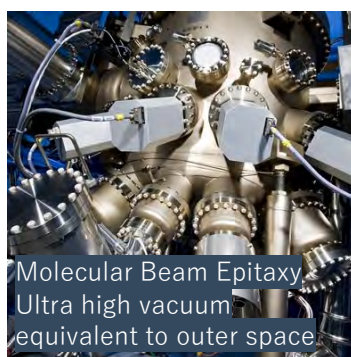
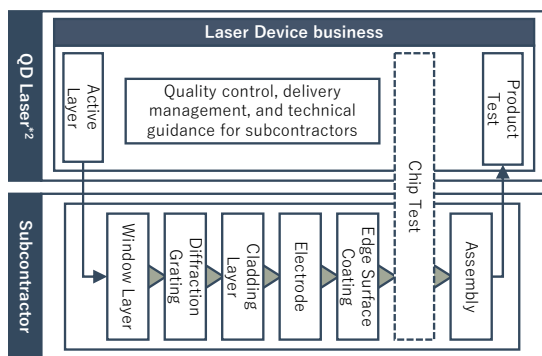
Business Model

- **The only fabless company in the semiconductor laser industry**
 - Flexible manufacturing scale of several units to tens of millions units
 - High marginal profit ratio of over 45% on average*¹ (made fixed costs into variable costs)
 - Mass production and diverse product offering lead to beyond breakeven point

- **Any wavelengths of lasers**
Wavelengths of lasers we offer (nm)

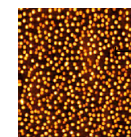


- **High level of freedom in creating new business, fields and products**



Core Competence : Quantum Dot Lasers

- **Atomic-level precision epitaxy technology (proprietary)**
 - Growth control by 0.1 second
 - Extracted the best recipes from over 100,000 recipes
 - The only one to succeed in mass production of quantum dot lasers, thanks to over 20 years of accumulated technology



100 nm

image of quantum dot by atomic force microscope

- **Capable of operating in harsh environments of over 100°C and under high density packaging**
 - Optoelectronic integrated circuit
 - In-vehicle devices

- **New potential market created by quantum dot lasers**
 - Chip-to-chip optical interconnect
 - LiDAR
 - Quantum cryptography



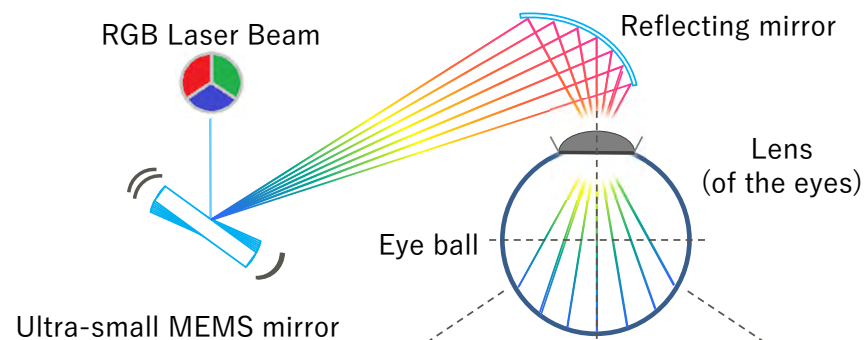
03

Laser Retinal Projection

World's First Commercialization of Laser Retinal Projection Eyewear

VISIRIUM TECHNOLOGY®

Unique Laser Technology bringing Innovation to Vision

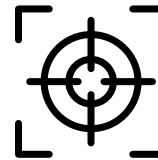


Direct Image Projection onto Retina



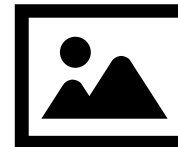
Visual experience independent of the condition of your cornea or lens

You can recognize an image clearly even with myopia, hyperopia, astigmatism, or ametropia.



Free focus

The focus of both the landscape you see with the naked eye and the image projected by our glasses can be superimposed on the retina. This is a unique feature not found in other AR glasses.



Enables vision even in the periphery of the retina*1

Since the image is in focus even over a wide area of the retina, we expect that it can also be effective for patients with retinopathy.

Three Areas based on Retinal Projection Technology

Transforms
“hard to see”
to “visible”

Low Vision Aid

Sales started

Extend the healthy
lifespan of your vision

Vision Health Care

Business Development

The power of
“vision” broadens
your world

augmented vision

Strengthening Alliance

World's First Laser Retinal Projection Eyewear

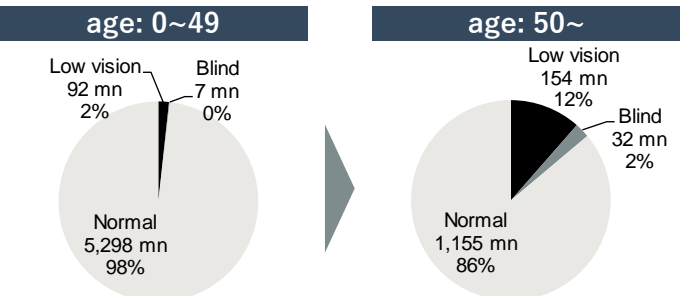
In the Low Vision Aid Space where Innovation has been Minimal, Laser Technology makes a Breakthrough

250mn people

with Low Vision Globally^{*1}

Currently they use magnifying glasses, video magnifiers, and telescopes daily. These tools are limited in use, have operational, issues and are not suitable for all users.

Here, we will make a breakthrough with our laser retinal projection technology.



GLOBAL DATA ON VISUAL IMPAIRMENTS 2010, WHO

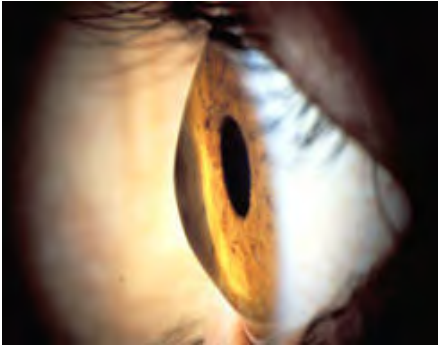


"Papa, you have grown old, I can see the wrinkles on your forehead."^{*2}



Medical Regulatory Affairs: Completed Clinical Study in Japan and EU

JAPAN



Irregular astigmatism

- Improved visual acuity and reading speed of **15 subjects** verified.
- Domestic medical device manufacturing and marketing approval @ January 28, 2020

Europe



Corneal clouding

- Improved visual acuity on and reading speed of **20 subjects** verified.
- Long-term safety confirmed after one year of home use.
- Clinical trial completed in June 2021.

RETISSA® series product development status

Sales in both consumer and medical models



Corrected vision: 0.8

- Refractive power: 0.8 corrected vision without eyeglasses in the power range of -11D^{*1} (high myopia) to +6D (medium high hyperopia) ^{*2}

Sales strategy of this term

- New frame to improve wearing alignment and stability
- Accessory camera connected to the frame for enhanced functionality
- Proposals of use cases for companies
- Overseas sales, including US, China, and South Korea.



Controlled medical device (Controlled medical devices requiring special maintenance)^{*3}

- Used to correct vision in patients whose vision is impaired by unjustified astigmatism (patients who are unable to achieve adequate vision using existing eyeglasses or contact lenses)
- Expected to (1) correct visual acuity, (2) improve reading speed, and (3) improve reading acuity

Sales strategy of this term

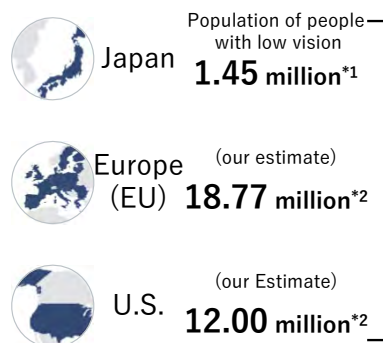
- Sales collaboration with Santen Pharmaceutical and Seed. • Efforts to reduce the burden on purchasers: Healthcare subsidy, medical insurance, tax deduction, etc.

Low Vision Aids : Total Addressable Market (※Anterior eye disease patients only : Ametropia and corneal opacity)

JPY 900 bn (USD 8.6 bn) Market in Japan, U.S. and Europe

Plan to Expand into Other Countries like China further behind in Ophthalmic Technologies

Low Vision Market



Estimated percentage of applicability (our estimate)*3

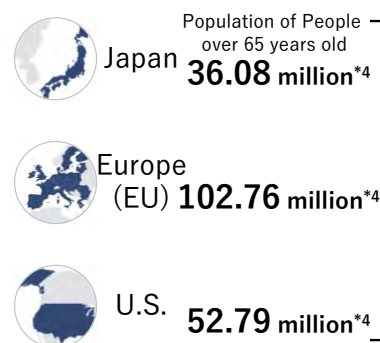
Product Price per Unit (our assumption)*6

× **11%** × **JPY 200k (USD 1.9k)**

Total market size of advanced countries (Our estimate)

JPY 708.7 bn (USD 6.7 bn)

Senior Citizens Market



Estimated percentage of applicability (our estimate)*5

Product Price per Unit (our assumption)*6

× **1%** × **JPY 100k (USD 950)**

Total market size of advanced countries (our estimate)

JPY 191.7 bn (USD 1.8 bn)

JPY 900 bn (USD 8.6 bn)

*1: Japan Ophthalmologists Association "Social costs of visual impairment in Japan"

*2: Calculated by multiplying the ratio of persons with low vision sourced from WHO "Visual Impairment and Blindness 2010" by the current population in each region (Europe: Eurostat "Population on 1 January", U.S.: United States Census Bureau "Annual Estimates of the Resident Population for the United States")

*3: According to the survey by Santen Pharmaceuticals, the number of keratoconus patients in Japan is estimated to be 60,000 to 120,000; also, as the data on p.39 shows that the prevalence per 100,000 people of keratoconus is almost the same as that of corneal opacity, it is assumed that the number of corneal opacity patients in Japan is similar to that of keratoconus patients. Assuming the number of patients suffering from each of these diseases to be an intermediate value of 80,000, the total is calculated to be 160,000; then, we apply the estimated percentage of applicability of 11%, calculated by dividing 160,000 by the population of persons with low vision (1,450,000), to each country's population of low vision persons. This percentage only takes into account anterior eye diseases; therefore, if our product is also effective for patients with retinal disease, the estimated percentage of applicability is expected to increase.

*4: Assuming that all the elderly aged 65 and over use near-sighted, presbyopic or bifocal glasses, we can estimate that each country's population aged 65 and over can be the potential population of persons with gap vision (Japan: Statistics Bureau of Japan "Population Estimates May 2020", EU: Eurostat "Population on 1 January by broad age group and sex", U.S.: United States Census Bureau "Population by Age and Sex: 2019").

*5: Due to the products' similarity in characteristics to hearing aids (used by the elderly on a daily basis, wearable equipment, sold at glasses stores, etc.), the hearing aid market is used as a reference to estimate the percentage of applicability. Given that the number of hearing aids shipped in Japan in 2017 numbered 562,747 (Japan Hearing Instruments Manufacturers Association "2018 Shipment Volume of Hearing Aids"), this number divided by the number of elderly people in Japan will give us an estimate that 1.7% of the elderly purchased a hearing aid, which we then adjust conservatively to assume an estimated percentage of applicability of 1.0% which can then be applied to each country's population of gap vision persons.

*6: Expected price per unit after the mass production is realized.

Sales and Manufacturing Strategies

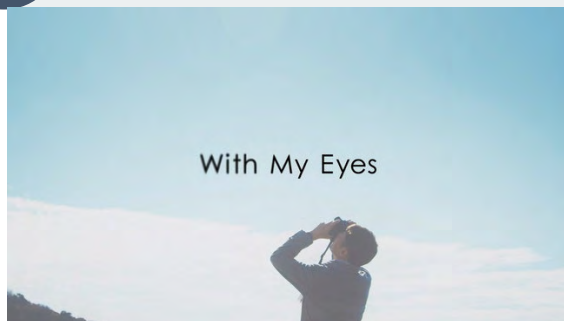
01

Through partnership with major manufacturers such as MinebeaMitsumi and Audio Technica, achieved fabless manufacturing for high-performance and low-cost products.

02

Through media exposure / participating in large-scale exhibitions / donations to schools for blind children / trial sessions and interviews, raise awareness

Cumulative
sales record as
of Sep. 2022
>900 units



03

Develop close cooperation with major players in each field

SONY



Santen

SEED



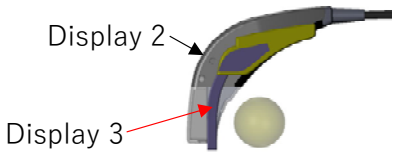
TDK

04

Improving usability and developing new products

Retinal Imaging Product "RETISSA" Roadmap: Laser Eyewear

- Medical Equipment "Medical": Being promoted by Santen Pharmaceutical and Seed to 479 hospitals on corneal diseases. Eleven domestic medical institutions are now introducing the device to patients.
- Consumer Product "Display / Display2": Cumulative sales of 800 units via EC, domestic and overseas distributors. Local Municipality Subsidy with 90% benefit starting to be registered.
- Display 3: Under development to realize a compact, lightweight, and low-price eyewear with improved operability.

| | Medical | Display/Display 2 | Display 3 |
|-------------|---|--|---|
| |  |  RD2CAM |  |
| FY2018-2021 | <ul style="list-style-type: none"> • Domestic manufacturing and marketing approval. • Introduction to low vision and corneal outpatient. • Treated in 11 medical institutions. | <ul style="list-style-type: none"> • Free focus / high resolution (equivalent to 0.8 visual acuity) / full color • Launch of accessory camera RD2CAM • Cumulative sales of 800 units | <ul style="list-style-type: none"> • Jointly developed with a domestic electronics manufacturer. |
| FY2022 | <ul style="list-style-type: none"> • Continue sales activities • Expansion of application range through clinical research (Clouding, retinopathy) • Strategy in Europe | <ul style="list-style-type: none"> • Subsidy, administrative budget acquisition activity (already certified by 6 municipalities) • Overseas expansion <ul style="list-style-type: none"> US in-house EC Korean subsidy acquisition activity Resume Chinese agency activities | <ul style="list-style-type: none"> • Development and Marketing <ul style="list-style-type: none"> Flat mirror (thinner and wider FOV) Built-in camera Low-cost design Compact controller BOX Eye Track |
| FY2023-2024 | Consolidation of sales channels and know-how to comply with various regulations (Pharmaceutical Equipment Law, Consumer Product Safety Law, Welfare Equipment Law, etc.) | | Commercialization 100,000 yen selling price 100,000 units sales target after launch |

Retinal Imaging Product "RETISSA" Roadmap : Three New Products

- Commercialization of three new laser retinal imaging devices for various usage scenarios

<https://www.qdlaser.com/uploads/2021/12/20211214-1.pdf>

ONHAND

Hand-held devices used by visitors in public spaces (libraries, museums, theaters, etc.)



Super Capture

Digital cameras viewfinders that extend the vision and behavior of low vision users



MEOCHECK

Self-measuring simple checkers to help people recognize eye diseases



FY2021

Prototype

- Questioned and deliberated as a device to comply with the Reading Barrier-Free Act*1 at four congresses in the Tokyo metropolitan area.

Prototype

- Exhibited with Sony Corporation at CSUN, an accessibility exhibition in the U.S.
- Successful crowdfunding

Prototype

- Conducted eye examinations on 500 drivers at cab companies in Japan under collaborative research with medical universities.
- Obtained evidence of highly sensitive detection of glaucoma, cataract, etc. (to be published)

FY2022

Product launch

- Introduction to administrative services like libraries, art galleries, museums, theaters, etc.
- Sales collaboration with three distributors.

Product launch

- Promotion and sales collaboration with digital camera manufacturers
- Operation of EC sites in Japan and the U.S. (already established)

Product launch

- Sales collaboration with medical equipment distributors nationwide
- Eye check service pilot operation with Tohoku University and DX companies at transportation companies, drug chains, extensive private facilities, nursing care facilities, etc.

FY2023

Sales are expected to reach several thousand units/year.

- Assumed sales of 1,000 units/year

- Assumed sales of 1,000 units/year
- Full-scale operation of eye check service

RETISSA Sales Strategy and Progress: Laser Eyewear

- Posting information and expanding awareness with Mirairo Co., Ltd., low-vision groups, and public and educational institutions.
- Renewal of RETISSA special site retissa.biz
- Resuming operations in China. Bidding for a school for the blind in Xi'an.
- Developing high-performance, low-cost Display3 in cooperation with several domestic and overseas electronics manufacturers.

<https://www.retissa.biz/>

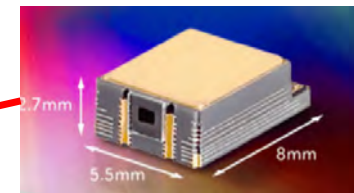
Development of Display3

At CES (Las Vegas, USA), a retinal projection device under joint development with TDK was exhibited and introduced in the media:

<https://www.kare11.com/video/news/local/kare11-saturday/tech-for-2023-at-ces/89-d28c17c1-5c43-44ed-b9ce-974b65ada4fd>



Full-color laser light source



Flat mirror

RETISSA Sales Strategy and Progress: ON HAND

- Concluded a sales contract with the Library Distribution Center (consignment operator of 562 public libraries and 19 facilities such as museums). A book fair joint exhibition tour and an experience session for library purchasing staff are underway. Working for the local government budget acquisition for fiscal 2023.
- Gradually replacing the magnifying reader for the visually impaired.
- In collaboration with the albino people's association, providing experience events in aquariums, Youtube information transmission, and crowdfunding #1.



RETISSA ON HAND

レティッサ オン ハンド

レーザ投影読書支援機器

網膜に投影映像を投影し、目で見るのではなく、
見たいものが目に“映る”

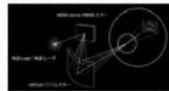
ロービジョンの方、目障りなものを避けている方、
細かい字が見にくい方の読書を助けます

TRC図書館流通センター

特長 ① 視力にかかわらず、クリアな像を網膜に描き出します

※演算「ピクセル・シフト」

市販の液晶ディスプレイと高速で駆動するMEMSミラーを組み合わせ、最新の光学
技術にフロントローリングして、網膜に投影。ピントの合った像を描き出します。
目のピント調節機能を使わずに見ることができます。



目のピント調節機能



特長 ② 広い視野でページ全体を見ることができます

ムービーや拡大読書機は、文字を大きくすることで読めるようにするため、本の見開き全像を
とらえることができませんでした。
レティッサ オン ハンドの視野角は、約60度。広い範囲で網膜に映し出します。



ムービー読書機



レティッサ オン ハンド 読書機

特長 ③ 充電式・軽量のため、図書館のさまざまなシーンで利用できます

図書館にレティッサ オン ハンドがあることで、ロービジョンの方の読書体験の提供や
読書・読書会・読書会などイベントへの参加も期待できます。
レティッサ オン ハンドにパソコンなどをつないで、電子図書館を見ることができます。



※演算「ピクセル・シフト」
市販の液晶ディスプレイと高速で駆動するMEMSミラーを組み合わせ、最新の光学
技術にフロントローリングして、網膜に投影。ピントの合った像を描き出します。
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市販の液晶ディスプレイと高速で駆動するMEMSミラーを組み合わせ、最新の光学
技術にフロントローリングして、網膜に投影。ピントの合った像を描き出します。
目のピント調節機能を使わずに見ることができます。

株式会社図書館流通センター お問い合わせ フリーダイヤル 0120-118491



Events



leaflet for libraries



Albino people's association

RETISSA Sales Strategy and Progress : NEOVIEWER(Super Capture)

- Expanding sales of the NEOVIEWER, laser retinal projection viewfinder, as an accessory for digital cameras.
- Launch of sales in Japan and overseas. Established a US subsidiary. Renewal of HP/brand site with contents including experienced users and customer leads for Internet sales.
- Equipment introductions and demonstrations are ongoing at exhibitions in Japan, the United States, and Europe in collaboration with digital camera manufacturers.



NEOVIEWER^{*1}
+Digital Still Camera

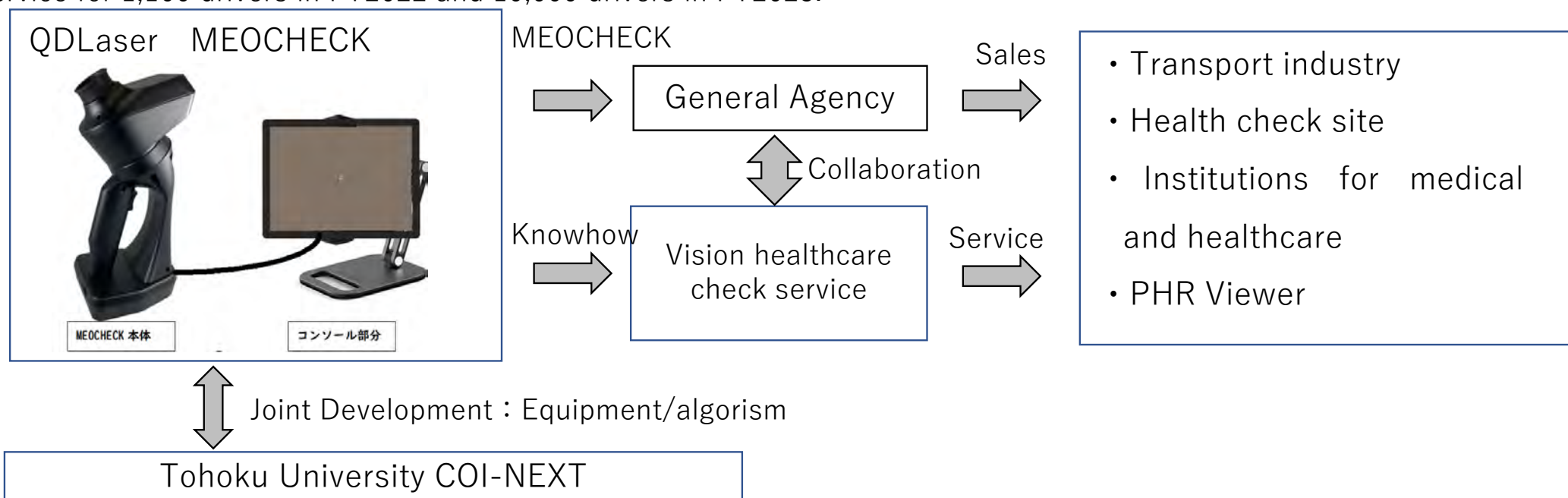


JAPAN : Sight World 2022 (suspended)
USA : 37th CSUN Assistive Technology Conference on May 14 to 18 in 2022
EU : TECHSHARE PRO, Nov, 15 to 17, 2022



RETISSA Sales Strategy and Progress: Laser Eyewear : MEOCHECK

- We plan to expand earnings by selling MEOCHECK, a small self-check optometry device, and providing the vision healthcare check service.
- Participation in Tohoku University COI-NEXT (JST "Co-creation field formation support program") for joint development of equipment and disease determination algorithm.
- Completed ophthalmology general agency contract (750 units of hardware sold) to start selling Feb. 1st, 2023.
- Test operation by taxi companies nationwide has been completed, and preparations are underway to start providing service for 1,100 drivers in FY2022 and 10,000 drivers in FY2023.



IEC (International Electrotechnical Commission) officially published an international standard that defines how to evaluate the overall image quality of scanning retinal projection devices

QD Laser Co., Ltd. is the only company to have commercialized the laser scanning retinal projection product globally. On June 20th, the IEC [Note 1] officially issued the international standard on scanning retinal projection devices. This document covers a general image quality evaluation method, including the free focus characteristics. As a result, the performance of our products to provide "clear images that do not depend on eyesight" has come to be evaluated objectively and quantitatively. With this standardization, QDLaser expects the guarantee of product quality and the elimination of inferior products in the market, accelerating the worldwide spread of our products and forming a healthy industry and market.

International Standard

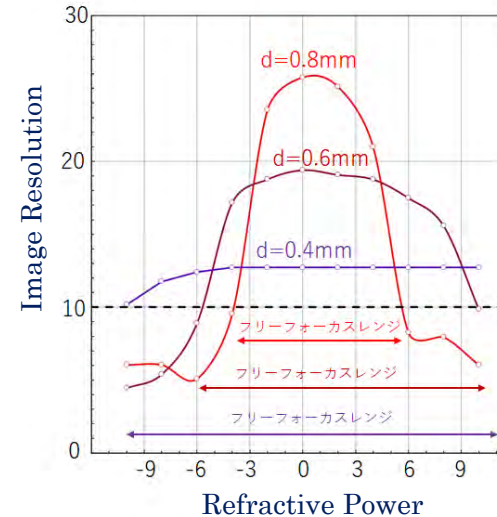
IEC 62906-5-5:2022

- Laser displays – Part 5-5
- Optical measuring methods of raster-scanning retina direct projection laser displays
- <https://webstore.iec.ch/publication/60142>

Note 1: IEC is an abbreviation for International Electrotechnical Commission.

Note 2: Free focus means that the visibility of the image projected by the scanning retinal projection device does not depend on the refractive power of the eyeball or the focus position. The performance of free focus changes depending on the beam diameter and divergence angle of the laser incident on the eyeball.

Free Focus Range Evaluation



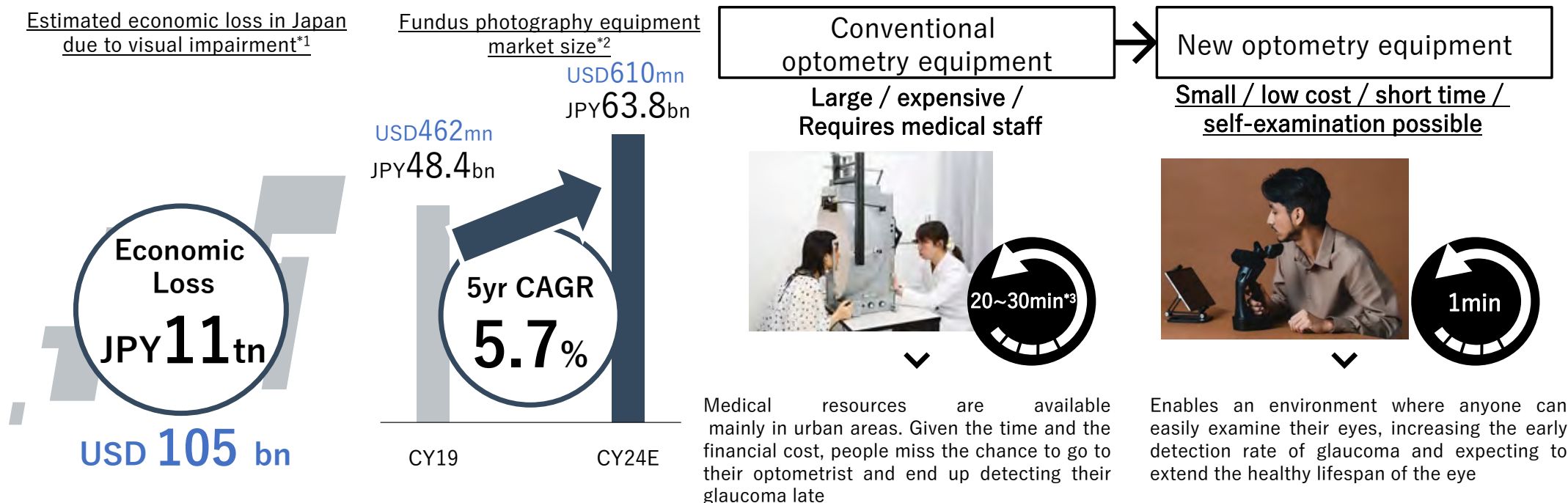
The refractive power of the eyeball determines the resolution of the retinal projection image with the diameter of the parallel laser beam as a parameter. This international standard states that the range of refractive power of the eyeball to provide free focus is determined according to the diameter. When commercializing a scanning retinal projection device, it is required to specify the range of refractive power to provide free focus.

04

Further Growth Upside Expected

Large Growth Potential in Optometry Market

Utilizing Laser Retinal Projection Technology,
Developed New Optometry Prototypes and Working with Partners to Launch
in FY2022.



*1: Japan Ophthalmologists Association (2009) "Economic Cost of Visual Impairment in Japan" and "Prevalence of Visual Impairment in the Adult Japanese Population by Cause and Severity and Future Projections"
Economic cost = Direct health costs + Other financial costs + monetary converted number of loss of well-being from visual impairment (measured in disability-adjusted life years (DALYs))

*2: TechNavio (2020) "Global Ophthalmic Diagnostic Devices MARKET 2020-2024" Converted at an exchange rate of JPY/USD = 110 yen

*3: The approximate measurement time of the Goldmann perimeter and Humphrey perimeter, which are typical perimeters in conventional perimeter measurement.

A new group of optometry devices that utilize laser retinal projection technology

■ Eye & Brain Diseases

- Cataract (47%)
- Glaucoma (3.6%)
- Retinopathy (55%)
- Brain tumor (10 to 15 patients per 100,000)

Note:% is the average appearance rate of the entire population. The older the person, the more it increases.

■ Cognitive Function Degradation

- Aging
- Dementia
- Fatigue, Stress
- Alcohol

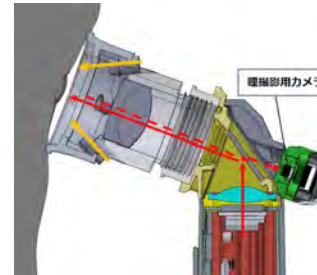
■ Cardiovascular Diseases

- Disease
- Diabetes
- Stroke
- Heart attack

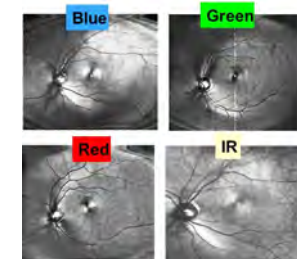
1st generation: Simple perimeter to be commercialized in FY2022 for screening eye diseases in 1 minute.



2nd generation: Eye track perimeter with a camera to measure fixation stability and dynamic response to various visual stimuli. Software medical equipment.



3rd generation: Ultra-compact fundus photography device. Hardware medical equipment.



Introduction to regular health checkupsImplemented

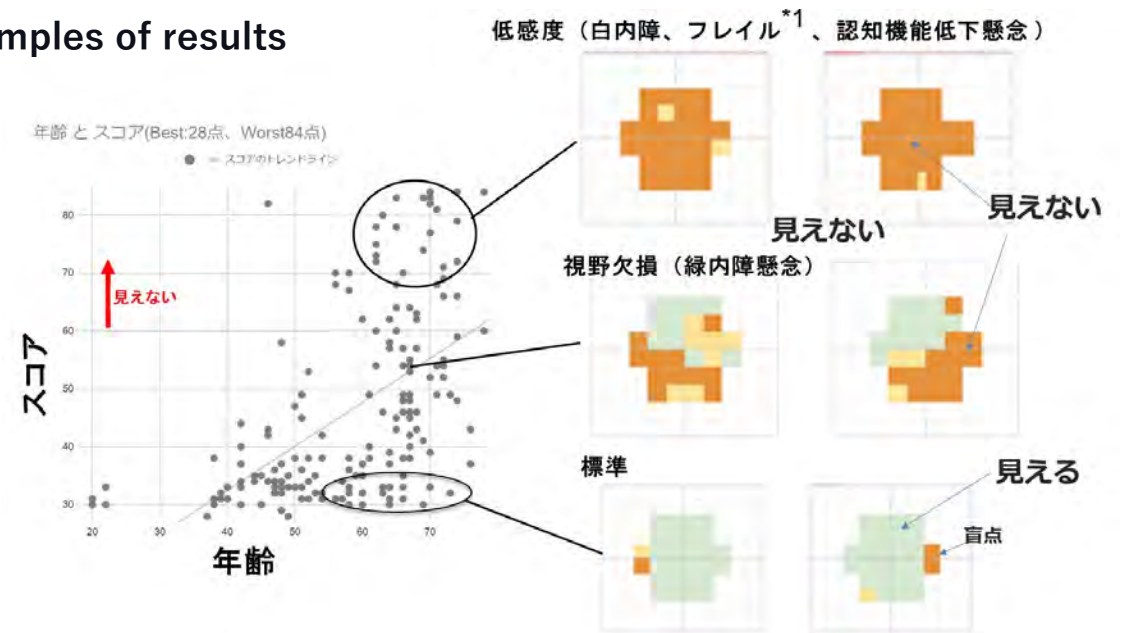
Implemented eye health checks using MEOCHECK as part of regular health checkups for Nihon Kotsu Co., Ltd employees.

Of the approximately 10,000 employees of Nihon Kotsu nationwide, more than 1,000 people who belong to the Shinkiba and Mitaka sales offices experienced a trial eye health check using MEOCHECK as part of their regular health checkups. It has been confirmed that the check can be completed in 1 minute per eye and 5 minutes for the entire system with a simple operation. Data analysis is performed on the check results, which is used to encourage employees to see an ophthalmologist to maintain the health of employees' eyes and realize safe driving.

Eye health check using MEOCHECK



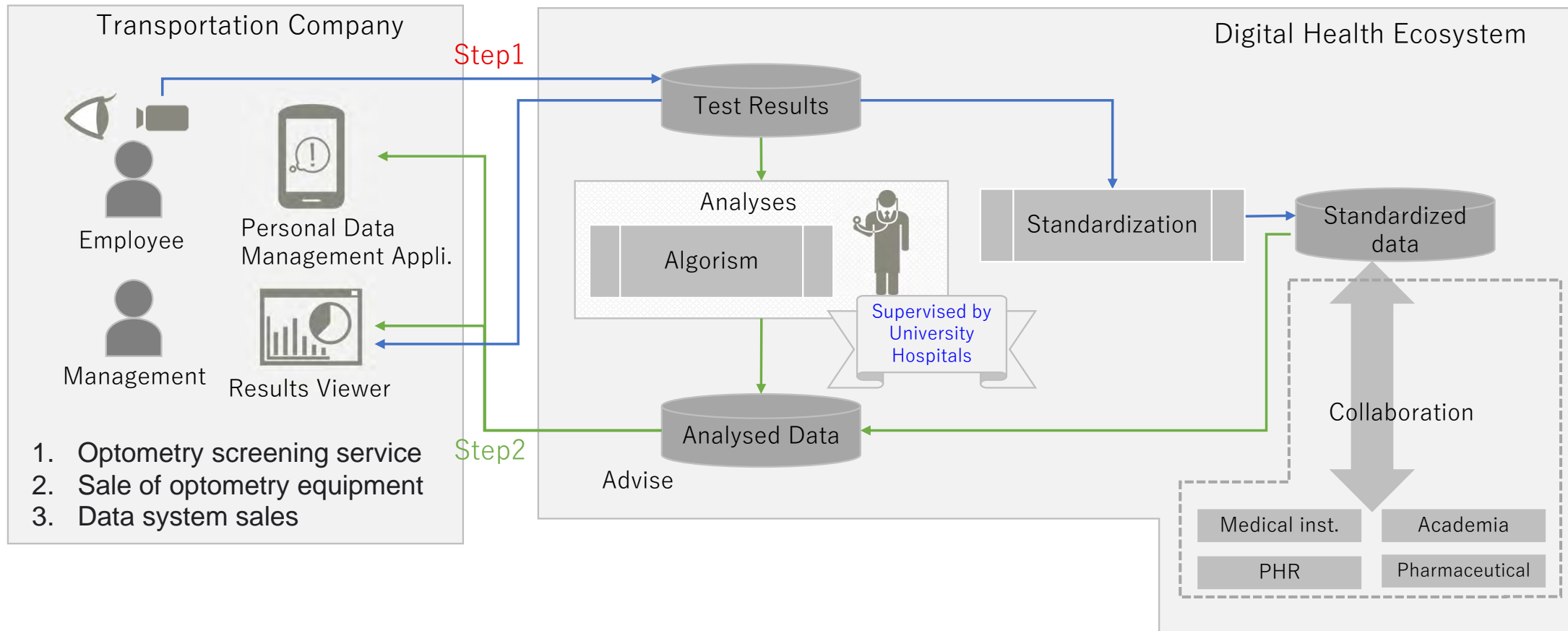
Examples of results



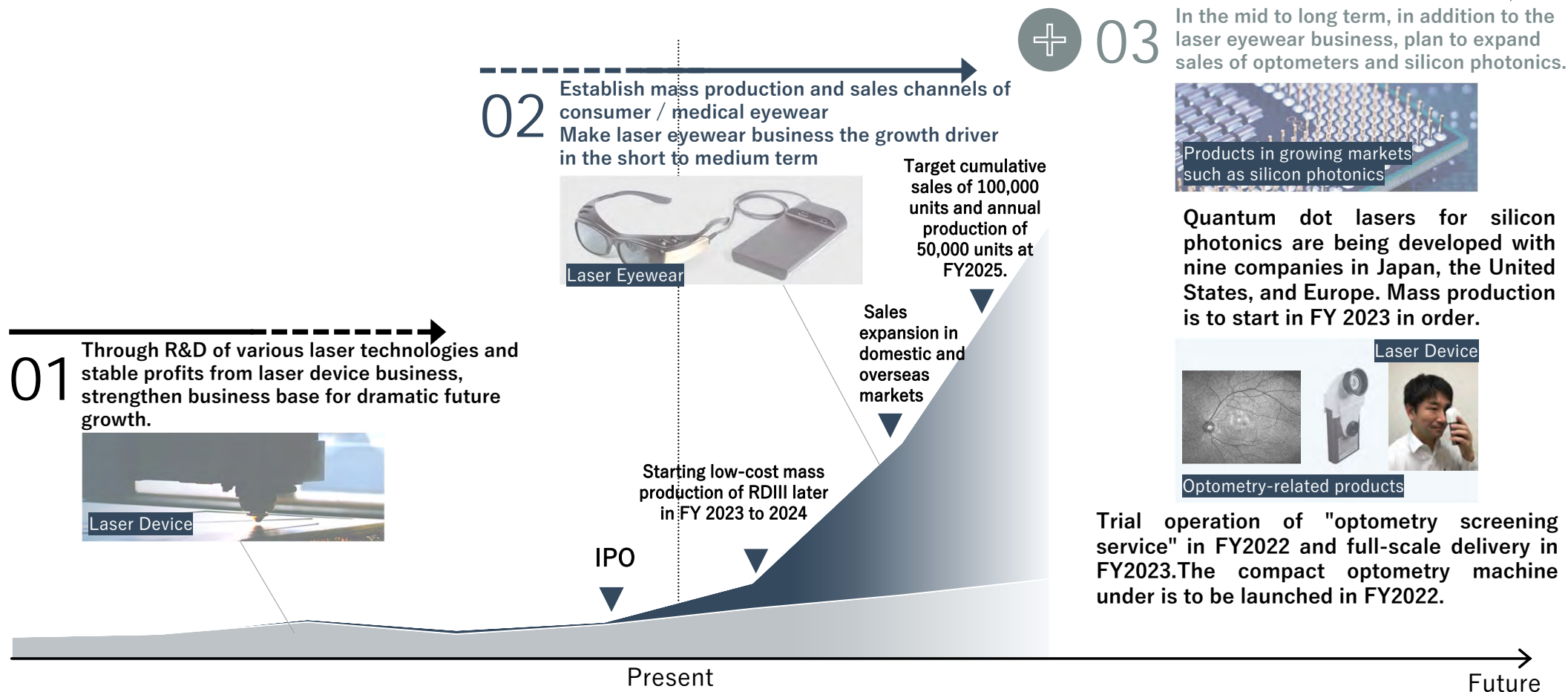
QDLaser is conducting medical research for people based on the Ministry of Health, Labor, and Welfare guidelines.

Service System Image

Starting introduction to companies with commercial drivers



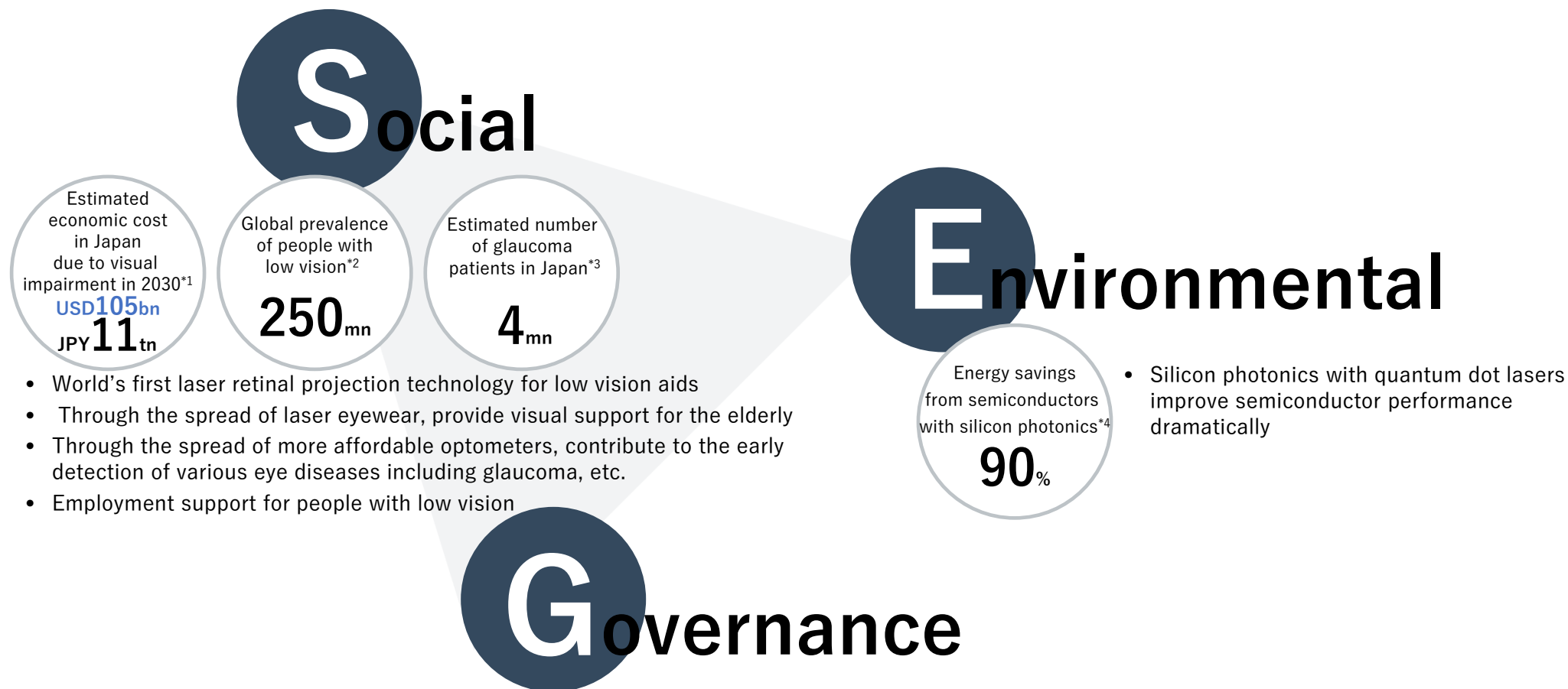
Expected Growth Potential in Mid-Long Term



05

ESG Initiatives

Business Development from an ESG Perspective



*1: Japan Ophthalmologists Association "Economic Cost of Visual Impairment in Japan" and "Prevalence of Visual Impairment in the Adult Japanese Population by Cause and Severity and Future Projections"

Economic cost = Direct health costs + Other financial costs + monetary converted number of loss of well-being from visual impairment (measured in disability-adjusted life years (DALYs))

*2: WHO "GLOBAL DATA ON VISUAL IMPAIRMENTS 2010"

*3: Santen Pharmaceutical "Annual Report 2017"

*4: Target numbers in "Development of Technologies for Super Energy-Efficient Optical Electronics Implementation Systems" Promoted by METI, The Institute of Electronics, Information and Communication Engineers "Opt-Electronics Packaging Technology for Silicon Photonics"

With My Eyes project

#1 Photographs by low vision people.

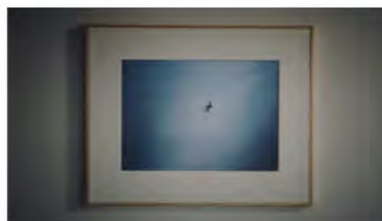
<https://www.youtube.com/watch?v=p5blfs94Oys>

#2 Let's go and see the invisible world.

https://www.youtube.com/watch?v=ZM52dax_5yc

#3 - Discovering a World of My Own -

<https://www.youtube.com/watch?v=lp6a5h6UfxA&t=37s>



RETISSA Super Capture

Digital cameras viewfinders that extend the vision and behavior of low vision users

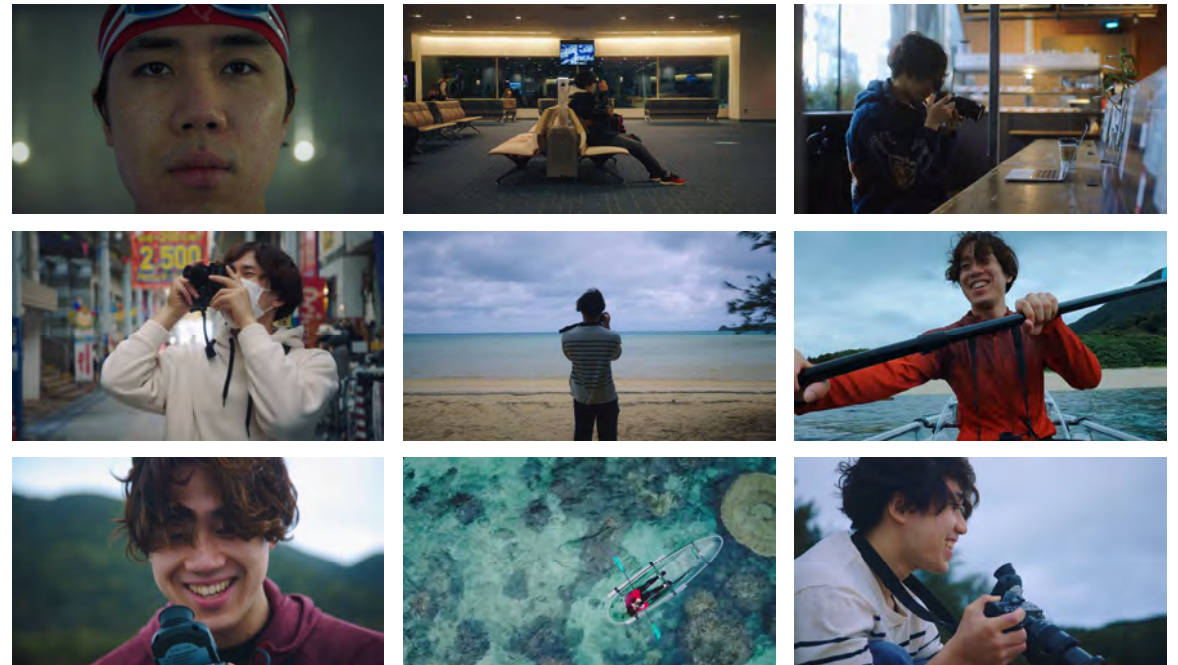
QD Laser Announce Part 3 of “With My Eyes” Project supported by Sony

Latest documentary short in series depicts quest of Paralympic swimmer with low vision to use laser retinal imaging camera to see inside ocean
To be launched Mar. 14, 2022, on YouTube and presented at the QD Laser and Sony booths at the 37th Annual CSUN Assistive Technology Conference



QD Laser Co., Ltd. (Headquarters: Kawasaki City, Kanagawa Prefecture, hereinafter referred to as "QD Laser") is the state-of-the-art semiconductor laser technology company that plans, designs, develops, manufactures, and sells a variety of unique semiconductor lasers and related products. The company launched the project "With My Eyes," employing the original laser retinal imaging technology to change the "difficult to see" to "visible" of the 250 million low vision worldwide who have visual inconvenience even when wearing corrective glasses. This release shows off the third project carried out with the cooperation of Sony Corporation (hereinafter, Sony), featuring a newly produced documentary movie to be on air on March 14, 2022 (Monday). At the 37th Annual CSUN Assistive Technology Conference in Anaheim, USA, starting on the same day, each booth of the companies exhibits this documentary movie and the retinal imaging camera device "RETISSA SUPER CAPTURE."

■ Scenes from the Movie



Company Profile

Spin-off Venture from Fujitsu

Tier 1 Medical Companies such as Nikon/Santen joined as Shareholders

| | |
|---------------------|---|
| Company Name | QD Laser, Inc. |
| Foundation | April 24, 2006 |
| Fiscal year-ended | March 31 |
| Representative | Mitsuru Sugawara, President and CEO |
| Location | Headquarter: 1-1 Minamiwatarida-cho, Kawasaki-ku, Kawasaki-shi, Kanagawa |
| Number of Persons*1 | 46 |
| Business | Planning, design, development, production and sales of semiconductor laser and its application products |
| Licenses | <ul style="list-style-type: none">• Class II Marketing License for Medical Devices• Registration of medical equipment manufacturer• ISO 9001• EN ISO 13485 |

**Science and Technology
Award from the Minister
of MEXT**

**Prime Minister's Honorary
Award for Achievement in
Industry-Academia-
Governmental Collaboration**



- Graduated from The University of Tokyo; Doctor of Engineering
- 1984: Graduated with a master's degree in Physical Engineering from the Department of Applied Physics, School of Engineering, University of Tokyo; joined Fujitsu Laboratory Ltd.
- 1995: Assumed the role of Senior Researcher at Optical Semiconductor Device Laboratory, Fujitsu Laboratory Ltd.; obtained degree in Eng. from The University of Tokyo
- 2004: Assumed the role of non-tenured professor at the Institute of Industrial Science, University of Tokyo
- 2005: Assumed the role of Deputy Head of Nanotechnology Research Center, Fujitsu Laboratory Ltd.
- 2006: Launched QD Laser Inc.; assumed the role of President and CEO

Laser Retinal Projection: Diseases and Applicable Rate

| Parts of Eye | Major diseases | # of patients per 100k people*1 | Total per eye part *1 | | Possible Efficacy*2 | Estimated applicability %*3 | Future Outlook | |
|--------------|----------------------------------|---------------------------------|-----------------------|--------|--|---|---|--|
| Anterior eye | Cornea | Corneal angiogenesis | 4,000 | 4,104 | ◎ | Effective on astigmatism and moderate opacity | 50% | • May not be applicable in cases of severe opacity • Focused on obtaining the approvals to marketing medical devices by targeting diseases for which high efficacy can be expected. • Plan to expand the scope of application with RDII and RDIII on page 25 and the wide-angle viewfinder on page 27. |
| | | Keratoconus | 54 | | | | | |
| | | Corneal opacity | 50 | | | | | |
| | Crystalline lens | Cataract | 47,800 | 52,900 | ◎ | Effective on near/far-sightedness, astigmatism, opacity, etc. and as the technology does not depend on the function of the crystalline lens | 40% | |
| | | Aphakia | 5,100 | | | | | |
| | | Phacocoele | <50 | | | | | |
| | Uvea | Uveitis | 714 | 714 | △ | Effective on astigmatism developed as a complication | 10% | |
| | | Choroidal neovascularization | <50 | | | | | |
| Vitreum | Vitreous opacity | NA | - | ○ | Effective on low to moderate opacity | 20% | | |
| Retina | Epiretinal membrane | 28,900 | 55,614 | ○ | Enlargement and black and white inversion features are effective on macular diseases | 30% | • Adaptable to central scotoma by changing the projection position and increasing magnification • Adaptable to tunnel vision through wide-angle imaging • May not be applicable in cases with severe symptoms | |
| | Lattice degeneration of retina | 10,600 | | | Some efficacy is seen in cases where anterior eye disease is also present | | | |
| | Hypertensive retinopathy | 9,100 | | | AE camera feature is exceptionally effective on photophobia, night blindness, etc. | | | |
| | Age-related maculopathy | 3,900 | | | | | | |
| | Diabetic retinopathy | 3,114 | | | | | | |
| | Retinitis pigmentosa | <50 | | | | | | |
| Optic nerve | Glaucoma | 3,550 | 3,865 | △ | Image downsizing feature is effective on tunnel vision | 10% | • May not be applicable in cases with severe symptoms | |
| | Optic nerve head drusen | 200 | | | | | | |
| | Optic neuritis | 115 | | | | | | |
| Other | High myopia | 3,000 | 3,000 | ◎ | Exceptionally effective | 50% | • Can improve by processing images taken by camera | |
| | Color amblyopia, color blindness | 2,500 | 2,500 | ○ | - | 20% | | |

*1: These numbers were calculated by research company Lampe & Company in a report we commissioned with reference to scholarly papers published by governments and research institutions from each country. Figures for "# of patients per 100k people" and "Total per eye part" reflect the general research conducted across several jurisdictions and are not necessarily indicative of the number of potential cases in the markets in which we currently operate.

*2: Based on our assumptions

*3: Evaluated the "expected efficacy" using a scale: ◎ = 40-50%, ○ = 20-30% and △ = 5-10%.

Terminology

| | |
|---------------------------------------|--|
| Semiconductor laser | A compact device with an approximate length of 1mm that causes laser oscillation by passing an electric current to a semiconductor. In comparison with a solid-state laser or gas laser, more micro-miniature in size; higher speed modulation characteristics up to 10GHz; higher photoelectric conversion efficiency achieving several tens of percent and better controllability of wavelength, among other things. Became widely used in the 1980s as a light source for communication systems and optical recording media, such as CDs and DVDs, etc. |
| Quantum dot laser (QDL) | A semiconductor laser using a quantum-dot structure comprising nanocrystalline semiconductors in its active layer. QD Laser is the only firm in the world to mass-produce QDLs for optical communications and silicon photonics. In comparison to existing semiconductor lasers, it is superior in temperature stability, high-temperature endurance and low-noise properties. |
| DFB laser | Distributed Feedback Laser: QD Laser's DFB laser is equipped with a diffraction grating which enables laser oscillation at a single wavelength. It is suitable for applications where the light output needs to be concentrated into a narrow wavelength range, such as the seed light of a fiber laser. |
| Silicon photonics | A technology which integrates an optical circuit with a silicon electronic circuit that has signal processing and memory functions, thus enabling a breakthrough in the processing capacity limitation of the conventional electronic circuit system (achieving 100 times faster processing speed and lower power consumption) and high-capacity data transmission between LSI chips (10Tb/s). |
| VISIRIUM technology | A technology that projects images onto the retina using precise optical systems, creating different colors flexibly from the three primary laser light colors - red, green and blue. |
| Diffraction grating technology | A technology that freely and precisely controls the wavelength of semiconductor lasers to fit into various applications by forming periodic irregularities inside the laser. |
| Ultrashort pulse | A laser with a very short pulse width (duration). It is used for microfabrication and other processes as it can prevent shape distortion due to thermal effects. |
| Retinal projection | To project images onto the retina |
| Simple perimeter | A device to assess the visual field of human eyes |
| CE marking | A certification mark that indicates conformity with standards required to be met by products exported to the EU. The CE mark is granted when a product meets standards in all EU member states. |
| Flow cytometer | A device capable of measuring certain properties of cells. By irradiating a cell suspension in a tube with a laser beam, it can measure the number and size of a large volume of cells over a short period of time using fluorescence and scattered light parameters. It is used in various fields including molecular biology, pathology, immunology, plant biology and marine biology. |
| LiDAR | LiDAR (Light Detection and Ranging) is a technology which irradiates an object and uses a light sensor to detect the reflection to measure the distance. It is expected to be used in autonomous driving systems in the future. |
| Heads-up Display | A technology that projects information and images onto various surfaces, such as glass, within the field of view. It is expected one day to project necessary information for drivers onto the windshield and the like. |

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- These statements are based on expectations, forecasts and risk assumptions as of this presentation's publishing, and contain uncertainties that could lead to results that are substantially different from these statements.
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- Note that QD Laser does not bear any duty to update or revise forward-looking statements provided in this document, even if new information comes to light or future events occur.