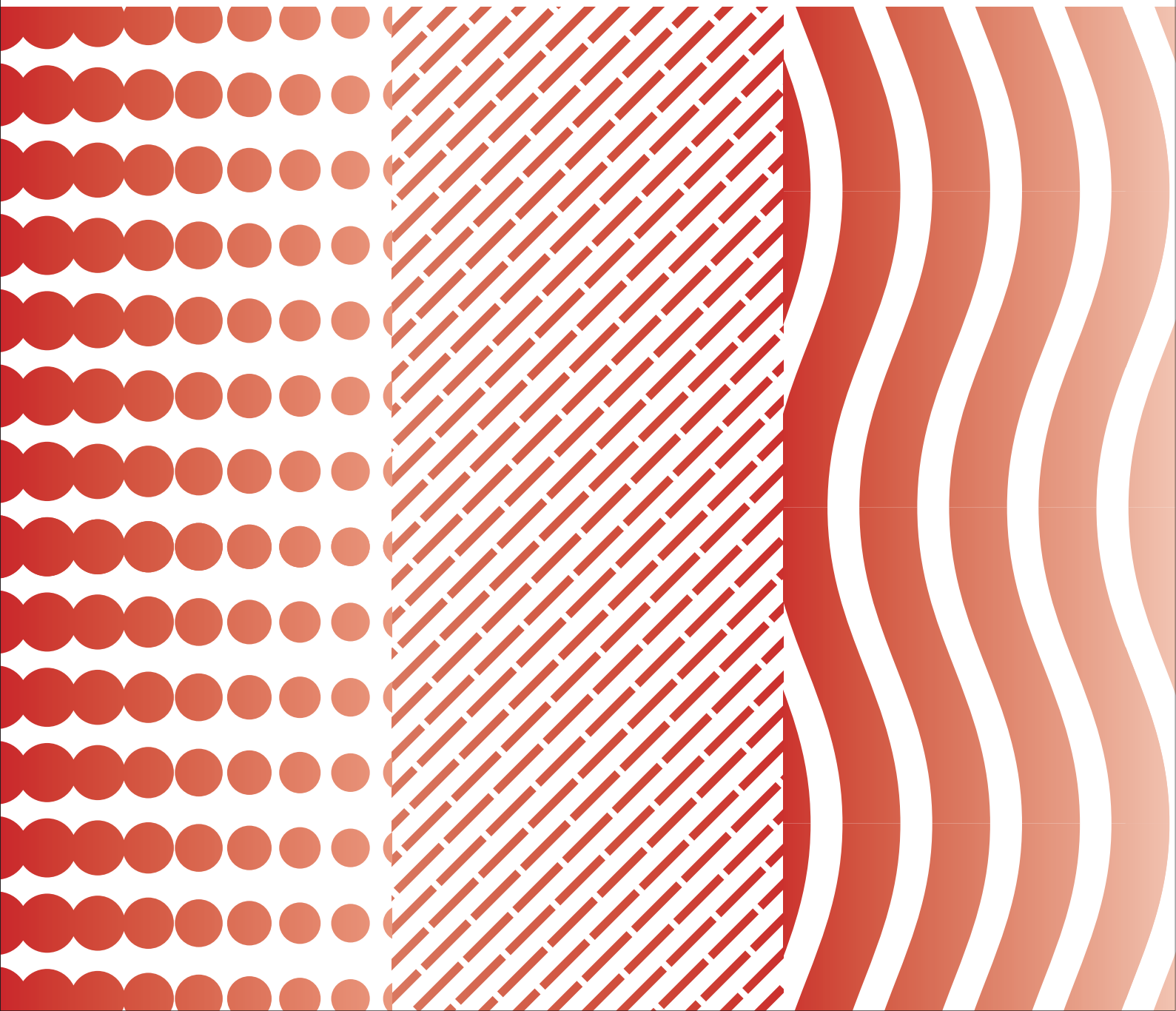
HAMAMATSU
PHOTON IS OUR BUSINESS

HAMAMATSU PHOTONICS K.K.

Integrated Report 2020



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Editorial Policy

Hamamatsu Photonics published the Integrated Report 2020 as a medium to share mid-to-long term value creation through both financial and non-financial information. The International <IR> Framework provided by the International Integrated Reporting Council (IIRC) and the Guidance for Integrated Corporate Disclosure and Company-investor Dialogue for Collaborative Value Creation provided by the Ministry of Economy, Trade and Industry were used as reference in preparing this integrated report. Our corporate website also includes even more extensive and detailed information. Please read the Integrated Report 2020 together with the information on our website.

Environment
Social
Governance
Guidance for
Collaborative
Value Creation

Reporting Organization

The Integrated Report 2020 focuses on reporting of non-consolidated information about Hamamatsu Photonics K.K. The scope of the financial information encompasses 26 companies (as of September 30, 2020), including Hamamatsu Photonics K.K., 21 consolidated subsidiaries, and 4 entities accounted for using the equity method.

Reporting Period

The reporting period for this integrated report is FY2020 (October 2019 to September 2020).

Management Philosophy of the Hamamatsu Photonics Group

We pursue the unknown where no one has yet explored. By leveraging photonics technology to establish new industries and reach for the world's highest levels of manufacturing excellence, we build enterprise value and contribute to the development of science and technology.

Light is a fundamental technology that supports various industries, and further advances in photonics technology are required on a global scale, to achieve technological innovation today and to improve the performance and accuracy of electronic equipment in the future. However, only a small fraction of the nature of light has been elucidated. We explore fields not yet explained. Based on the knowledge generated by that inquiry, we enhance our enterprise value by discovering practical applications with which to create new industries and expand our business operations.

At the same time, we have a duty to generate a stable earnings base and continuous growth on which a long-term development of technology depends. To respond flexibly and quickly to the expansion of the photonics industry and to changes in the business environment, we have formed a framework for the proactive investment in R&D and equipment for continuously stable and high earnings, based on our medium-to-long-term vision.

In addition, we believe that people, technology and knowledge are the foundation of sound management. We improve ourselves everyday through our work, discovering the things that only we can do. In so doing, we conduct technology development which is backed up by the knowledge, needs and competitive technologies for building the photonics industry. We believe it is vital that we, guided by a mind of “Wa” *, foster a corporate culture that can combine our individual talents to form a whole that is greater than the sum of its parts. At the heart of this, effort is a bottom-up operational approach that is focused on the workplace.

*“Wa”: means collaborative spirit and integration of diversified talents.

HAMAMATSU
PHOTON IS OUR BUSINESS

Representative Director and President

Akira Hiruma

To Our Stakeholders

- To everyone who is pursuing and revealing the possibilities of photonics together -

In recent years, there have been various problems worldwide due to political reasons, and in FY2020, the new threat of the novel coronavirus infection (COVID-19) has created a challenging business environment. In the future, we will have to face not only the COVID-19 but also climate change and many other issues in order to continue doing business. However, we have overcome various past crises by pursuing photonics technology and have continuously developing as a company. We always refer to our products as “Key Enabling Technology.” This is because, rather than merely supplying components, we create products that enhance the performance of our customers' products. Although COVID-19 pandemic has caused a temporary decline in sales, the application of photonics technologies will continue to expand. I believe that we can continue to grow further by enhancing our essential core photonics technologies and pursuing their potential. During the pandemic, I also realized our strength and the need for the Company to take on new challenges. Through this experience, we will continue to pursue our core photonics technologies and take on new challenges.

Pursuit of Core Photonics Technologies

In 1926, in Hamamatsu, Japan, the Japanese katakana character "イ" was projected electronically on a cathode-ray tube. That was the instant that Professor Kenjiro Takayanagi, later respectfully known as the "father of Japanese television," created something never been before in the world. This television technology revolutionized the lives of people around the world. Before industries utilized photonic technology, our founder, Heihachiro Horiuchi, who studied under Professor Takayanagi realized the future potential of photonics and started a business using photoelectric conversion technology, inherited from Professor Takayanagi. Hamamatsu Photonics has continued to pursue the possibilities of photonics while always holding dear to the spirit of Professor Takayanagi. One of these people is our former President, Teruo Hiruma.
Teruo Hiruma, the Company's former President, often said "Try before you say you can't." He always embodied a spirit to do something new in order to become the best in the world, with the belief our products must not only be the best in Japan but around the globe. Performing research that aims for something that does not exist and developing technologies thought to be impossible can sometimes be difficult and sometimes produce unexpected results. "Light" is always present around us and is still filled with much mystery. Playing a central role in photonics technology, we continue to build the foundation for the future.

Inverted Pyramid Structure Supporting Contributions of Value to Society

Unlike the general industry pyramid structure, industries that utilize photonics employ an inverted pyramid structure. Hamamatsu Photonics creates photonic devices at the bottom of the inverted triangle, while customers use our photonic devices to create modules above us. The next level comprises customers who create system products, while customers who supply services are at the top. Hamamatsu Photonics may be at the bottom of this pyramid structure, but we are not simply a company that supplies components. We create vital products known as "Key Enabling Technology," which are essential core technologies for industries that utilize photonics.

Contributing to Society through Business

In recent years, natural disasters, assumed to be caused by global warming, have been occurring almost every year, and the scale of damage is increasing. In August 2020, Hamamatsu City, Shizuoka Prefecture, where we are based, recorded a temperature of 41.1°C, tying the highest recorded temperature in Japan. This and similar examples show us that the impact of global warming has become an issue that we cannot ignore in our daily lives. In March 2020, we announced our long-term vision of global warming countermeasures to cut greenhouse gas emissions by 83% for scope 1 and 2 by FY2051 compared with FY2018. Many of our products are used for environmental analysis, which is the basis of global warming countermeasures, and many are used to overcome COVID-19 such as for PCR testing and X-ray CT scans to check for pneumonia, etc. These products support society in many situations, including daily life. While our products' contributions are not always apparent since they are not the end products, knowing our products themselves contributes to society is important for us to grow together with society and our employees to have a strong sense of pride. I believe that this sense of pride is the foundation that helps our employees become aware of social issues as an extension of their own problems and motives them to find new solutions. However, nothing can be done only with the photonic devices. Our products start to have significance once incorporated into the products of our customers. In other words, co-creation with customers is what plays a beneficial role. This is why communication with customers is so important for us. COVID-19 has diversified the way we communicate with each other. I would like to continue to strive to build a co-creation system in which customers who have issues related to photonics can immediately contact us.

Diversification of Communication

Until now, we have always placed importance on face-to-face communication in our sales and our development activities. Now those face-to-face sales activities became impossible due to COVID-19 there is a feeling in Japan that a certain decrease in sales will be unavoidable as a result of these circumstances. This is, however, a bit different overseas. In the US particularly web-based communication has improved productivity and increased sales in some cases. I believe that diversification of communication will serve as a source of growth for us. In the past, because of distance and time differences, only the sales staff could communicate with our customers, now our development staff can participate in making deeper communication possible with our customers. Although it is said that Japan as a whole is lagging in digitalization, we recognize that there are vast areas where we can grow further by utilizing IT more in the future.

From Human Resources Development to Regional Development

We have long been adopting an department-independent profit system to promote management philosophy. However, in order to develop our people so they can make appropriate decisions when emergencies such as COVID-19 occur, we need to cultivate the next generation of leaders with venture spirits to launch startup companies. Developing young leaders may not be an urgent task, but we will need to do so now if we want such leaders ten years from now. After witnessing COVID-19 pandemic, I feel the importance of working on things that are not urgent but very important for our future. In order to nurture startup companies, I think the role of a mentor is important to give advice to young entrepreneurs and lead them to success based on his or her own experience as done in the US. I would like to see next-generation industries that utilize photonics established by energetic young people who are willing to launch startups within the Company and experienced mentors willing to support them. We are currently working on creating such a framework within the Company. I would also like to see us help small- to medium-sized companies and venture companies outside the Company that manufacture medical instruments and bio instruments. We have a CVC (Corporate Venture Capital) function within the Company for this purpose and have also established a course called BPxD (Biophotonics Design) at the Graduate School for the Creation of New Photonics Industries*. Along with our optical technology, Hamamatsu City has fostered processing technology, cultivated in the textile, musical instrument, and transportation industries. Hamamatsu City can offer technical support to people who want to manufacture new medical instruments or bio instruments. I hope that the efforts to create new industries by taking advantage of regional characteristics will become a model case and create new industries for the next generation in regions other than Hamamatsu. It is meaningless if our Company alone is full of vitality. I believe that if the entire region where we live becomes energized,not only our employees but also our families and society will develop for the better.

*Offering education at the doctorate level only, the Graduate School for the Creation of New Photonics Industries aims to create new industries that use photonics technologies.

In August 2017, Hamamatsu Photonics K.K. became a registered participant of the United Nations Global Compact.

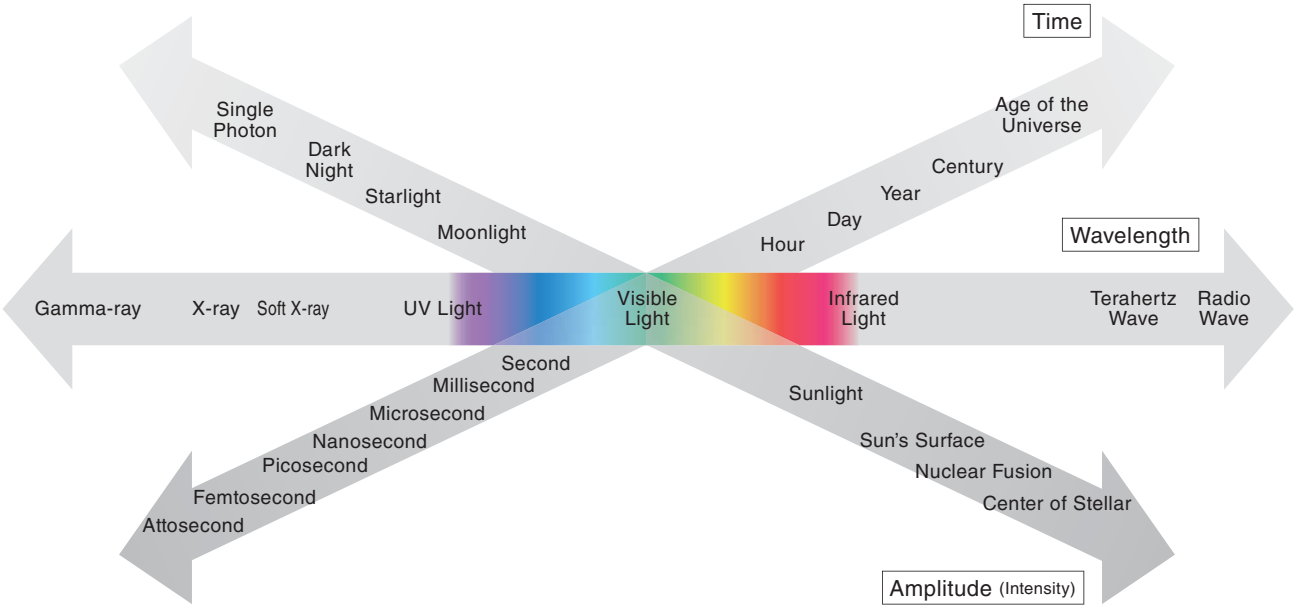
WE SUPPORT UN GLOBAL COMPACT

Hamamatsu Photonics will continue to grow, making every member of our organization more able to contribute to the betterment of society by creating new industries with photonics technology. We, as a global company, uphold the Ten Principles of the United Nations Global Compact and contribute to the sustainable growth of society.

What is “Light”?

Always striving to reveal the infinite and hidden potential of light.

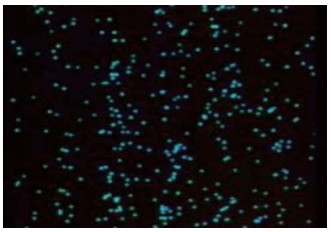
“Light” is always present around us and is still filled with much mystery.
The core of these mysteries is found in the strange nature of light that has the properties of a wave and a particle, no mass, and travels faster than anything else in the universe.



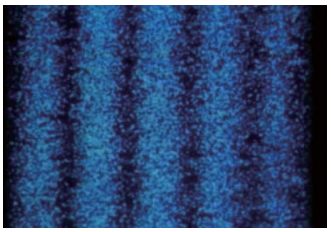
The human eye can detect “visible light” at a wavelength between 400 to 700 nanometers. Visible light corresponds to the multiple colors of the rainbow. UV light, X-rays, and gamma-rays exist on shorter wavelengths than those beyond the violet. On the other hand, infrared light, terahertz waves, and radio waves exist on the longer wavelengths than those beyond the red. In addition to wavelengths, light also possesses many other attributes such as amplitude (intensity), time, polarization and phase, which influence various aspects of our world. The reason to extend the use of photonics technology in the field of advanced science, such as unknown elementary particles and gravitational wave detection can be found in these characteristics. Light is the source of potential to expand the knowledge of mankind. We contribute to human health and happiness, as well as the development of science and technology, through the supply of optical sensors, light sources and the systems using them.

Wave-Particle Duality of Photons

This is Young’ s Interference Experiment or Double-slit Interference Experiment. This experiment shows interference fringes appear even if the light is drastically weakened to the level of having only one particle. This demonstrated that in the double-slit interference experiment, one photon particle simultaneously passed through the two slits and interfered by itself. Photon has the wave-particle duality.

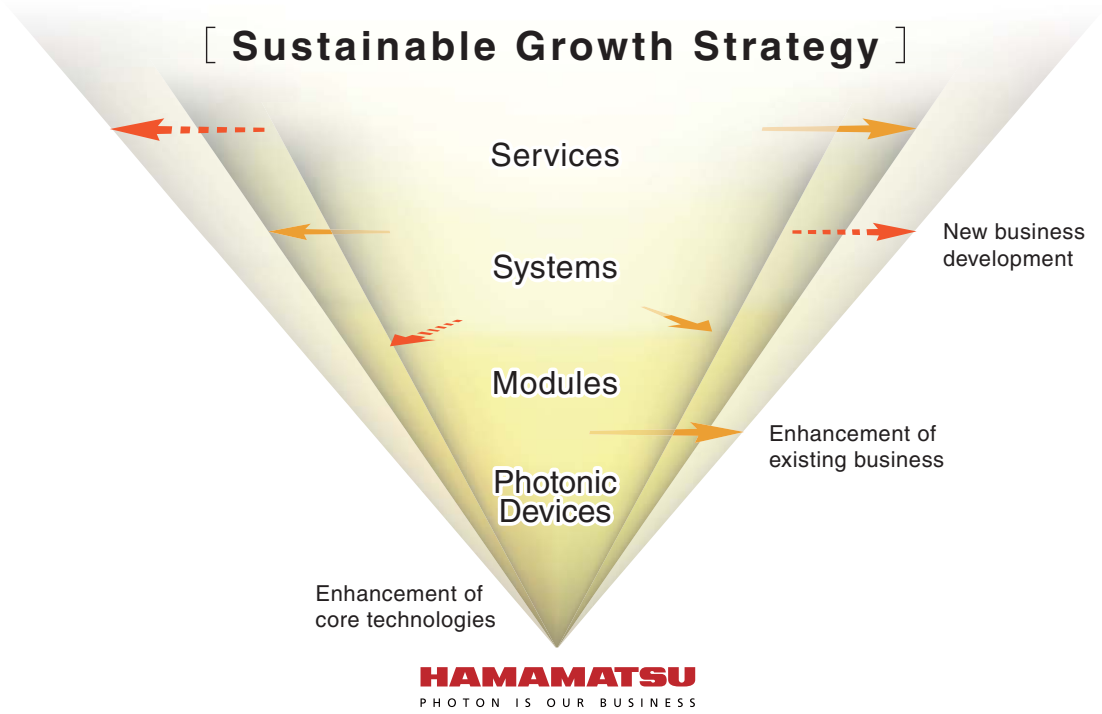


▲ When light weakened to an extremely low brightness limit and projected on a screen is detected, it behaves like a particle.



▲ However when the recorded particle count increases, an interference fringe appears.

▲ Watch a video of the experiment.



Key Enabling Technology

Nothing is possible without it.
No destination can be reached without it.
Future needs cannot be realized without it.
We are proud that our photonics technology is a Key Enabling Technology.

The structure of general industry is a pyramid shape with the end-product manufacturers at the top.
However, the structure of the applied photonics industry is an inverted pyramid shape.
Hamamatsu Photonics, as a supplier of devices such as optical sensors and devices, is positioned at the bottom.
The size and fields of these industries grows as we move upward.
However, Hamamatsu Photonics does not simply supply products from the bottom of this pyramid,
but rather supplies the Key Enabling Technology that heightens end-product performance found
at the core of industries that utilize photonics.
As we expand our business reach upwards from photonic devices to modules,
co-creation with customers discovers new applications,
broadens the angle of the inverted pyramid structure for industries that utilize photonics,
and diversifies the utilization of photonics technology.
Moreover, to anticipate needs that customers are not yet aware of themselves,
we must collaborate with ventures that aim for new businesses that use photonics technology,
which in turn means that developing internal ventures is important.
In the future, we will nurture and embody the same venture spirit we have held since our founding,
while strengthening our core photonic devices to strategically broaden the industries which utilize photonics,
and foster sustainable growth.

Products and Applications

Our Key Enabling Technology

Key Enabling Technology, our core technology, is developed around three businesses with a broad portfolio of products ranging from photonic devices, modules and system products. The following are examples of applications and methods in which various products are used in industries that utilize photonics.

Photomultiplier Tubes, Imaging Devices and Light Sources
(Electron Tube segment)

Optical sensors using vacuum technology such as high-sensitivity photomultiplier tubes and phototubes, Imaging devices such as scintillators, as well as various kinds of light sources such as lamps.

Opto-semiconductor Devices
(Opto-semiconductor segment)

Optical sensors (photodetectors) such as Si photodiodes, image sensors, photo ICs and light emitting devices such as infrared LED and opto-semiconductor modules.

Image Processing and Measurement Systems
(Imaging and Measurement Instruments segment)

Imaging systems, photometry systems, and measurement and analysis systems that use optical sensors as key components and are deployed in a wide range of fields.

Main Application Fields

Medical-Bio P.09,10

Industry P.11

Analysis P.12

Transport P.12

Academic Research P.38

Contributing to the Fight Against the Novel Coronavirus Infection (COVID-19)

COVID-19 is imposing a serious impact on a variety of areas, from our daily lives to our economic activities. We provide products and technologies that serve as the core of analytical and diagnostic instruments to support medical care and research, which are at the forefront in the battle with the novel COVID-19. We also contribute to the world's fight against the Corona disaster through the development of detectors and measurement systems that are compatible with new lifestyles that provide disinfection / deactivation, touchless capabilities and labor savings.

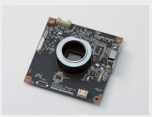
PCR Testing and Antigen / Antibody Testing to Check for Infection

Polymerase chain reaction (PCR) and isothermal gene amplification are technologies for mass replication of DNA and gene testing. Equipment that uses these principles is used in various applications, such as clinical diagnosis and research to check for infection. In real-time PCR, digital PCR, and some isothermal gene amplification methods enable quantitative DNA detection and fluorescent probes are used to detect DNA amplification. Photomultiplier tubes (PMTs), mini-spectrometers, MPPC® (SiPM), Si photodiodes, and board-level cameras are used for such fluorescence detection.


Photomultiplier tubes (PMTs)

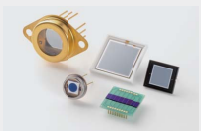

MPPC®


Mini-spectrometer


Board-level camera

Along with gene testing such as PCR testing, antigen testing is used for rapid diagnosis of viral infections. The presence of previous infection can also be checked through antibody testing. Therefore, understanding the immune response to the virus is essential for vaccine development, and analyzing symptoms caused by COVID-19 can be useful in determining a treatment strategy. Photomultiplier tubes (PMTs) and Si photodiodes are used for quantitative testing of antigens and antibodies. An immunochromato reader is used for a simple antigen and antibody test and only requires a few drops of sample.

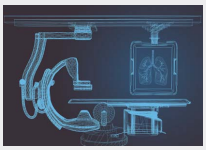

Photomultiplier tubes

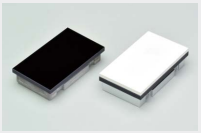

Si photodiodes


Immunochromato reader

X-ray Diagnosis to Determine Severity Level after Infection

X-rays are used to diagnose pneumonia and determine the severity level of COVID-19. Computed tomography (CT) is a method for reconstructing the inner image of a human body by irradiating X-ray. An X-ray CT scan provides high resolution images of the human body and allows observation of the tissues inside the body. Si photodiode arrays are used as detectors. Digital radiography (DR) is an alternative to conventional X-ray films and imaging plates (IP), using a scintillator plate that converts X-rays into visible light.




Si photodiode arrays


Example of Si photodiode arrays mounted inside of a CT scanner gantry


Scintillator plates

Virus Research, Drug Discovery and Adapting to a New Way of Life (Lifestyles)

Research / Drug Discovery

A variety of related instruments are used in a wide range of studies, including those on origin and mutation of viruses, as well as immune response and treatment methods during infection. Examples include next-generation sequencers (NGS) and microarrays for population studies and gene sequencing, flow cytometers for vaccine development and immunological studies, cameras and digital slide scanners for microscopic imaging of tissues and cells to analyze infection mechanisms, drug screening systems, high-performance liquid chromatographs (HPLC) and mass spectrometers.

Adapting to a New Way of Life (Lifestyles)

• Disinfection / Deactivation

In the wake of the Corona disaster, disinfection technology using UV light has attracted a great deal of attention. It is believed that DNA and RNA, which hold genetic information in microorganisms such as bacteria and viruses, are destroyed and inactivated by UV light in the vicinity of 222 nm, preventing them from multiplying. We are developing various measurement systems and detectors that contribute to the construction of sterilization and disinfection systems using UV light sources. These products include spectroscopic measurement systems for photometric quantity evaluation, UV power meters, and sensors for UV monitoring.

• Touchless, Labor-saving

Touchless device operation of machinery for hygiene management, positional measurement for ensuring social distance, and labor-saving such as autonomous robots are becoming more common in everyday life. We have developed distance image sensors as a part of sensing technology to address these new needs, and they are expected to be applied in various situations in the future.

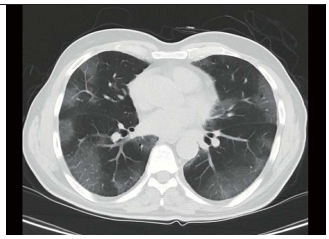
01 Medical-Bio

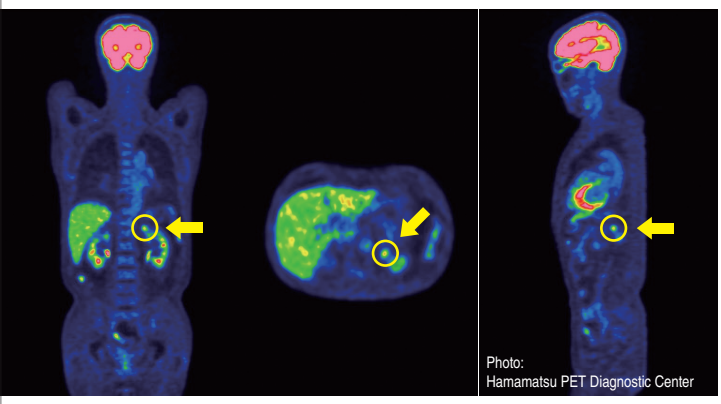
Examining the Body

■ CT

Computed tomography (CT) is used to find various lesions in the body by taking images of the human body cut into slices by irradiation such as X-ray. Si photodiode arrays are used as detectors in CT scanners.


Si photodiode array


CT image



PET image (arrows indicate areas where kidney cancer is present)

■ PET

PET is an abbreviation for Positron Emission Tomography, a method of capturing and imaging the special gamma rays produced by positrons. It is used for cancer tests and dementia (brain function) tests. Scintillators, photomultiplier tubes, and MPPC® are used as detectors in PET systems.

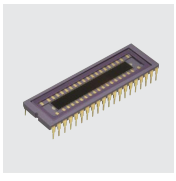

Photomultiplier tube


MPPC® module

■ Blood Testing

Blood testing is widely used in the diagnosis of diseases and for making treatment decisions. Among the many blood testing methods, one uses an optical sensor to capture data possessed by the cells contained in the specimen (blood or blood components) in the form of fluorescent or transmitted light. Xenon flash lamps are used as light sources, while Si photodiodes and photomultiplier tubes are used as detectors.


Xenon flash lamp


Si photodiode array


CMOS image sensor


Photomultiplier tube
(Photosensor module)

■ Antigen / Antibody Testing

As a type of immunological testing, antigen / antibody testing is used for examination and diagnosis of various diseases such as cancer and infectious diseases. For this type of testing, a highly sensitive photomultiplier tube is used to measure the weak luminescence generated by the reaction between the specimens and reagents to measure the target substance.

DNA Testing

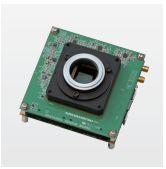
■ DNA Sequencer

DNA sequencing is a technology that automatically decodes the base sequence of DNA, the genetic information of organisms. It is used in various types of research at universities and research institutes. In the field of cancer medicine, it is important to analyze the genetic information of cancer cells quickly and comprehensively. This technology contributes to medical treatment and drug discovery by fulfilling such a need. One of the analysis methods is to determine the nucleotide sequence through fluorescent labeling each type of base (A, T, G, C) and detecting the weak light emitted. Our high-sensitivity image sensors and cameras are used to achieve such a method.

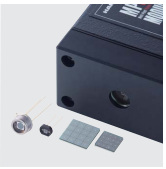
■ PCR

Polymerase chain reaction (PCR) is a technology used for the mass replication of DNA. Although it has become widely known as a method to test for COVID-19, it is also used in a variety of applications, including molecular biology and clinical research. Photomultiplier tubes, MPPC®, and CMOS cameras are used to detect the amplification of DNA through fluorescence detection.

Photomultiplier tube (Photosensor module)

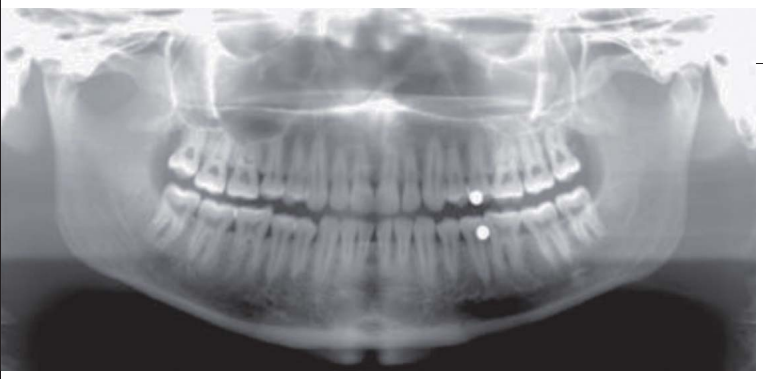


CMOS camera for scientific measurement



MPPC® / MPPC® module

CCD image sensor



Dental Examination

■ Dental X-ray Images

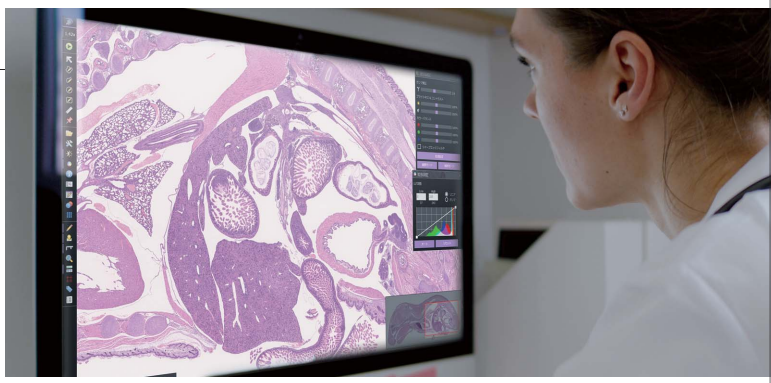
When taking X-ray images of teeth, the use of an X-ray flat panel sensor as a detector allows for digital imaging at high-speed and with much lower radiation exposure.

X-ray flat panel sensor

Supporting and Innovating “Pathology”

■ Digital Slide Scanner for Pathology

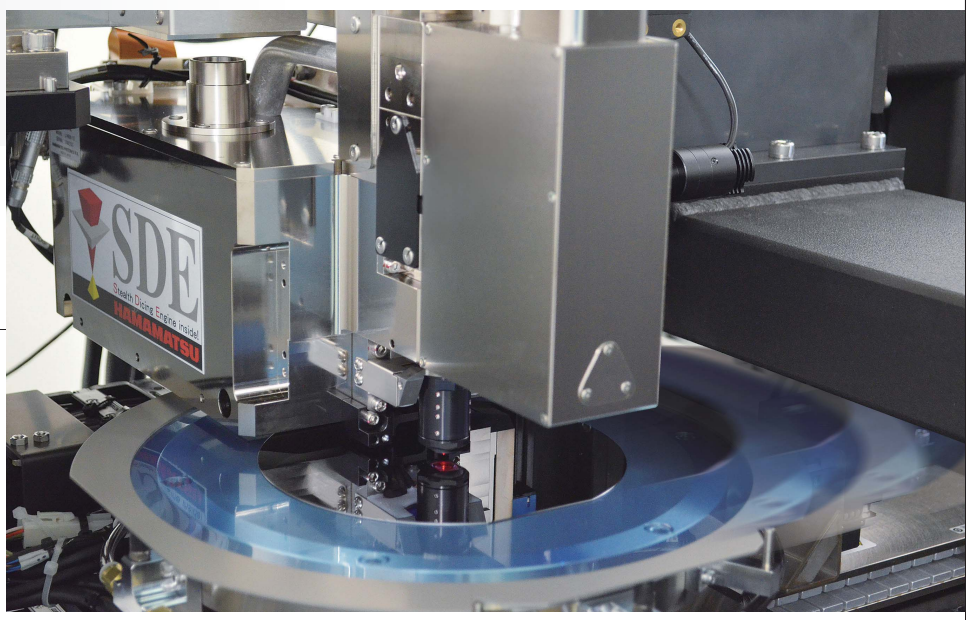
It is said that one in every two Japanese people suffer from cancer. Although early detection and early treatment are the best ways to combat cancer, it is said that there is currently a shortage of pathologists in Japan who can provide definitive diagnosis of diseases, especially cancer. Our digital slide scanner “NanoZoomer®” is capable of converting glass slide specimens of tissue and cells into digital data at high speed and high resolution. By sharing digital data over a network, it enables exchange of opinions among pathologists and advice from medical specialists in other locations, thereby allowing for remote consultations that contribute to reducing the burden on pathologists.



Digital slide scanner “NanoZoomer®”

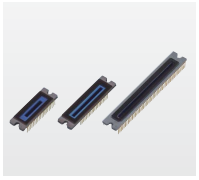
02 ／ Industry

Multifaceted Support for Semiconductor Manufacturing



■ Semiconductor Manufacturing / Inspection

Our products are also widely used during the manufacture of semiconductors, which are indispensable in modern life. These products include image sensors, photomultiplier tubes, and other optical sensors used in the inspection process such as lamps, laser-driven light sources, known as LDLS™, Stealth Dicing Engine™ system for cutting wafers at high speed and with high quality, and failure analysis systems that can identify failure locations on semiconductor wafers.

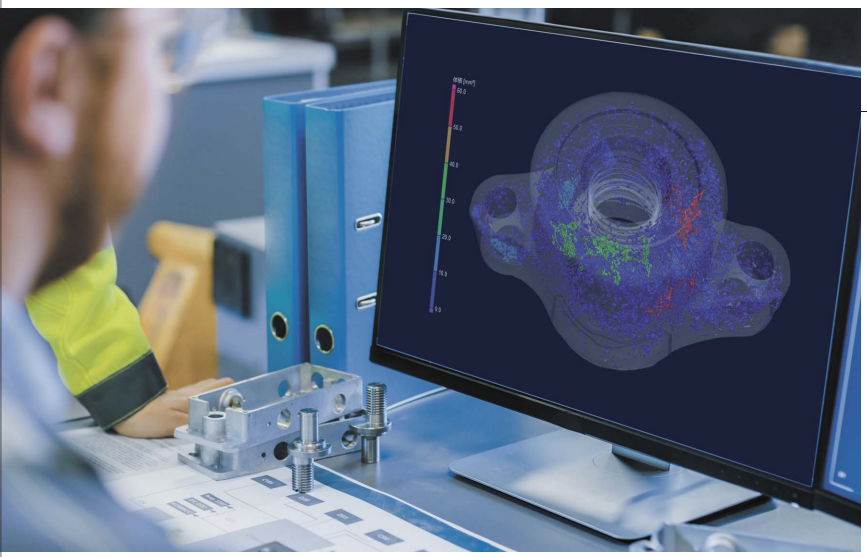


TDI-CCD image sensors

Laser-driven light source "LDLS™"

Stealth Dicing Engine™ system

Failure analysis system



Inspection of the Inside of Things

■ X-ray Non-destructive Inspection

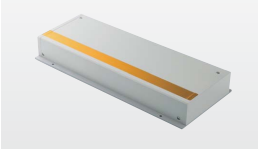
X-ray non-destructive inspection, which enables non-contact, non-destructive inspection and analysis of the structure and properties of an object in real time, is widely used in our daily life. Examples include production and inspection processes in the manufacturing industry, inspection of infrastructure equipment, inspection of foreign matter in food, and baggage inspection at airports. Our microfocus X-ray sources are used as X-ray sources, and X-ray line sensor cameras and Si photodiode arrays are used as detectors.

Image taken during baggage inspection

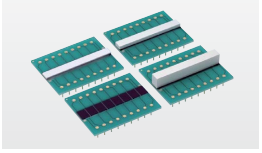
Internal shape inspection of Li-ion batteries

Microfocus X-ray source

Soft X-ray source



X-ray line scan camera



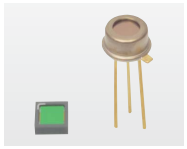
Si photodiode arrays

03 ／ Analysis

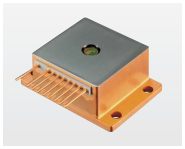
Protecting the Health of the Earth

■ Atmospheric Measurement

Light sources and optical sensors using infrared light are used to detect greenhouse gases and air pollutants. X-rays, beta rays, and neutron rays are used to measure dust (PM2.5), and ultraviolet rays are used to decompose pollutants in the atmosphere.

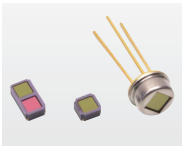


Mid infrared LEDs



Quantum cascade laser

Xenon flash lamp

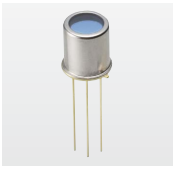


InAsSb photovoltaic detectors

■ Water Quality Tests

Water quality tests are conducted to detect water pollution in rivers, oceans, and groundwater, which can cause environmental degradation and health hazards. A number of potential contaminants exist in water, and their major components are regulated by law and regulations regarding their reference values and measurement methods. Our high-sensitivity optical sensors and high-intensity light sources are used in water quality testing equipment that needs to be able to detect extremely small amounts of contaminants.

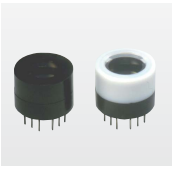
Xenon flash lamps



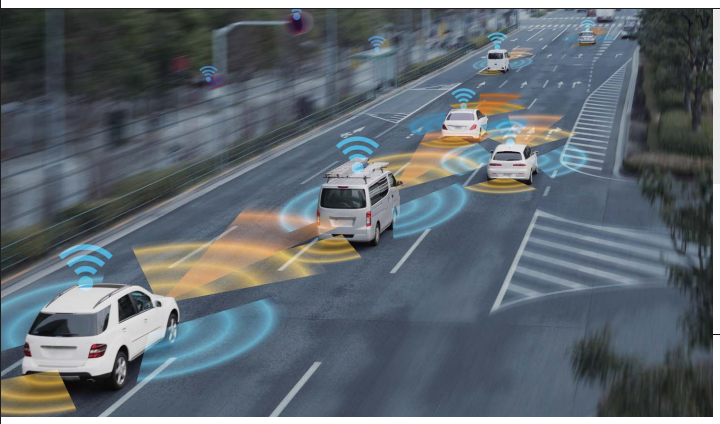
Si photodiode

Image sensor

Photomultiplier tube

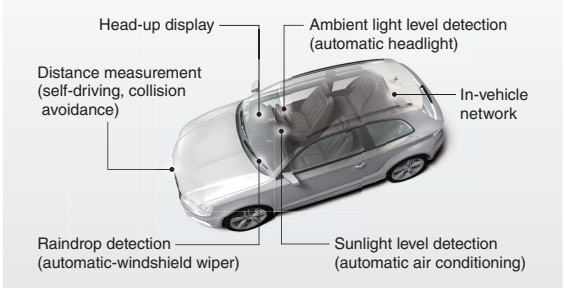


Phototubes



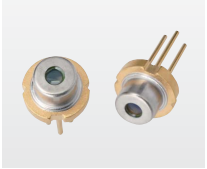
04 ／ Transport

Supporting Innovative Automotive Technologies to Realize Safety, Security and Comfort

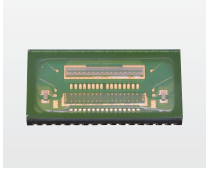


■ LiDAR and Other Automotive Related Technologies

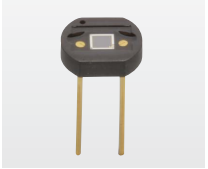
LiDAR (Light Detection and Ranging) is a technology that serves as the eyes of self-driving systems, using infrared lasers and sensors to determine the position and distance of surrounding objects. The distance is measured by irradiating a laser light onto an object and capturing the reflected light with an optical sensor. Pulse laser diodes, etc. are used as light sources, and various optical sensors such as Si photodiodes and Si APDs are used as detectors. In addition to this technology, our opto-semiconductor devices are used for many functions designed for safety, security, and comfort, including ambient light level detection to achieve automatic headlight, raindrop detection for automatic-windshield wiper, and sunlight level detection for automatic air conditioning.



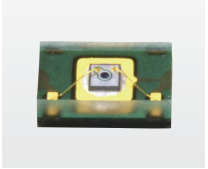
Pulse laser diodes



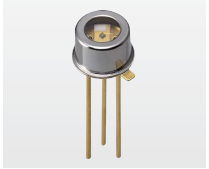
Photosensor with front-end IC



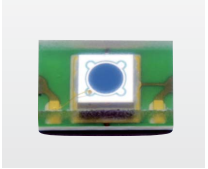
MPPC®



Si APD



InGaAs APD



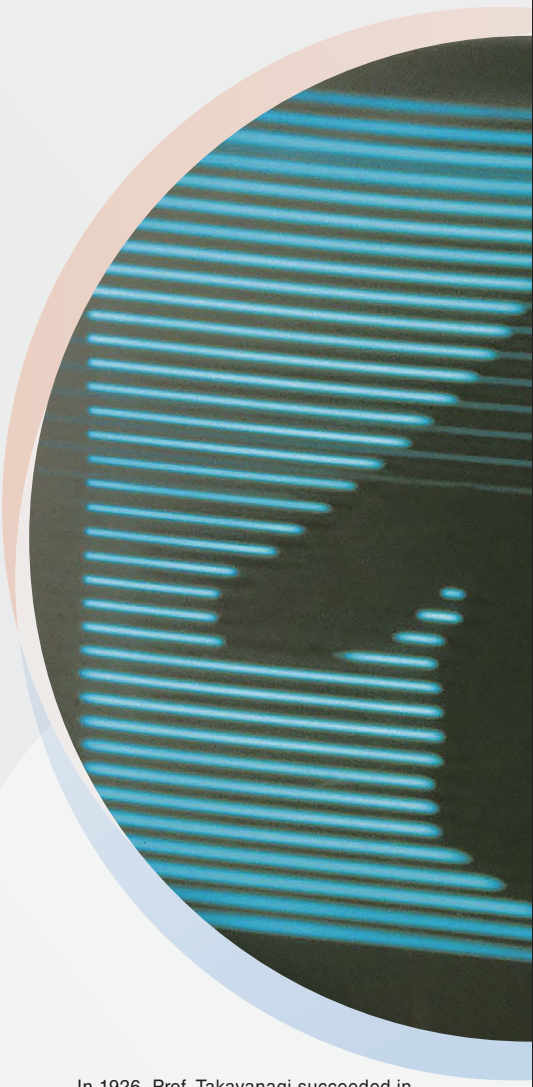
Si PIN photodiode

Pursuing the Unknown and Unexplored

The Origin of Management

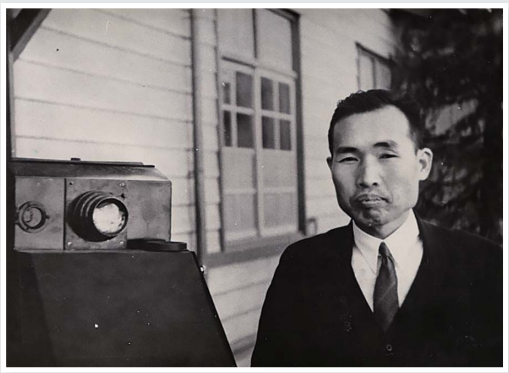
The spirit of pursuing the unknown and unexplored - inherited from our predecessors

Prof. Kenjiro Takayanagi has come to be respectfully known as the “father of Japanese television.” There was always one woman who was a muse to Prof. Takayanagi in his pursuit of the unknown. This woman was “Fortuna” - the goddess of fortune in Roman mythology. As told in these myths, Fortuna only had forelocks with no hair at the back of her head. One would have to be one-step ahead of her, wait for her to catch-up, and then turn around and seize her by her forelocks. When trying to develop technology to benefit society in the next ten or twenty years, we have to strive to go farther ahead than people think is necessary. That pioneering approach led to the success of the world’s first electronic television.



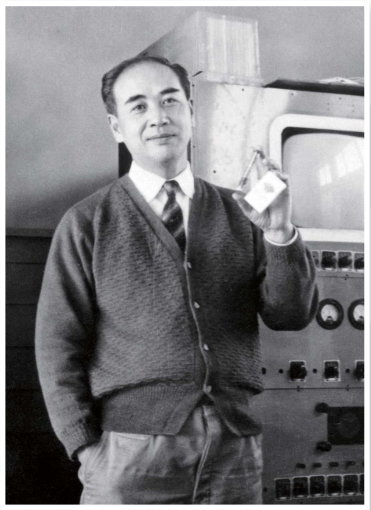
In 1926, Prof. Takayanagi succeeded in receiving images on the world's first electronic cathode-ray tube. “イ” is derived from the “Iroha” order as the first character of the traditional syllabary. (The picture is of the reproduction device.)

Seize the Forelocks of the Goddess



Prof. Takayanagi and an Iconoscope Television Camera (1935)

Light to Electricity, Electricity to Light

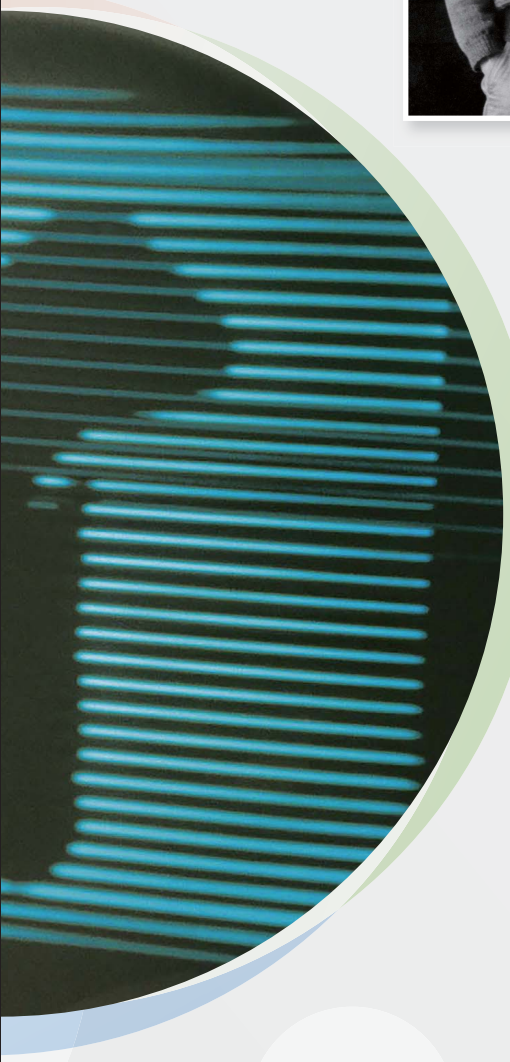


Heihachiro Horiuchi and the 1/2-Inch Diameter Vidicon (1963)

Photonics Technology Will Surely Help Society

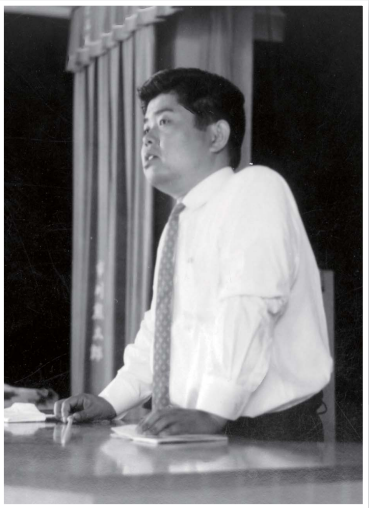
Prof. Takayanagi passed on his spirit to create things that did not yet exist in the world to his student, and our founding president Heihachiro Horiuchi and former president Teruo Hiruma. Our entire company fully embodies this spirit. From almost the start of the company's inception, Teruo Hiruma, who was mainly in charge of sales, encouraged everyone at Hamamatsu Photonics to make the world's best products. He established a system to engage with the research industry and travelled the world in an effort to develop markets. Teruo Hiruma inherited the ideals of Prof. Takayanagi and Heihachiro Horiuchi, and through his actions, our organization has grown into a world-class company.

The origin of our company to engage in photoelectric conversion technology and the applied products to grow with the advancement of photonic technologies lies in the unyielding spirit to confront the unknown and unexplored realms.



At the 25th anniversary ceremony for Hamamatsu TV Co., Ltd. (renamed to Hamamatsu Photonics K.K.), Heihachiro Horiuchi passed the baton of president to Teruo Hiruma. On the left, Prof. Takayanagi attends the ceremony as a guest. (1978)

Lecture by Teruo Hiruma (1960)

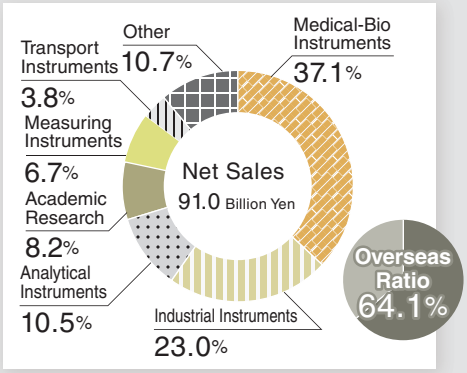


Make the World's Best Products

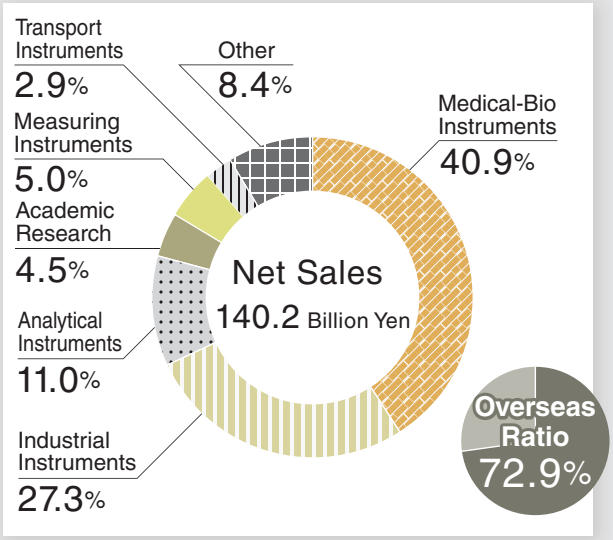
What Can We Do with Light?

Our History

▼FY2010 (Sales by Industry and Application)



▼FY2020 (Sales by Industry and Application)



1953
Established Hamamatsu TV Co., Ltd.(former name)

1969
Established an affiliated company in the USA

1973
Established a joint venture company in Europe

1983
Company name changed to Hamamatsu Photonics K.K.

1984
Registered for off-exchange stock trading

1982
Introduced divisional system

1953 1955 1960 1965 1970 1975 1980

The history of our growth

▶ 1st Term: 1953 to 1972

From Founding to Product Development

Inheriting the spirit of Prof. Kenjiro Takayanagi, founder President Heihachiro Horiuchi established Hamamatsu TV Co., Ltd. with the second President Teruo Hiruma. The office building was a storehouse that had survived the flames of air raids. Even while confronting the difficulties of having few knowledgeable and skilled employees, acquiring expertise through literature and other materials this new company took on the work with an unwavering spirit to "try before you say you can't" toward a goal of making the world's best products. The unique corporate climate of an "all researchers system" was created, and through the fun in each and every day even during the struggles at the time of our founding.

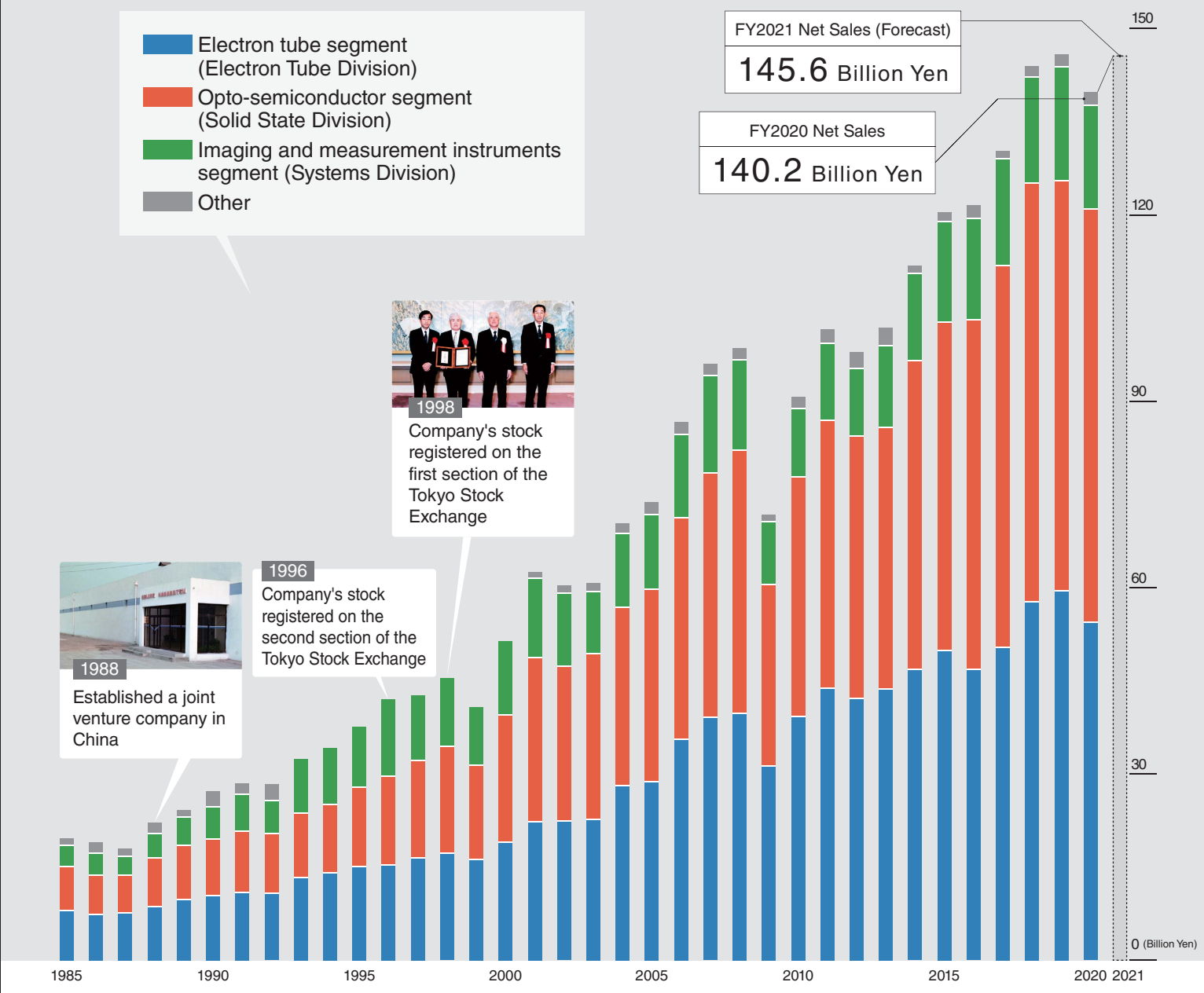
Research Industry ▸P17

▶ 2nd Term: 1973 to 1981

Expand New Applications from Analysis

The construction of a new factory put in place a production system. However, the impact of the oil shock, and the appreciation of the yen at that time, forced us to face the only financial deficit since the founding of our company. Analysis was the mainstay product application for the company at that time. However, we talked with customers about their challenges and developed 1/2-inch diameter head-on PMT. An opto-semiconductor for X-ray CT scanners then followed. This swept the optical sensor market for X-ray CT scanners and recovered our business performance. Thereafter, we developed other new products and generated new demand to expand applications from analytical and medical fields to industrial, academic, measurement and a wide range of other fields.

Photon Fair ▸P17



▶ 3rd Term: 1982 to 1989

Establish Current Management Base through a Divisional System

To acquire advanced technology and expertise, and continue to drive superior planning and development capabilities, heightening the reputation of the company is indispensable in securing and cultivating excellent human resources. Therefore, we changed the name of the company to Hamamatsu Photonics K.K. and grew into a public company by officially registering on the over-the-counter of the stock market. As the corporate scale expanded and products diversified, we introduced a divisional system, which has become our current management base, to engage in business activities that can flexibly maneuver more efficiently, to adapt to the changing times.

Cash Voucher System ▸P18

▶ 4th Term: 1990 to 2008

A New Challenge to the Human Unknown and Unexplored Realms

A strong mentality to make the world's best products is strengthened by our employees thanks to our work to establish superior technology and develop new products unified as a company. Furthermore, to achieve even more high-minded company goals, we had to take on challenges in the "human unknown and unexplored realms" that bring about new research findings. As some specific fruits of these pursuits, we established the Central Research Laboratory, the Hamamatsu Medical Imaging Center for validating the early detection of cancer and dementia, and the Graduate School for the Creation of New Photonics Industries for the education of human resources who aim to create new industries that use photonics technologies.

Contributions to the Nobel Prize ▸P18

▶ 5th Term: 2009 and Beyond

Change of President, Establishment of a Cross-divisional Department

Akira Hiruma was appointed as the third president of Hamamatsu Photonics, succeeding Teruo Hiruma who had led the company since its founding. The divisional system is a framework that is able to ensure stable earnings, but a cross-sectional department was established to drive growth. The cross-sectional department acts as a new organization to maintain sustainable growth from the business headquarters that links mid-to-long-term research and development, as well as sales activities throughout the entire company. In addition, to the compound semiconductor fabrication center that integrates the compound semiconductor pre-processes expected to diversify future applications, and the GSCC promotional organization to put in place strategies to take on challenges as a global company.

01 / Research Industry

“Once the photomultiplier tube is made, I'll call you sir Hamamatsu TV”

▲ Our first side-on photomultiplier tube type R105 in 1959

These words were said by one of our partners, just after Hamamatsu TV Co., Ltd was founded. At the time, photomultiplier tubes were a product major enterprises were struggling to realize. The world thought Hamamatsu TV, which was still a small local workshop, had absolutely no chance of developing a photomultiplier tube.
However, at the time, these words energized our engineers. They held stubbornly to their position and at the workbench repeatedly enhanced prototypes, before asking for, and intently listening to feedback from customers, only to then re-start the trial-and-error process all over again. Based on the belief that the world would surely accept Hamamatsu TV, tremendous amounts of tests were carried out every day. Now, 60 years later, the photomultiplier tubes made by Hamamatsu Photonics continue to be a mainstay product that packs performance far and above other photomultiplier tubes on the market.
Great care and passion is part of our daily work. We discover unknown phenomena and realize things thought impossible. We use this as a stepping-stone in the further pursuit of the advancement of new photonics technologies. This in and of itself is the research Industry.
In the ongoing quest to explore the unknown, curiosity and craftsmanship remain constant to serve as the driving forces propelling us to new heights.

Episodes

Historical Episodes

02 / Photon Fair

Conveying the Future of Photonics Technology

The Photon Fair (HAMAMATSU PHOTONICS K.K. Exhibition) serves as a milestone for us to improve our technologies and enables opportunities of co-creation to let the world know about our technologies. It represents our pride as a leading company in the photonics industry and provides a platform for us to share information about our products.
In 1979, on the occasion of the opening of our Osaka sales office, we held a private exhibition “Hamamatsu TV Co., Ltd. comprehensive exhibition” focusing on the introduction of new technologies, technical negotiations, and lectures. The main objective of the exhibition was to let as many people as possible know about our company Hamamatsu TV (former name) and its corporate commitment, rather than just promoting our products. The name of the exhibition was later changed to “Photon Fair”. After a nine-year hiatus due to the economic recession caused by the collapse of the bubble economy, the fair was resumed in the form of Photon Fair 1998, and with the launch of the Central Research Laboratory during that time, it became a place to showcase our research and development, as well as future business development based on our company's philosophy, further strengthening our branding. The Photon Fair also serves as an opportunity to further promote the aspect of co-creation with industry, academia, and government. Since 1998, the fair has been held approximately every five years, and the venue is now settled in Hamamatsu, the city where our company is based. The Photon Fair is an event to show what our company will look like in five to ten years, and it has become a valuable place to create ties and opportunities between our company and all of our stakeholders, including customers, local residents, and employees' families.

▶ Photon Fair 2018 (ACT CITY Hamamatsu)

▲ Cash Vouchers used today

03 / Cash Voucher System

You can lead a horse to water, but you can't make him drink.

The motivation of each employee is important. As part of our organization, we have been searching for ways to stimulate motivation for all employees. After the first oil crisis, the Japanese economy faced appreciation of the yen and a period of low growth. We had to find ways to cut costs and improve productivity, but success required every employee to be motivated to take action. Therefore, we started a cash voucher system as internal currency with the aim to encourage everyone to act with a managerial mentality.

All of our internal economic activities used these cash vouchers and each department was financially independent. For example, when confronted with insufficient funds, departments would borrow and pay back cash vouchers with interest. By doing so, we were able to enhance a sense of profitability regardless of group size or operational responsibilities.

Today, the cash voucher system supports our management base by evolving according to changing times and business conditions while raising managerial awareness through the ongoing participation of our employees.

04 / Contributions to the Nobel Prize

"Try before you say you can't."

Our conviction to respond to the needs of our customers has supported the growth of the company.

In 1979, Prof. Masatoshi Koshiba from the University of Tokyo's School of Science asked us to develop a 20-inch-diameter PMT. At the time, the world was working to develop 8-inch-diameter photomultiplier tubes while we had just begun development of 5-inch and 8-inch-diameter photomultiplier tubes. This was not a simple request, but swayed by the passion of Professor Masatoshi Koshiba, we started development.

Many challenges confronted us, but we concentrated on the manufacturing technology we had amassed into this large tube development. Just five months after the start of the development, the 20-inch-diameter photomultiplier tube was completed and in 1982 we successfully delivered 1,050 20-inch-diameter photomultiplier tubes for Kamiokande.

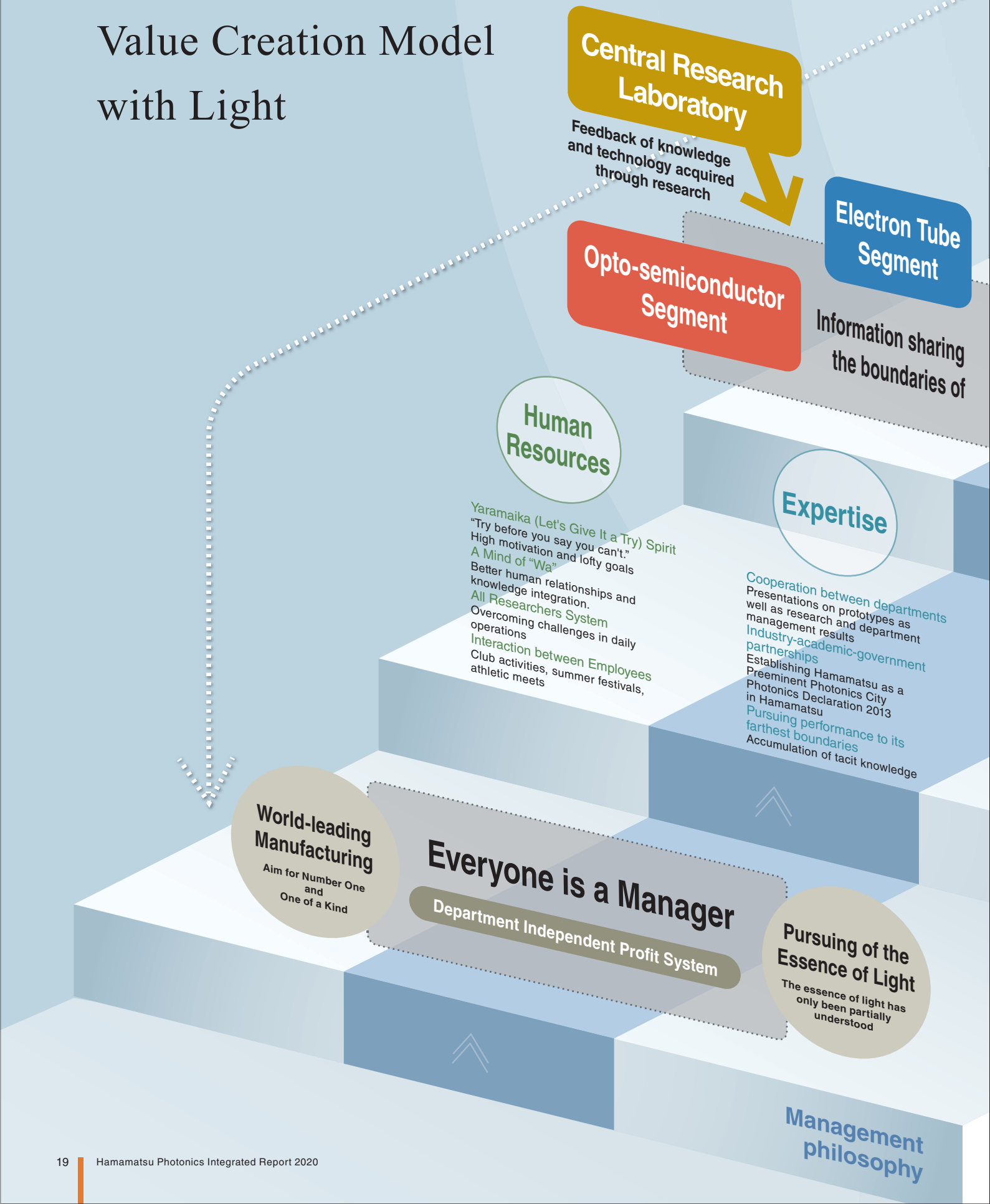
On 23 February 1987, at 4:35 in the afternoon, a neutrino from supernova 1987A that appeared in the Large Magellanic Clouds 160,000 light years from Earth, was captured by Kamiokande. This was the first time in the world a supernova neutrino had been observed. It heralded the dawn of neutrino astronomy - the search for astronomical objects through elementary particles. Almost 1,000 of the world's largest photomultiplier tubes embedded in a water tank continued to operate normally in water for four years. By providing products with the required performance, Hamamatsu Photonics was able to contribute to this outstanding achievement, which started a new page in astronomy.

In addition, Prof. Masatoshi Koshiba earned deeper regard from everyone involved, for his amazing achievement of observing the neutrino, merely one month before his retirement.

2002	Prof. Masatoshi Koshiba awarded the Nobel Prize in Physics Kamiokande Colossal achievement of neutrino observation [Photomultiplier tube]
2013	Prof. Higgs and Prof. Englert awarded the Nobel Prize in Physics CERN Discover Higgs boson [Opto-semiconductor devices/photomultiplier tubes]
2015	Prof. Takaaki Kajita awarded the Nobel Prize in Physics Super-Kamiokande Discovery that neutrinos have mass [Photomultiplier tube]

▲ Prof. Masatoshi Koshiba (Left), Teruo Hiruma (Center) and Prof. Sydney Brenner (Right), awarded the Prize in Physiology or Medicine the same year, at the Nobel Prize Ceremony. Photo courtesy of Chunichi Shimbun

Hamamatsu Photonics´s Value Creation Model with Light



Pursuing the Unknown and Unexplored Realms

Human Health and Happiness Development of Science and Technology

- Early detection of diseases
- Extended healthy life expectancy
- Industry development
- Environmental conservation
- Promotion of academic research

Enhanced Corporate Value

Continuous and Stable High Earnings System

- Unique governance system
- Development of new markets
- Higher motivation
- Accumulation of technology

beyond segments

Imaging and Measurement Instruments Segment

Outcome

Medical-Bio
Industry
Analytical Instruments

High-performance, High-quality Products that Meet Global Needs

Academic Research
Measuring Instruments
Transport Instruments

OUR BUSINESS ACTIVITIES

Organization

Departmental sales management
Formulation of sales plans from the bottom-up.
Stable cash flow generation capability
Through profit management by department

Technology

Sales/Manufacturing/ Development Partnership System
Full support of customer needs
In-house Production Facilities
High-mix low-volume production/ customer service
Building co-creation relationships with customers
Information sharing from the development stage

Management resources

Management base that supports business strategy

Human Resources	•Number of employees: 5,195 (Domestic employees: 3,986 Overseas Employees: 1,209) •Ratio of R&D personnel: Approx. 10%
Expertise	•Number of patents held: 6,587 •Publicly funded R&D themes: 154 (cumulative)
Organization	•Free cash flow: 7.1 billion yen
Technology	•R&D expenses: 12.1 billion yen •Net sales and R&D expense ratio: 8.7% •Representative product share: Approx. 90% •Custom product ratio: More than 70%

Activities for the Environment

Efforts to Tackle Climate Change Issues

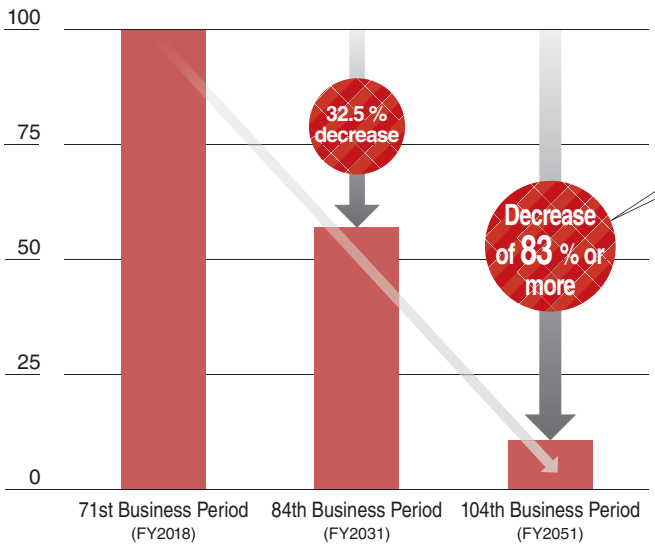
Significance of Our Environmental Initiatives

Environmental pollution, depletion of resources, climate change, and large-scale disasters have become important environmental issues faced by all. Our goal is to realize human health and happiness. That is why Hamamatsu Photonics cannot ignore the need to resolve environmental problems through its business. We develop products and technologies that are able to help find solutions to environmental problems by driving unique photonics technologies in order to achieve a sustainable society by reducing the environmental burden related to our business activities.

Long-Term Vision of Global Warming Countermeasures

In recent years, the problems caused by climate change, such as extreme weather (droughts, heat waves, and heavy rain, etc.), as well as the increasing number of natural disasters, which were traditionally thought to occur once every 50 years, have been imposing serious impacts in many parts of the world. In addition to strengthening business continuity, companies are also required to take measures against climate change in terms of both mitigation and adaptation. In March 2020, we formulated our Long-term Vision of Global Warming Countermeasures, and are working to cut greenhouse gas emissions (scope 1 and 2*) from our business activities. We are also working towards SBT (Science Based Targets) certification, which is a mechanism for companies to set emission reduction targets consistent with the Paris Agreement.

▼Target to cut greenhouse gas emissions for scope 1 and 2*



*Scope 1: Direct emission from use of fuels, city gas, GHGs from non-energy sources, etc., CFC leaks
*Scope 2: Indirect emissions from the use of purchased electric power, etc.
Reduction rate when the amount of greenhouse gas emissions in the 71st Business Period is set at 100

Long-term Vision

Aim to reduce greenhouse gas emissions in the 104th Business Period by at least 83 % (2.5 % annually)

71st Business Period used as standard for comparison

73rd Business Period	54,048 t-CO_2

Greenhouse Gas Emissions (compared to the 71st Business Period) 6.7 % decrease

Greenhouse gas emission data is verified by a third party.

Specific Activities

Commitment to Renewable Energy

In order to achieve our Long-term Vision, we are promoting the use of renewable energy, including solar power. During FY2020, in addition to the introduction of solar-power generating equipment to provide power for in-house consumption (approx. 614 kW), we procured CO_2-free electricity from electric power companies (approx. 684 million kWh).

Renewable Energy Usage Rate **6.4%**

▼Solar-power generating equipment seen at Shingai Factory (left) and Toyooka Factory (right)

Efforts for Adapting to Climate Change

We have formulated a business continuity plan (BCP) and established a risk management structure in anticipation of a variety of disasters, including major earthquakes as well as other natural disasters caused by climate change. During the construction of new buildings, we are striving to mitigate risks through disaster-responsive design and water risk assessment of our business sites.

Contributing to Emission Reductions through Our Products

We are developing and expanding sales of low carbon products that contribute to power saving in older product models, equipment and process-based energy saving, and lower power consumption.

TOPIC

Pinhole inspection unit
C15477

The technology to capture weak light enables high-speed detection of holes as small as 1μm in diameter, contributing to the reduction of tact time in the production of lithium-ion rechargeable batteries and fuel cells. It enables high-precision and high-speed inspection that supports the production of core components for a low carbon society.

Future Challenges and Countermeasures

In August 2020, Hamamatsu Photonics announced to support recommendations of the Task Force on Climate-related Financial Disclosures (TCFD). We will proactively disclose information based on the TCFD recommendations, while proceeding with analysis on the financial risks and opportunities that climate change poses to our business. We will also implement measures to reduce greenhouse gas emissions and take steps toward SBT certification, with the aim of achieving our Long-term Vision.

TCFD TASK FORCE ON CLIMATE-RELATED FINANCIAL DISCLOSURES

▼ For more information, please refer to the link below.

Environment

https://www.hamamatsu.com/jp/en/our-company/csr/environment/index.html

Activities for Society

Efforts for the Vital Human Resources of Hamamatsu Photonics

Significance of Our Activities for Society

We hope to provide value to society, such as the human health and happiness, through our company activities. Our employees are the foundation for us to achieve this goal. Therefore, we work to provide a work-friendly environment for all of our employees and strive to maintain and improve their physical and mental health. To fulfill that need, we recognize the importance of building an organization and corporate culture in which employees are encouraged not merely to support the status quo but to actively engage based on free and innovative thinking.

Specific Activities

Ensuring Work-life Balance

We believe enriching the home, community and other social infrastructure is important for every employee to actively participate in the company. That is why we consult with the labor union as necessary and have put programs in place, as we strive to ensure a work-life balance.

To eliminate long working hours, the management oversees employees' work hours, and the labor-management council verifies them.	Every Wednesday is designated a no-overtime day.	Managers are provided with appropriate training.
When an employee's overtime seems excessive, managers engage in dialogue with that employee and arrange for interviews with an appropriate professional, such as an industrial physician or public health nurse.	The company invites outside instructors to run seminars on topics including childcare support system, nursing care and mental health.	Various policies are implemented to balance work, children, nursing care, and medical treatments of individuals and their families.

Continuing-employment Program

In March 2002 the Company introduced a continuing-employment program. Under this program, the retirement age for monthly wage earners was raised from 60 to 65 years of age. This means that employees can extend their employment to 65 years of age if they desire. In tandem with continuing employment, the Company offers the same amount of wages as received at the age of 60 for the period of extension. This scheme creates an environment in which veteran employees can enjoy making full use of their skills and capabilities, passing their knowledge on to younger colleagues. This plan also enables Hamamatsu Photonics to secure the talented employees it needs.

▼Continuing Employment Comparison by Year

2017	2018	2019
87.5 %	92.7 %	91.9 %

Operation of Dormitories for Single Employees

As many employees join the Company from distant regions, Hamamatsu Photonics builds dormitories and provides residences for single employees. We also provide interested employees with breakfast and dinner services. Our dormitories respect single employees' dignity and privacy. Each resident is assigned his or her own suite, and no curfew is imposed. We provide a stable base for their lives where young employees can fully demonstrate their abilities.

Health Management Initiatives

In accordance with its Corporate Health Policy, Hamamatsu Photonics promotes health management in cooperation with Photonics Group Health Insurance Society. Based on the verification of effectiveness, the Company implements various measures after proposal, discussion and approval by the Headquarters and Branch Health and Safety Committees and by the Board of Executive Officers.

▼Mental-health Education Programs

FY2017	Focused on middle-tier employees
FY2018	Focused on all employees
FY2019	Focused on managers

▼Percentage of Employees Answering Stress Check

FY2017	95.3 %
FY2018	96.3 %
FY2019	95.8 %

To maintain and improve the physical strength of employees, the Company holds a body design school, and conducts physical strength measurements. Employees are also encouraged to walk and use sports facilities.

In addition to the regular medical check-ups mandated by law for the purpose of the early detection and treatment of diseases, we also conduct dental check-ups.

We recommend health screening and PET examinations to our employees. Hamamatsu Photonics and the health insurance society pay a contribution to the fees.

As part of our mental health measures, we have formulated a three-year, mental health promotion plan. The mental health education program is tailored to each employee rank.

All employees are encouraged to recognize the signs and different types of stress through our stress check-up program, known in-house as the “Mental Health Check”. This aims to reduce stress in the workplace, together with group analysis and on-site training.

Fruits of Our Efforts

The average length of service is 16.4 years for males and 14.9 years for females with a turnover rate of 0.9%. The average acquisition rate of paid leave was 76.5% (74.6% in the previous year). Additionally, the percentage of employees on mental health leave was 0.46 %, which is dramatically lower than the average (0.8 %) of business sites with 1,000 employees.

In three consecutive years, 2018, 2019, and 2020, the Company earned certification as an Excellent Health and Productivity Management Corporation (Large Enterprise Division) (White 500).

2020
Health and productivity White 500

Future Challenges and Countermeasures

Hamamatsu Photonics primarily recruits science students. This has created a tendency to hire relatively few women because the percentage of women in the sciences is low. Ensuring diversity is important to facilitate multifaceted viewpoints in the development of new technology in the future. For this reason, we are engaging in recruitment activities as per the action plan outlined in the Database on Promotion of Women’s Participation and Advancement in the Workplace. Additionally, we always strive to better the working environment and promote health management in an effort to make certain every employee can live a prosperous life.

▼ For more information, please refer to the link below.

CSR/ESG Information

https://www.hamamatsu.com/jp/en/our-company/csr/index.html

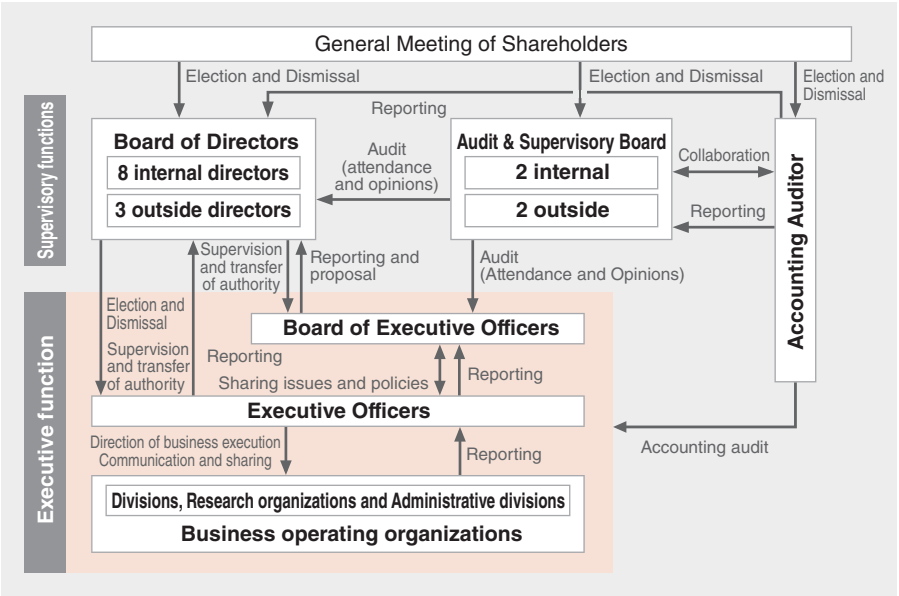
Activities for Governance

Foundation of Hamamatsu Photonics Supporting the Pursuit of the Realms of the Unknown and Unexplored

Significance of Strengthening Corporate Governance

Our products are used as key devices that contribute to human happiness and the sustainable growth of society in medical, analytical, industrial and a wide range of other fields. We will enhance our corporate value toward ongoing social contributions in the future. In order to do so, Hamamatsu Photonics formulates and shares its corporate philosophy because all of our employees unified in both action and principle toward the future is indispensable. We believe this can generate stable earnings, furthers research and development, and fosters growth. Therefore, we are building a distinct governance structure suitable for Hamamatsu Photonics.

▼Meeting structure under the Executive Officer System



Specific Activities

Sharing Our Corporate Approach

Research Industry and All Researchers System

Hamamatsu Photonics advocates “the research industry” and “the everyone-a-researcher framework”. This system means that every employee always keeps in mind not only the research departments, but also manufacturing and other indirect departments, with the goal of expanding business operations by sharing an approach that further improves and develops day-to-day operational processes.

Cost and Effectiveness

Hamamatsu Photonics gives independence to each division through a bottom-up approach. We ask each department to work as small organizational units in each division, which act as individual small companies required to balance accounts within each team. Each division operates with a 30% operating profit target across all the affiliated departments. By continuing to operate under this type of structure over the long term, each employee naturally learns a sense of awareness of profitability, which in turn helps ensure profit for the entire company.

Introduction of the Executive Officer System

In December 2020, we introduced the Executive Officer System. By transferring the business execution functions of the Board of Directors to Executive Officers, we have enhanced the supervisory function of the Board of Directors, while at the same time established a system that enables flexible decision-making.

Evaluation of the Effectiveness of the Board of Directors

To enhance the effectiveness of the Board of Directors, since 2016 the members of the Board of Directors have been asked to conduct self-evaluations. All Directors and Audit & Supervisory Board Members are subject to a five-point evaluation and a free-form descriptive questionnaire regarding the composition, operation and responsibilities of the Board of Directors. The results are reported during meetings of the Board of Directors and are used when appropriate to improve the Board's operation. In 2020, we outsourced the evaluation of the effectiveness to a third party in order to secure transparency and objectivity.

Dialogue with Investors

We, at Hamamatsu Photonics hope that our shareholders will hold our shares over the long term. For this reason, we actively engage in dialogue with our institutional investors based on our belief that we must facilitate understanding about our businesses. We also advocate the following policies related to our dialogue with institutional investors.

- An IR/SR Executive Officer is appointed and either the IR/SR Executive Officer or, an executive, dialogue with investors.
- Multiple departments collaborate and provide a dialogue with investors centered upon the Invester Relations Office under the supervision of the director in charge.
- Individual interviews or small meetings are held each quarter.
- Investor feedback received as an outcome of the dialogue, is appropriately reported to the representative director and executive officers.

Compensation Scheme for Directors

We require Directors to strive forward with a medium- to long-term perspective, rather than merely with a short-term mindset. Therefore, we see it appropriate to put basic remuneration at the base of the Company's compensation scheme for Directors. We have also introduced stock-based compensation with restrictions on transfer as part of the Company's compensation scheme. The purpose of this is to encourage our directors to hold the Company's stock on a long-term, stable basis, with the intention that they share the same perspectives as our shareholders and contribute to the sustainable growth of Hamamatsu Photonics' corporate value. Both basic remuneration and restricted stock remuneration are determined by the Board of Directors, and their ratio is generally 85 to 15.

Fruits of Our Efforts

01 We established a basic corporate governance policy aligned to our management philosophy. We also formulated our basic approach to corporate ethics and compliance, both of which are publicly available.

02 Hamamatsu Photonics has had no legal violations or company scandals.

03 We introduced restricted stock remuneration as part of Director compensation. At the same time, we formulated a compensation policy

04 We held 206 interviews with investors during FY2020.

Future Challenges and Countermeasures

The challenge is whether we can meet matters deemed necessary in the short-to-mid-term for stakeholders, while also satisfying mid-to-long term requirements. Therefore, Hamamatsu Photonics advances its core technologies such as photodetectors, which are the foundation of its business. Whilst never forgetting the venture spirit held since our founding, planning and endeavoring to develop new technologies, and cultivating the human resources entrusted with these tasks. We share the things we see as important, as well as our values, with all of our shareholders and various other stakeholders involved to build long-term relationships based on trust. In the future, ongoing contributions to society are directly connected to the perpetual existence of corporate organizations.

▼ For more detailed information about our corporate governance, please refer to the link below.

CSR/ESG Information

https://www.hamamatsu.com/jp/en/our-company/csr/index.html

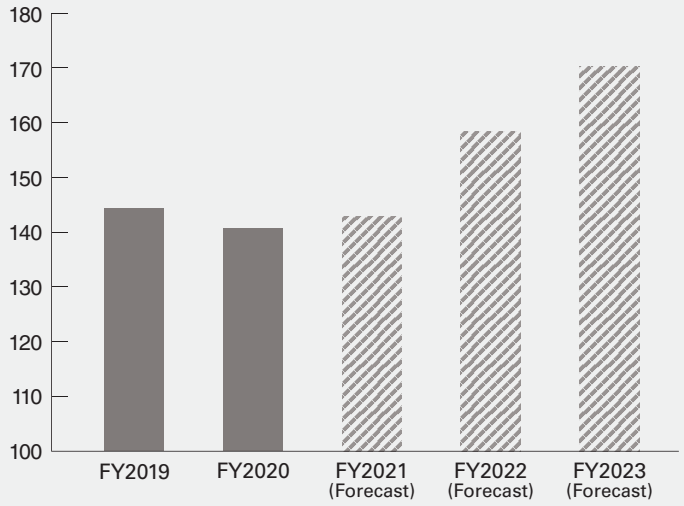
Basic Policy on Corporate Governance

https://www.hamamatsu.com/resources/pdf/hamamatsu/corporategovernance_en.pdf

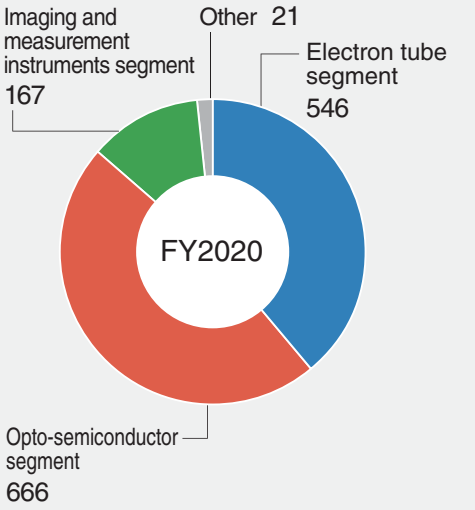
Review and Vision of Each Division

- Electron Tube Division (Electron Tube segment)
- Solid State Division (Opto-semiconductor segment)
- Systems Division (Imaging and Measurement Instruments segment)
- Central Research Laboratory

▼ Medium-term sales plan (Unit: Billion Yen)



▼ Consolidated financial results by business segment



■ Electron Tube Division (Electron Tube segment)

Develops, manufactures and sells optical sensors such as high-speed, high-sensitivity photomultiplier tubes, as well as various kinds of light sources such as lamps.

P.29

■ Solid State Division (Opto-semiconductor segment)

Develops, manufactures, and sells opto-semiconductor devices such as photodiodes, photo ICs, and image sensors, as well as module products based on them.

P.31

■ Systems Division (Imaging and Measurement Instruments segment)

Develops, manufactures and sells specialized systems for industrial and research applications in the life science, semiconductor and medical fields.

P.33

■ Central Research Laboratory

Engages in a broad spectrum of research projects, including fundamental research into the nature of light, and uses technology and knowledge gained to perform industrial applied research.

P.35

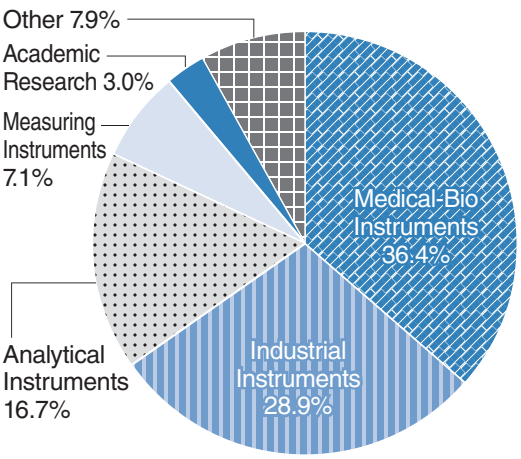
Electron Tube Division (Electron Tube segment)

Photomultiplier Tubes, Imaging Devices, Light Sources, and X-ray Sources

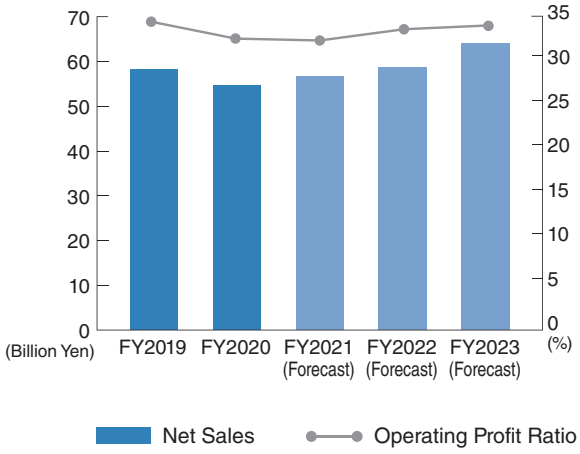
Division Director,
Electron Tube Division
Hisaki Kato

Electron tube devices are key devices for measuring and capturing phenomena that were impossible to find up to now. We achieve this by applying our long-fostered basic and element technologies. Our new manufacturing technology creates innovative devices that are more compact and optimized for particular usage environments, expanding the application fields of the equipment in which those devices are integrated. Electron tube devices that have actively been used in a wide range of fields including medical diagnosis, spectroscopic analysis, semiconductors, biology, and academic research are now being pushed to their ultimate performance limits to meet customer needs and to expand the market.

▼ Sales ratio by industry and application (FY2020)



▼ Consolidated financial results by business segment



Features

Electron Tube Division continues to grow as a result of the strength of product development and market development by each production department. The manufacturing process for photomultiplier tubes has required a high-level of manual labor and this is why I believe development work done at the production site is essential, as it is where manufacturing actually takes place. Product development and market development by department provides a high level of freedom, allowing us to actively engage in development activities even in small markets. In order to take advantage of this strength and achieve further growth, we have created a design team that shares the technology of each department. In addition to the photomultiplier tube, which is our most dominant product within Electron Tube Division, this division offers a wide range of other products, such as light sources and applied products, that have successfully developed new markets. By sharing technologies not only within a particular department but also from other departments, we will strengthen our product development and continue to achieve sustainable growth by further developing new markets.

Review of FY2020

In the medical field, sales of photomultiplier tubes (PMT) for products for in vitro diagnostics (IVD) such as blood analyzers have increased, thanks to strong demand in Japan and overseas, specifically China.
However, sales for photomultiplier tubes declined as a result of a significant fall in sales for oil-well logging devices due to sluggish oilfield investment as well as a decline in sales for academic applications and environmental and emission analysis. Regarding imaging devices and light sources, in the industrial field, sales of the Stealth Dicing Engine for high-speed, high-quality silicon wafer dicing decreased, affected by the trade friction between the U.S. and China, despite the strong sales of xenon lamps for semiconductor inspection equipment. In addition, sales of deuterium lamps for environmental analysis, etc. decreased mainly in Asia due to closures of universities and research institutions in the second half of the fiscal year. As a result, net sales of imaging devices and light sources decreased. In total, the Electron Tube segment comprised of photomultiplier tubes, imaging devices and light sources closed fiscal year 2020 with net sales of JPY 54,636 million, down by 8.3% from the previous year. In terms of capital investment, a new building was completed to consolidate development and administrative departments. This will accelerate the development of new light source and X-ray source products, as well as the development of element technologies for electron tube products that specifically target industrial fields.

Risks and Opportunities

	Market Environment	Human Resources	COVID-19
Risks	Migration from photomultiplier tubes to opto-semiconductors	Lack of information sharing due to vertically divided organization	Prolonged stagnation in economic activities
Opportunities	Market development based on technologies cultivated in photomultiplier tubes	Establishment of an information sharing system that transcends the boundaries of independent divisions	Expansion of demand for in vitro diagnostics

For Future Growth

As communication becomes more diversified due to COVID-19, I feel that it is necessary to develop products not only in response to provided information but also in a proactive manner to inspire our customers. Recently, we launched an immunochromato reader that can be used for coronavirus testing. We have developed a wide range of technologies such as evaporation, vacuum, and laser applications, and will continue to develop products that will bring new awareness to our customers and expand into new applications.

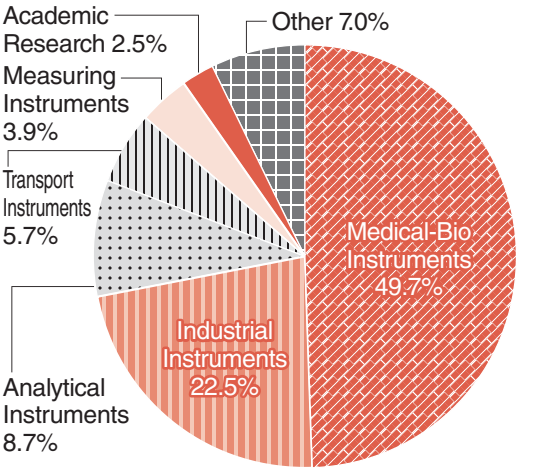
Solid State Division (Opto-semiconductor segment)

Opto-semiconductors

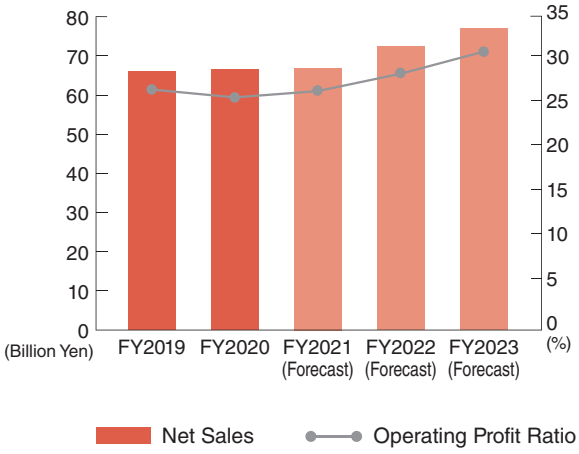
Division Director,
Solid State Division
Takayuki Suzuki

Solid State Division has explored physical properties that determine opto-semiconductor performance since the early days in this field and succeeded in creating a variety of product lineups. Our opto-semiconductor products incorporate unique semiconductor process technology, mounting & packaging technology, and MEMS technology, and cover a wide wavelength range from infrared, visible, ultraviolet, all the way to X-rays and high energy rays. They are used for a wide range of purposes including medical care, industrial applications, academic research, analysis, and in vehicle electronics. We will continue to pursue opto-semiconductor technology, always staying one step ahead, to meet the increasingly sophisticated needs of the future.

▼ Sales ratio by industry and application (FY2020)



▼ Consolidated financial results by business segment



Features

The Solid State Division does not develop technologies or equipment for a single application but for horizontal expansion to wider applications in order to maintain high-mix low-volume production, whilst also increasing production efficiency. This is where our strength comes from. In addition, this broadening of applications has given us the ability to come up with creative capabilities to develop products that our customers want. LiDAR, a technology which is currently the focus of attention in autonomous driving, is also used for measuring distances in everyday life (such as distance measurements at golf courses and robotic vacuum cleaners) as well as in cutting-edge academic research. Although customer requirements differ depending on application, our creative capability and development capability is strengthened by making products highly functional for each application. In addition, the modularization efforts that we have focused on in recent years have enabled us to provide not only sensor capabilities but also optimal functions to customers with different needs. We will continue to grow by making proposals that are best suited to our customers.

Review of FY2020

In opto-semiconductor devices, in the medical field, sales of Si photodiodes for X-ray CT and laboratory testing increased, caused by rising demand in Japan and overseas. However, sales of X-ray flat panel sensors for dental applications decreased due to the suspension of production activities by customers, especially in Europe. In addition, in the industrial field, sales of image sensors for semiconductor fabrication and inspection equipment increased in response to the recovery of the semiconductor market. As a result, the opto-semiconductor segment generated 66.666 billion yen in net sales, up 1.0 % year-on-year. As for capital investment, we completed the construction of a new building at the Shingai Factory in August 2020. This new building will be used to manufacture X-ray flat panel sensors and components for automotive applications such as molded photodiodes, photo ICs. Although these products were affected by the Corona disaster, we expect significant growth in these fields in the future.

Risks and Opportunities

	Market Environment	Human Resources	COVID-19
Risks	Increase in competition due to expansion of industries that utilize photonics	Education system based on on-the-job training	Prolonged stagnation in economic activities
Opportunities	Increase in market opportunities due to expansion of industries that utilize photonics	Establishment of the employee education system and clarification of human resource development plans	Expanding demand for semiconductors due to digitalization

For Future Growth

Ongoing collaboration with our compound semiconductor fabrication center is being facilitated the expansion of applications in the infrared range, such as analytical instruments and transportation instruments in the future. The market is expected to expand further as industries that utilize photonics expand. On the other hand, I feel the need to increase our production capacity based on a concern that competition will increase along with market expansion. In addition to investing in buildings and production facilities to respond to increased sales, we will also actively invest in the automation of production, inspection, and other processes to improve productivity more than ever before.

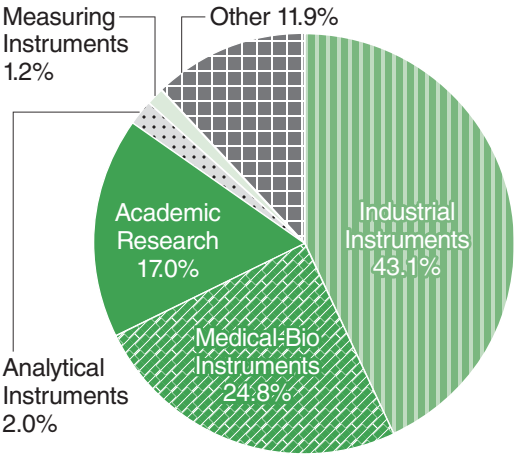
Systems Division (Imaging and Measurement Instruments segment)

Image Processing and Measurement Systems

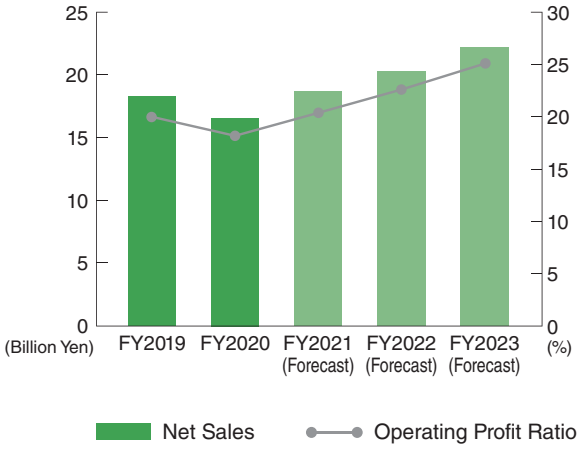
Division Director,
Systems Division
Tadashi Maruno

Our Systems Division is developing and manufacturing system products that integrate light detection technology, imaging technology, and image processing technology by using optical sensors. As a leading sensor manufacturer, we use our expertise and technology to design and develop applied products that combine core products using high-speed, high-sensitivity, and high-resolution technologies, such as cameras, with peripheral technology and equipment. We develop products that maximize the performance of sensors.

▼ Sales ratio by industry and application (FY2020)



▼ Consolidated financial results by business segment



Features

Systems Division, through a development structure that can clearly satisfy market needs, has utilized this strength in FY2020 by transforming each department into a group of expert professionals. This was achieved by organizing each process, such as product planning, sales strategy, market research, prototype/principle verification, prototype creation, and commercialization. By gaining a deeper understanding of the market in which we have accumulated information and where we have a large market share, we aim to achieve sustainable growth by discovering new needs and by planning new concept products that do not replace existing products.

Review of FY2020

In image processing and measurement systems, sales of digital slide scanners for remote pathologic diagnosis systems grew due to rising demand from inter-hospital networks in the U.S. and Europe. However, sales of digital cameras used in the life sciences sector and biotechnology sector declined in Japan and overseas by the impact of a stagnation of activities at universities and research institutions. In addition, affected by restrained capital investment primarily in Japan and Europe, sales of failure analysis systems for semiconductor devices declined. As a result, net sales for the Imaging and Measurement Instruments business were JPY 16,754 million, down by 9.0% from the previous year.

Risks and Opportunities

	Market Environment	Human Resources	COVID-19
Risks	Opportunity loss due to prolonged development	Intensified acquisition of human resources for software development, especially for AI	Prolonged stagnation in economic activities
Opportunities	Clarification of concepts by improving organizational structure	Strengthening of human resources for software development through human resource development	Expansion of demand for remote pathology diagnosis

For Future Growth

In FY2020, we will utilize the functions of the reorganized organization to accelerate growth by focusing the industrial instruments, imaging, and medical-bio instruments markets. In the industrial instruments market, we will launch inline inspection instruments to meet the needs of the expanding semiconductor market, and I expect sales to expand in the Asia region. In the medical-bio instruments market, we are seeing a trend towards digital slide scanner for pathological diagnosis being approved as medical devices all over the world. With the Corona disaster, digitalization is expected to accelerate, and I expect the market to expand not only in developed countries but also in emerging countries. In the imaging market, we are making great strides in technology, including the development of photon counting cameras in cooperation with other divisions. In the future, we expect to expand our market share for many other applications in addition to medical-bio applications, such as academic and industrial applications.

Central Research Laboratory

Basic and Applied Research

Director,
Central Research Laboratory
Tsutomu Hara

What will our future be like 20 or 30 years from now? How about a future where all people can enjoy comfortable and active lives with peace of mind, and where optimal balance is maintained among the Earth, its people and all living things? To make this dream a reality, we will have to overcome many obstacles and challenges. Our Central Research Laboratory is conducting R&D work that conforms to “sustainability” values. We call this work “Life Photonics” which is based on the theme of “life” encompassing a broad range of areas such as life, living things, human life, vitality sources, and ways of living. We will continue researching a diverse spectrum of photonics and optical technologies taking “Life Photonics” as our motivating theme.

Genesis and Role of the Central Research Laboratory

By 1990, Hamamatsu Photonics had established itself as a world-leading manufacturer of optoelectronic components and systems. The company had gradually grown, and its divisions were producing market-leading products. In the field of research and development, we have been interacting with world-class researchers and are now participating in joint research. In order to effectively pursue the unknown and unexplored realms of light in this environment, we decided to create our very own Central Research Laboratory. Central Research Laboratory was established in Hamakita-ku, Hamamatsu City, to act as a compass, which guides us into the future. The Tsukuba Research Center (Tsukuba City) and Industrial Development Center (Nishi-ku, Hamamatsu City) also became a part of Central Research Laboratory to further expanding our research base. The Central Research Laboratory is currently advancing basic research and the applied research of photonics technology under the keywords “Life Photonics.” “Life” here does not refer to concepts such as medical and life sciences but it takes on the broad meaning of life and living. By making this “life” possible through photonics technology, we will help build a sustainable society. Central Research Laboratory has two primary roles. Our first responsibility is to contribute to Hamamatsu Photonics business. We will help foster growth by providing the expertise and technologies necessary for product development in each division, while collaborating with them to commercialize products using our accumulated knowledge. Our second responsibility is to advance research into fundamental measurement and fundamental physics in the pursuit of the unknown and unexplored realms of light. By standing shoulder-to-shoulder with universities and research institutes worldwide and conducting leading-edge research, Hamamatsu Photonics obtains new findings develops science and technology, and contributes to human health and happiness.

Review of FY2020

Although we witnessed some limitations in FY2020 due to the COVID-19 pandemic, it was a year in which I felt that we had established a foundation for Central Research Laboratory to function in both of its roles: “to contribute to business” and “to pursue the unknown and unexplored realms of light”. One example of our activities is the improvement of the performance of our products through a series of experiments and improvements, utilizing the expertise of the research themes of our laboratories and discussing the problems through collaboration with other divisions. I think this is a good example of how Central Research Laboratory was able to utilize the results of its work for non-urgent but important issues for the future in developing products for the business divisions. Although many products have been transferred to the business divisions for commercialization, I felt that there was not enough follow-up support provided afterwards. After transfer, we are working to not only contribute to sales by continuing to provide technical support, but also to pursue new optical technologies by improving problem areas and responding to customer requests. As a result of our focus on human resource development, including changes in research themes, reorganization of personnel, interaction with business units, and young researcher's projects for selecting themes, I feel that we have been able to find many projects that involve and impact business division development.

▼ Major Research Outcome

1990 — Established Central Research Laboratory Research Center

1991 — Developed a prototype animal PET system and conducted joint research at Kyoto University

1995 — Developed near-infrared time-resolved spectroscopy system for quantitative measurement of hemodynamics

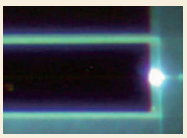
2000 — Transferred parallel aligned nematic liquid crystal spatial light modulator (PAL-SLM) to business division

2003 — Began to use our newly-developed PET system for medical checkups at Hamamatsu Medical Imaging Center

2004 — Developed 250 MW all-solid-state laser (in collaboration with Osaka University)

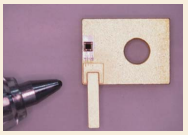
2006 — Developed LCOS-SLM, a reflective liquid crystal device that precisely modulates the phase of light and controls wavefront

2008 — Succeeded in the production of ultraviolet laser diodes with world's shortest wavelength (336 nm)



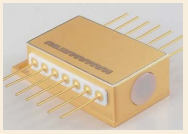
2010 — Succeeded in continuous generation of neutrons through laser fusion experiments (through joint research with the Graduate University for the Creation of New Photonics Industries and other institutions)

2013 — Succeeded in the commercialization of a photonic crystal laser

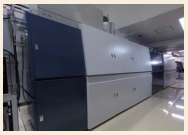


2016 — Succeeded in optical manipulation of neurotransmission in neurons (through joint research with Yokohama City University)

2018 — Developed room temperature terahertz difference frequency quantum cascade laser



2019 — Developed a laser diode pumped pulse laser capable of 100 J-class high output power



Laboratories

Central Research Laboratory

Tsukuba Research Center, Central Research Laboratory

Industrial Development Center, Central Research Laboratory

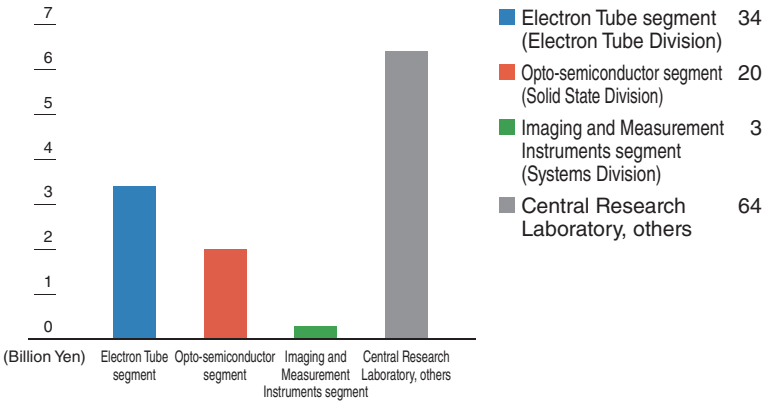
For Future Growth

I have again become aware of the importance of goal management. In this context, I find it useful to set goals by adopting the Objectives and Key Results (OKR) methodology in which each level of the organization discusses a major goal. By setting goals that are recognized by the group, individuals can understand what they need to do now to achieve the large goal of pursuing the unknown and unexplored. Although I would like to see us conduct research on long-term themes fueled by dreams, such as the development of high power lasers for laser fusion power generation, I also want us to acquire serendipity (the ability to find something valuable when looking for something else) and contribute to business as well as pursue the unknown and unexplored realms of light.

Research and Development

Hamamatsu Photonics is promoting basic research aimed at creating new knowledge and new industries in the fields of biotechnology, medicine, information, communications, energy, materials, space/astronomy, and agriculture by making full use of the unique photonics technology that we have cultivated over many years. We are also engaged in the development of new products and the enhancement of the functionality and added value of existing products.

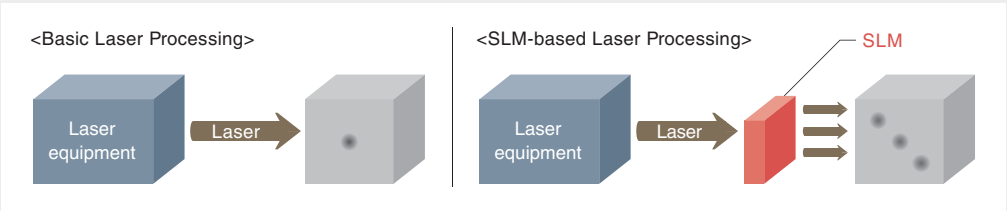
R&D expenses (FY2020)



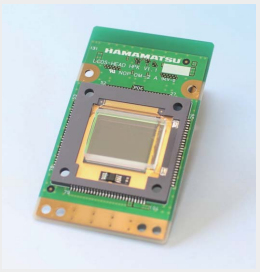
Examples of FY2020 Research Achievements

Basic Research ▸ Newly developed spatial light modulator (SLM) for laser processing with the world's highest pulsed laser power capability

An SLM is an optical device that utilizes phase modulation of a liquid crystal layer to control incident light, such as lasers, to freely control the branching and pattern of the reflected light. In recent years, methods using pulsed lasers [1] to process semiconductors and carbon fiber reinforced plastics (CFRP) have been gaining attention because the processing precision is higher than with conventional mechanical machining. By using an SLM in this method, the laser can be controlled using a plane instead of a point and it is expected to improve processing efficiency through simultaneous processing of multiple locations. On the other hand, because the output available for processing drops due to branching, irradiating with a higher power laser is necessary, which creates the demand for an SLM with higher resistance to laser power. To overcome this challenge, we succeeded in developing an SLM with light resistance that is more than 10 times higher than that of current products by utilizing our unique advanced thin-film and circuit designing technologies. [2] This developed product can contribute to further enhancing the high performance of material processing that uses pulsed lasers.



▲ By using an SLM for laser processing, it is possible to branch the laser beam and achieve simultaneous processing of multiple locations.



▲ Newly developed "SLM"

[1] Pulsed lasers can repeatedly emit high-power energy in light pulses at short time intervals. These lasers are suitable for high-precision material processing and because they produce little heat, they are less likely to damage the material.

[2] The development of this product was partially supported by the Cross-ministerial Strategic Innovation Promotion Program (SIP), "Photonics and Quantum Technology for Society 5.0."

Product Development ▸ Development of the ORCA-Fusion BT CMOS camera for observable scientific measurements in regions darker than with current products

When observing life phenomena of living cells in the life sciences field, cameras that can capture faint light, such as fluorescence and chemiluminescence, are necessary. Therefore, we have already developed and sold CMOS cameras for scientific measurements. ith the development of a new back-thinned sensor, we developed the ORCA-Fusion BT, which has dramatically higher sensitivity. This was achieved by improving the quantum efficiency [3] while maintaining the low noise, wide field of view, high resolution and other features of our current products. Because it is now possible to acquire images of fainter light, in addition to applications in the life sciences field, this camera will also enable higher accuracy in various inspection applications in the industrial field, such as the detection of foreign matter on semiconductor wafers.

▲ The newly developed "ORCA®-Fusion BT"

[3] Quantum efficiency is the efficiency of converting incident light into an electric charge.

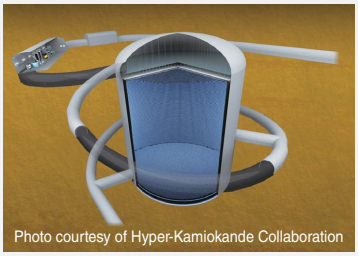
Contributions to Academic Research

This section introduces academic research projects, the products used in those projects and how they contributed to the advancement of science.

Neutrino Observation Equipment, Kamiokande, Super-Kamiokande, and Hyper-Kamiokande project

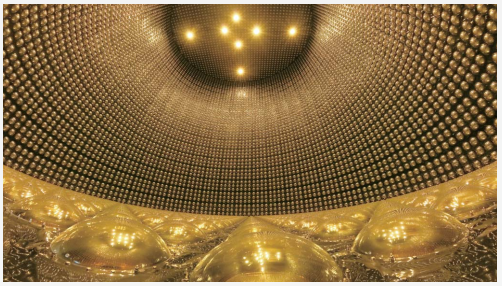
In October 2020, it was decided that our new 20-inch diameter photomultiplier tubes will be used for next-generation Neutrino Science Organization “Hyper-Kamiokande”, and a contract for the delivery of 16,400 photomultiplier tubes was signed with the Institute for Cosmic Ray Research, at the University of Tokyo, which is leading the research. The Hyper-Kamiokande is scheduled to start operation in the late 2020s.

▲New 20-inch-diameter PMTs



▲Illustration of Hyper-Kamiokande

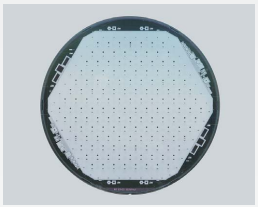
On 23 February 1987, Kamiokande Neutrino Observatory made an historical achievement. They had the first neutrino observation from a supernova explosion. This, once-in-a-lifetime opportunity triggered by a supernova 160,000 light-years away, was captured by Hamamatsu Photonics' Photomultiplier Tubes (PMTs). Our technology is always evolving and continues to gain attention. We are proud that our PMTs were selected for the upgraded Super-Kamiokande, and for the next Hyper-Kamiokande project.



Inside the Super-Kamiokande ▶

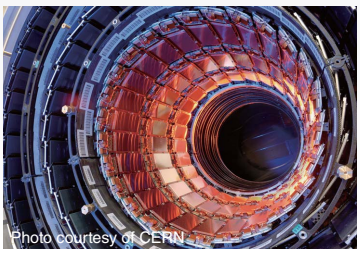
The Collider Which Detected the “Higgs boson”, often Called the “God particle”, which Gives Mass to Matter Particles.

In August 2019, CERN (the European Organization for Nuclear Research) announced that it had decided to sign contracts with us to purchase our silicon sensors for the next phase large hadron collider, the HL-LHC. The ATLAS and CMS trackers of the HL-LHC will use three types, about 75,000, of silicon sensors.



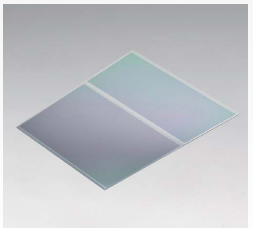
▲8-inch pad detector, one of three types of silicon sensors

▲Signing of contract with CERN



◀SSDs installed in the CMS tracker at CERN's LHC

The elusive Higgs boson, often called the “God particle”, was only recently discovered and its existence finally confirmed by experiments in 2012 using the Large Hadron Collider (LHC), the world’s largest accelerator measuring 27 kilometers in circumference. Hamamatsu Photonics SSD (Silicon Strip Detectors) contributed to this great discovery. These SSD detected the tracks along which the particles pass, to a resolution of within a few dozen micrometers.



▲SSD used for “Higgs boson” detection

Financial Data for Seven Years

Consolidated Performance Index	FY2014	FY2015
Net sales	112,092	120,691
Cost of sales	53,451	57,582
Selling, general and administrative expenses	25,998	27,897
Operating profit	21,665	23,596
Ordinary profit	22,531	24,658
Profit attributable to owners of parent	15,155	16,598
Capital investments	15,499	14,338
Depreciation *Tangible fixed assets	7,396	8,561
R&D expenses	10,977	11,615
Cash flows from operating activities	23,135	16,046
Cash flows from investing activities	▲13,677	▲17,057
Cash flows from financing activities	▲4,139	▲4,878
Cash and cash equivalents at the end of period	49,281	45,556
Total assets	215,412	226,179
Equity capital	168,274	180,141
Working capital	39,855	44,699
Number of shares issued (thousands)	83,764	167,529
Operating profit ratio (%)	19.3	19.6
ROA (%)	7.3	7.5
ROE (%)	9.4	9.5

Per share information	FY2014	FY2015
Net income for current period	94.26	103.23
Dividends	27.5	34
Payout ratio (%)	29.2	32.9

The results for FY2014, and FY2015 are calculated taking into account the 2-for-1 stock split executed in April 2015.

Non-financial data	FY2014	FY2015
Average years of service (years) Male	15.9	16.1
Average years of service (years) Female	16.3	15.9
Average years of service (years) Total	16.0	16.1
Turnover rate (%)	0.8	0.7
Maternity leave return rate (%)	100.0	100.0
Greenhouse gases (Scope 1, 2) (t-CO_2)	53,081	55,438
Water (thousand m^3)	680	748
Renewable energy (kWh)	0	0

Unit: Million Yen

FY2016	FY2017	FY2018	FY2019	FY2020
121,852	130,495	144,338	145,912	140,251
60,807	65,670	70,385	71,916	71,774
28,627	30,199	33,857	35,520	34,577
20,544	22,849	27,263	25,403	21,752
20,050	24,037	28,088	26,277	22,692
14,419	17,777	21,222	19,918	16,523
9,315	13,572	14,221	17,412	20,337
9,888	9,441	10,261	10,950	11,758
11,873	11,776	12,830	13,071	12,147
24,160	26,154	23,579	30,875	23,321
4,186	▲13,198	▲8,880	▲16,086	▲16,215
▲15,413	▲5,707	▲16,323	▲6,681	▲6,508
53,595	63,385	61,824	68,521	68,773
217,300	239,331	244,914	259,694	271,615
169,163	186,939	193,317	202,957	212,680
44,499	51,262	59,031	60,254	63,901
167,529	167,529	165,011	165,011	165,027
16.9	17.5	18.9	17.4	15.5
6.5	7.8	8.8	7.9	6.2
8.3	10.0	11.2	10.1	8.0

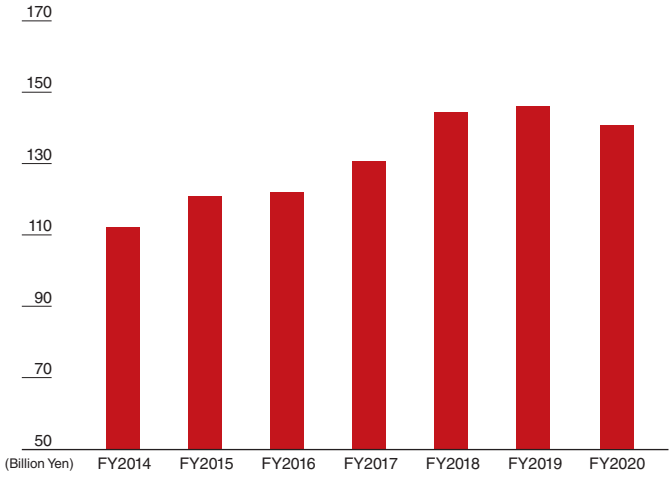
Unit: JPY

FY2016	FY2017	FY2018	FY2019	FY2020
90.23	113.00	136.50	128.67	106.73
34	34	37	40	40
37.7	30.1	27.1	31.1	37.5

FY2016	FY2017	FY2018	FY2019	FY2020
16.2	16.2	16.4	16.4	16.4
16.0	15.7	15.1	15.3	14.9
16.2	16.1	16.2	16.2	16.1
0.9	0.7	0.8	0.9	——
100.0	100.0	100.0	100.0	——
55,925	56,539	57,945	54,005	54,030
724	703	704	749	730
0	7,188	6,754	6,050,667	7,099,740

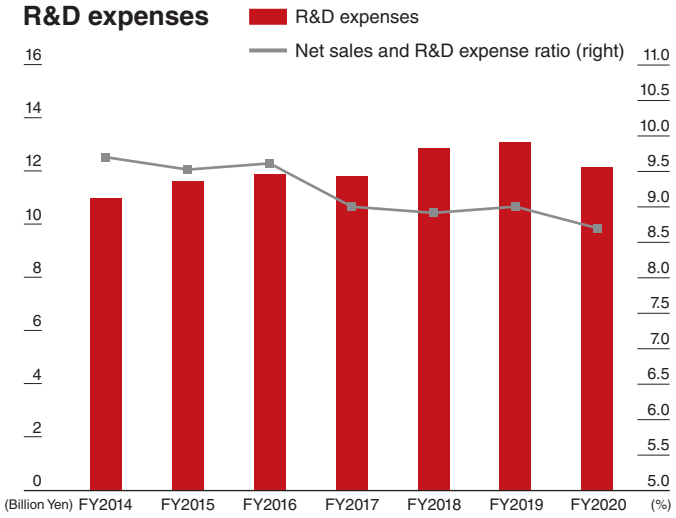
Financial Review

Net sales



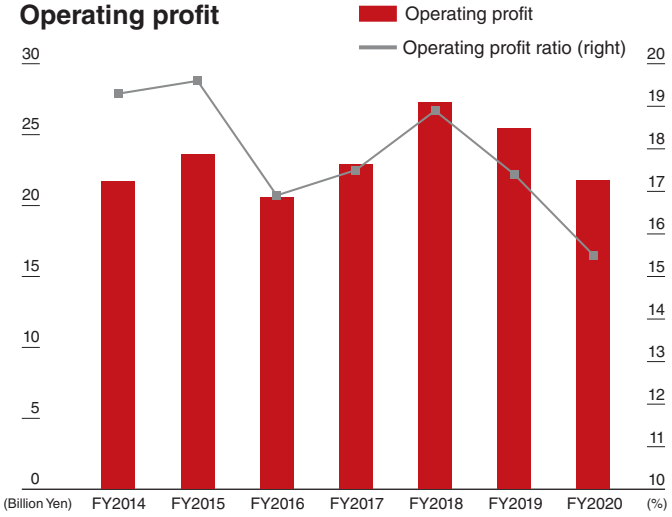
In FY2020, net sales reached 140.2 billion yen, representing a year-on-year decrease. In the first half of the period, sales of industrial instruments decreased due to the impact of trade friction. In the second half of the period, sales for many applications decreased due to the stagnation of economic activities caused by the global spread of COVID-19. However, demand for PCR testing and X-ray CT equipment increased related to COVID-19.

R&D expenses



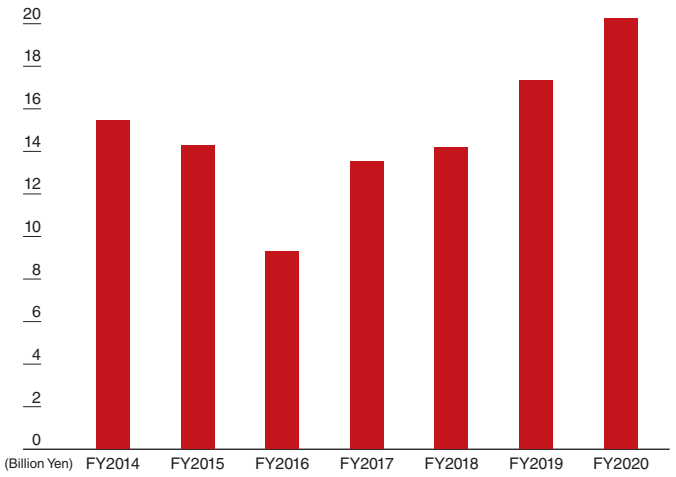
In FY2020, R&D expenses were 12.1 billion yen, representing a year-on-year decrease. Taking into account the impact of the decrease in sales, we revised our research and development strategy. However, since the solidification of core technology by pursuing performance to its farthest boundaries is the foundation of our business growth, we will actively invest in product development and basic research to further strengthen our research and development system.

Operating profit



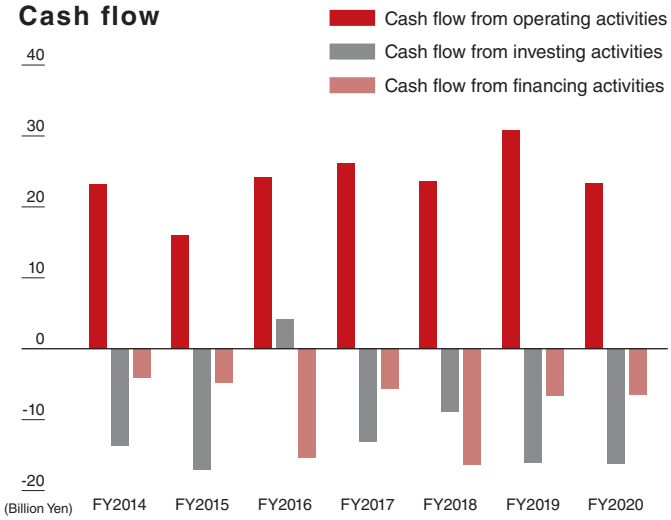
In FY2020, operating profit was 21.7 billion yen, representing a year-on-year decrease. Although there was a decrease in marketing expenses, such as advertising and travel expenses decreased due to implementing sales activities not requiring face-to-face meetings, operating profit was significantly affected by the decline in sales.

Capital investments



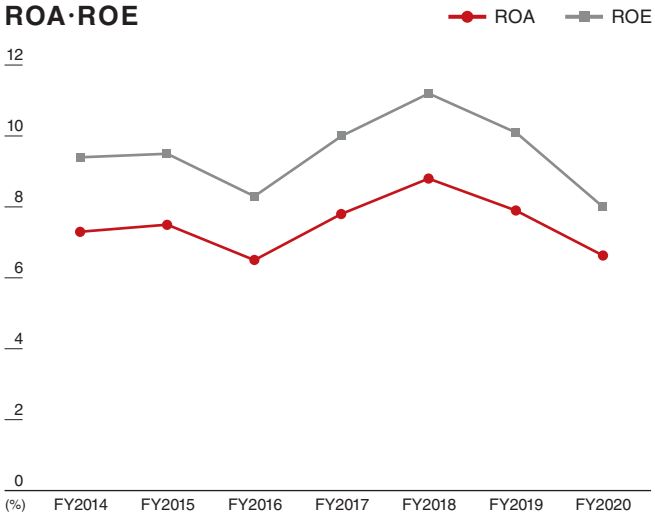
In FY2020, capital investments reached 20.3 billion yen for the completion of a new wing each for Electron Tube segment (consolidation of development and administrative departments) and Opto-semiconductor segment (strengthening of production systems for opto-semiconductor devices, X-ray image sensors, and X-ray flat panel sensors). We will continue to make further aggressive capital investments to strengthen research and development, accelerate the expansion of growth products, and heighten production efficiency.

Cash flow



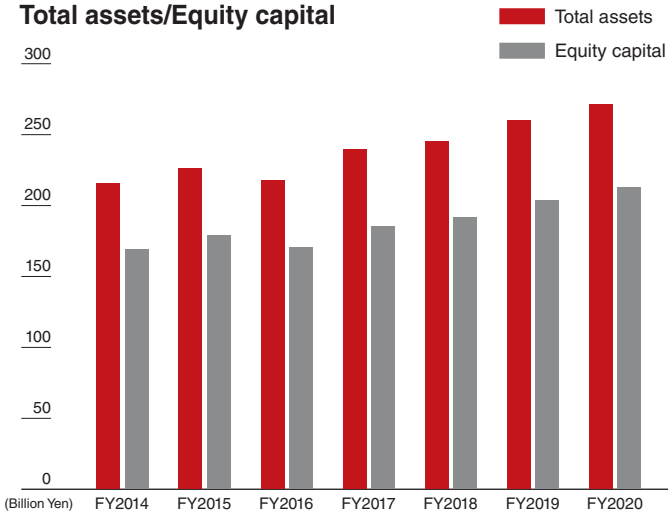
In FY2020, cash flow from operating activities was 23.3 billion yen due to a decrease in net sales. Cash flow from investing activities was minus 16.2 billion yen due to construction of new wings, resulting in free cash flow of 7.1 billion yen.

ROA·ROE



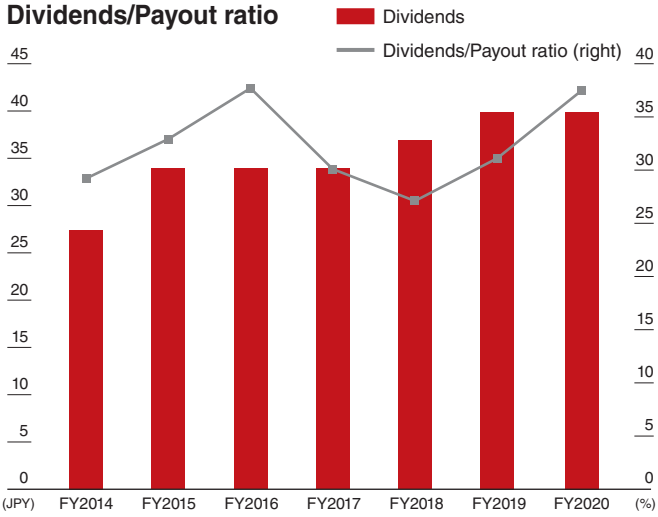
In FY2020, we had an 8.0% ROE (down 2.1% year-on-year) and a 6.2% ROA (down 1.7% year-on-year) due to a fall in profits resulting from COVID-19 and other factors. We will improve ROE and ROA by increasing our profit level.

Total assets/Equity capital



The equity capital for FY2020 increased 4.8 % year-on-year to 212.6 billion yen. We have secured a high standard of a 78.3% equity ratio to ensure stable business continuity and to build a research and development system. Our policy is to allocate our own cash for capital investment and research and development expenses.

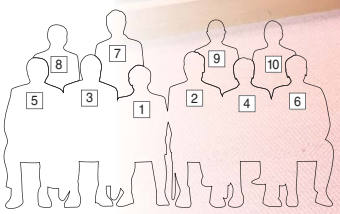
Dividends/Payout ratio



*The results for FY2014, and FY2015 are calculated taking into account the 2-for-1 stock split executed in April 2015.

The dividend for FY2020 was to 40 Yen per share. We aim for a payout ratio of 30% and are providing returns to shareholders through stable dividend increases.

Board Members



Akira Hiruma 1

October 1984	Joined the Company
October 2005	President, Hamamatsu Corporation
December 2009	Representative Director and President of Hamamatsu Photonics (present)
December 2020	Chief Executive Officer of the Company (present)

Kenji Suzuki 2

March 1966	Joined the Company
December 2009	Director
December 2012	Managing Director
December 2017	Division Director, Electron Tube Division
June 2019	Representative Director and Vice President (present)
December 2020	Chief Operating Officer (present)

Koei Yamamoto 3

March 1970	Joined the Company
January 1985	Division Director, Solid State Division
December 1985	Director
December 1987	Managing Director
December 2004	Senior Managing Director
July 2005	Representative Director and Senior Managing Director
December 2017	Division Director, Laser Promotion Division (present)
December 2020	Representative Director (present) and Senior Managing Executive Officer (present)

Tsutomu Hara 4

June 1979	Joined the Company
December 2009	Director
November 2010	Director, Central Research Laboratory (present)
December 2012	Managing Director
December 2020	Director (present), Managing Executive Officer (present)

Kenji Yoshida 5

March 1971	Joined the Company
May 1988	President, Hamamatsu Photonics UK Limited
June 1997	General Manager, President Office
December 2010	Director
December 2012	Managing Director
December 2013	Director, Administrative Division
October 2017	Division Director, Administration Headquarters (present)
December 2020	Director (present), Managing Executive Officer (present)

Tadashi Maruno 6

April 1983	Joined the Company
October 2014	General Manager, System Designing Division
December 2017	Director, Division Director, Systems Division (present)
December 2019	Managing Director
December 2020	Director (present), Managing Executive Officer (present)

Takayuki Suzuki 7

July 1989	Joined the Company
October 2016	General Manager, The 3rd Mfg., Solid State Division
October 2017	Deputy Division Director, Solid State Division
December 2017	Director
December 2019	Managing Director
December 2020	Director (present), Managing Executive Officer (present), Division Director, Solid State Division (present)

Hisaki Kato 8

March 1981	Joined the Company
October 2012	General Manager, The 1st Mfg., Electron Tube Division
January 2018	Deputy Division Director, Electron Tube Division
December 2018	Director (present)
December 2020	Managing Director (present), Division Director, Electron Tube Division (present)

Kashiko Kodate

April 1992	Professor, Japan Women's University Faculty of Science
January 2008	President and CEO, Photonic System Solutions Inc.
April 2009	Professor Emeritus, Japan Women's University (present)
September 2009	Director, Gender Equality Programs, Independent Administrative Agency (then the National Research and Development Agency) Japan Science and Technology Agency
April 2012	Specially Appointed Professor, The University of Electro-Communications
December 2015	Outside Director (present)
April 2017	Director and Chairman, Photonic System Solutions Inc. (present)

Ken Koibuchi

April 1993	Joined Toyota Motor Corporation
January 2016	General Manager/Advanced Safety System Research and Development Div.
April 2017	Executive General Manager/Advanced R&D and Engineering Company
December 2017	Outside Director (present)
January 2019	Field General Manager, Advanced Safety System Field, Advanced R&D and Engineering Company, Toyota Motor Corporation
January 2020	Senior General Manager, Advanced Safety System Field, Advanced R&D and Engineering Company, Toyota Motor Corporation (present)

Kazue Kurihara

April 1997	Professor, Institute for Chemical Reaction Science, Tohoku University (currently Institute of Multidisciplinary Research for Advanced Materials, Tohoku University)
April 2010	Professor, Advanced Institute for Materials Research, Tohoku University
April 2016	Professor Emeritus, Tohoku University (present)
April 2017	Professor, New Industry Creation Hatchery Center, Tohoku University (present)
December 2020	Outside Director (present)

Audit & Supervisory Board Member

Akira Utsuyama [9]

Michihito Suzuki [10]

Yuji Maki

Muneo Kurauchi

Executive Officers

Chief Executive Officer
Akira Hiruma

Chief Operating Officer
Kenji Suzuki

Senior Managing Executive Officer
Koei Yamamoto

Managing Executive Officer
Tsutomu Hara
Kenji Yoshida
Tadashi Maruno
Takayuki Suzuki
Hisaki Kato

Senior Executive Officer
Naofumi Toriyama
Kazuhiko Mori
Minoru Saito

Executive Officers
Ken Nozaki
Hiroyuki Okada
Kazuya Suzuki
Koichi Nagumo
Shuichi Osada

Message from Outside Director

Kashiko Kodate

Having been fascinated by light and studied at a laser research laboratory, I have been engaged in research and development for 40 years, together with female students. During these years, my research team benefited from Hamamatsu Photonics' contributions to research firsthand, using many image processing and measurement systems, such as the LCOS-SLM, which features high functionality and performance. As I enter my fourth year as an Outside Director, I see clear and achievable goals and directions, including the establishment of a unique corporate governance system and the realization of a vision that aims to further promote basic research in photonics technology and create innovative industrial application products. Although in the post-pandemic era, there are a number of challenges that must be addressed in order to respond to major social changes and expectations for photonics technology, it is essential to create a workplace environment that is easy for everyone to work in. By actively recruiting women in science and engineering, developing a system to foster diverse leaders, and motivating female employees, I believe we will be able to create new photonics technologies and continue contributing to a truly diverse and inclusive society.

Ken Koibuchi

In my view, Hamamatsu Photonics is a company that possesses cutting-edge, extremely high-level technologies in the field of photonics, and continues to commercialize its products, combining its technologies with advanced manufacturing capabilities. It is very different from other Japanese companies that rely solely on their manufacturing capability to make profits. I feel that Hamamatsu Photonics is a company that can bring about both technological evolution and manufacturing innovation. With technology and business models changing so rapidly, managing a company like this requires a high skill of level. With a management team bearing a significant level of expertise and a wealth of experience at the helm, I believe that my role as Outside Director is to provide advice and raise issues as necessary from a neutral perspective independent of business execution. I would also like to contribute to the sustainable growth of Hamamatsu Photonics by leveraging my experience as an automotive control system and automated driving engineer.

Our Stance toward Stakeholders

We pursue the unknown where no one has yet explored. By leveraging photonics technology to establish new industries and reach for the world's highest levels of manufacturing excellence, we aim to build enterprise value and contribute to the development of science and technology. However, we believe that this is not something that we can achieve alone, but requires co-creation with many stakeholders.
Therefore, we have clarified our stance toward our stakeholders and disclosed it on our website. We also believe that it is important for us to help our stakeholders understand us as a sound and trustworthy company. Below is a list of the stakeholders that we consider important and some of the issues that we consider to be important.
For more information, please refer to our website.

Closing Message

Director,
Managing Executive Officer
Kenji Yoshida

This report is the second issue of the Integrated Report that we have published. I would like to express my gratitude for the many valuable comments we have received through dialog with various stakeholders since the publication of the first issue (Integrated Report 2019).
In FY2020, a number of our products such as optical sensors were integrated into a range of medical devices such as PCR testing equipment and X-ray CT scanners, which played a significant role in the fight against COVID-19. On the other hand, as the world accelerates its efforts to become carbon neutral, we have set a long-term goal of reducing our greenhouse gas emissions by at least 83% in FY2051 compared to the emission amount for FY2018. In addition, we have introduced a new executive officer system in our governance structure in order to respond to the rapidly changing social and economic environment with greater agility. In this way, FY2020 was a period in which we reaffirmed the significance of integrated reports as well as the importance of the link between corporations and society.
This year's report is based on the content of the previous report, but has been prepared with the aim of deepening understanding of the company's business and the wide range of applications of photonics technology. I hope that our stakeholders will be able to share our management stance and sense of values as we aim for sustainable growth.
We will strive to provide even better reporting through an ongoing dialog with all of you. I look forward to all of your sincere feedback.

Global Organizations

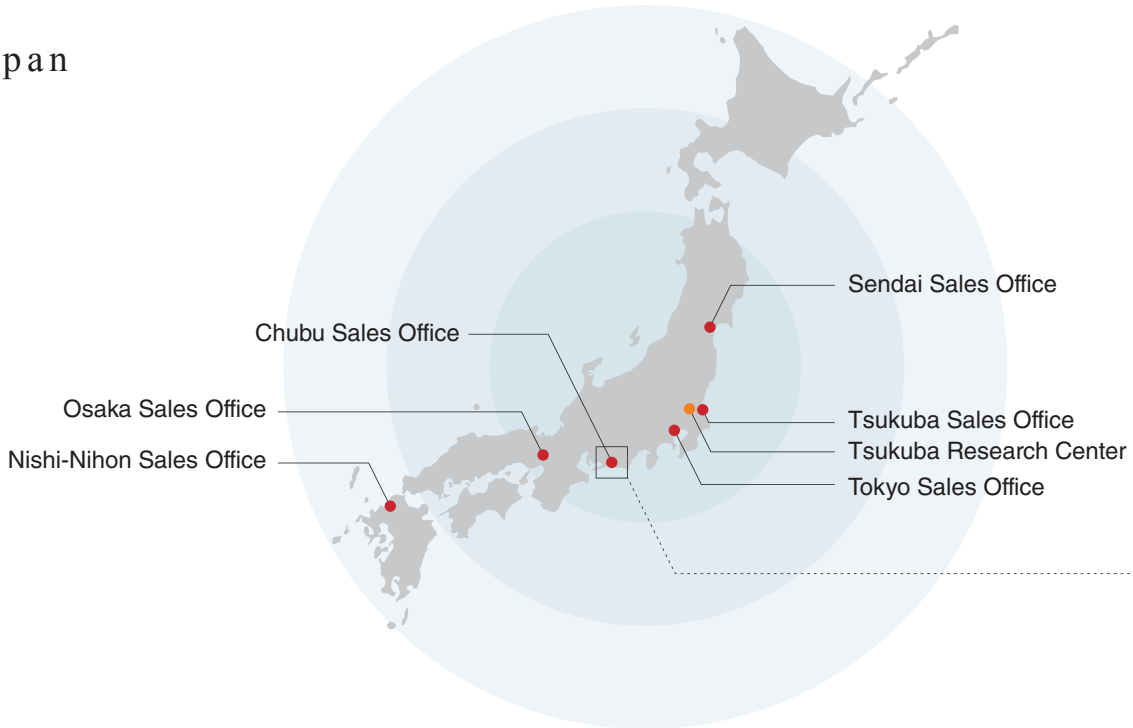
Americas

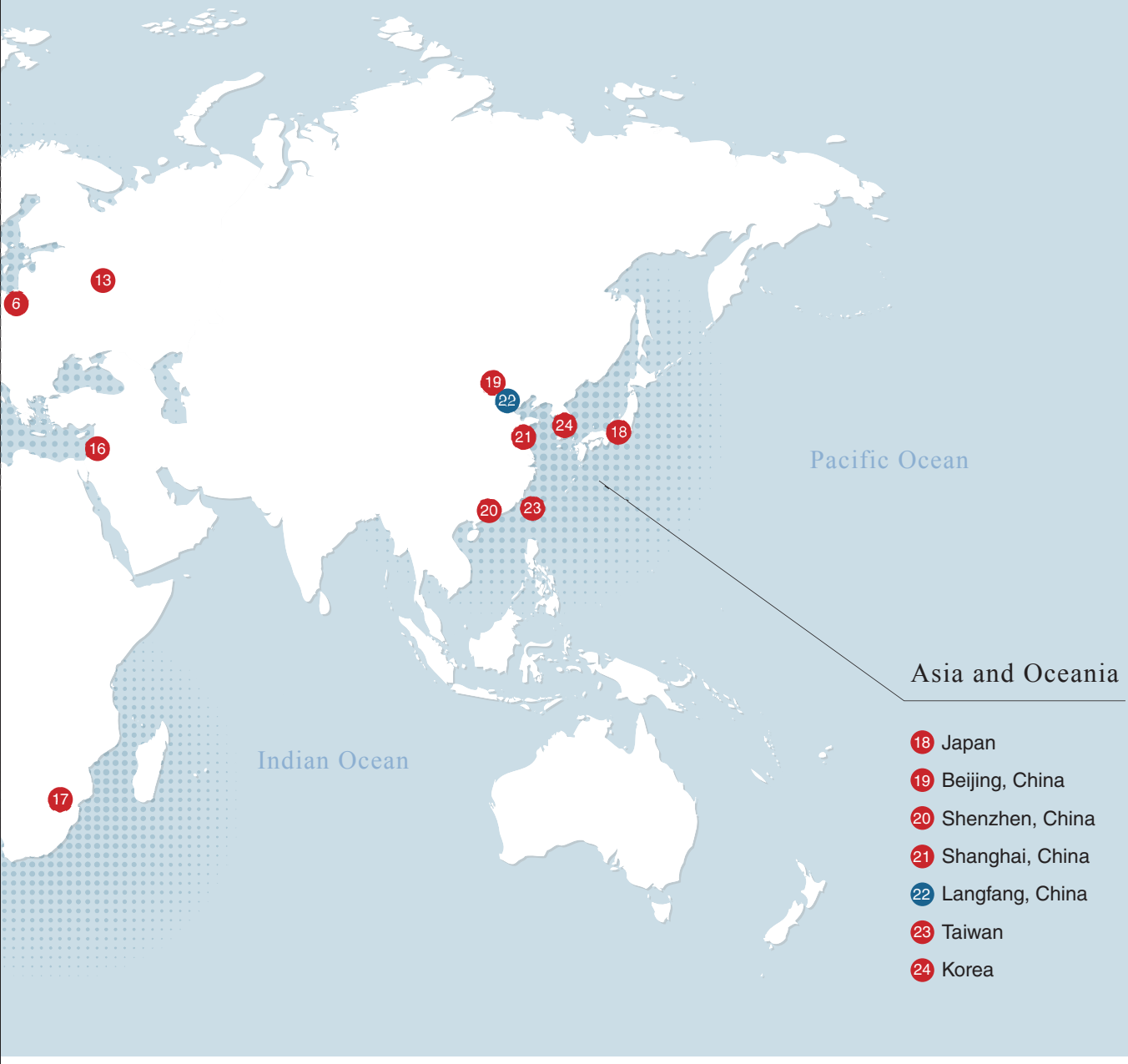
1. New Jersey, United States
2. California, United States
3. Boston, United States

Europe, Middle East, and Africa

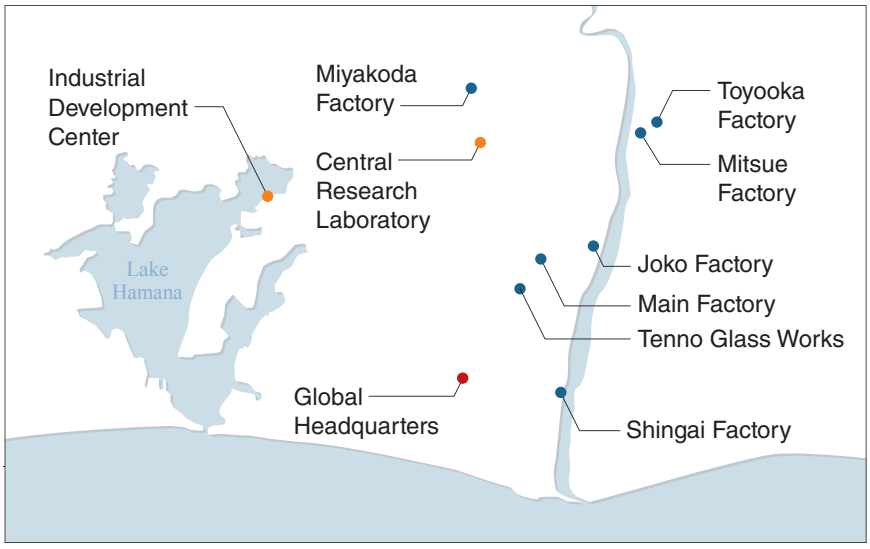
4. Germany
5. The Netherlands
6. Poland
7. Denmark
8. France
9. Switzerland
10. Belgium
11. Spain
12. Sweden
13. Russia
14. Italy
15. The United Kingdom
16. Israel
17. South Africa

Japan





Hamamatsu



Sales offices
Factories
Laboratories

Corporate Overview (As of September 30, 2020)

Company Name	Hamamatsu Photonics K.K.
Established	September 29, 1953
Global Headquarters	325-6 Sunayama-cho, Naka-ku, Hamamatsu City, Shizuoka Prefecture, 430-8587, Japan
Capital	34,964 Million Yen
Number of Employees	3,677 (Non-consolidated); 5,195 (Consolidated)
Main Product Lines	Photomultiplier Tubes, Imaging Devices, Light Sources, Opto-Semiconductor Devices, Imaging Processing and Measurement Systems
Net Sales (Consolidated)	140,251 Million Yen (FY2020)
Fiscal Year	October 1 to September 30 of the following year
General Meeting of Shareholders	December
Stock Listing	First Section of the Tokyo Stock Exchange
Securities Code	6965
Accounting Auditor	Ernst & Young ShinNihon LLC

Affiliate Companies and Organizations (Japan)

■ Global Headquarters

Hamamatsu City, Shizuoka Prefecture

■ Factories

Main Factory, Shingai Factory, Tenno Glass Works, Joko Factory, Miyakoda Factory (All Located in Hamamatsu City), Toyooka Factory, and Mitsue Factory (Both Located in Iwata City)

■ Sales Offices

Tokyo Sales Office, Sendai Sales Office, Tsukuba Sales Office, Chubu Sales Office (Hamamatsu City), Osaka Sales Office, and NishiNihon Sales Office (Fukuoka City)

■ Laboratories

Central Research Laboratory, Industrial Development Center (Both in Hamamatsu City), and Tsukuba Research Center (Tsukuba City)

Consolidated Subsidiaries

▼ Japan

Koso Corporation
Takaoka Electronics Co., Ltd.
Hamamatsu Electronic Press Co., Ltd.
Iwata Grand Hotel, Inc.

▼ Overseas

Americas	Photonics Management Corp. Hamamatsu Corporation Energetiq Technology, Inc.
Europe	Photonics Management Europe S.R.L.* Hamamatsu Photonics Europe GmbH. Hamamatsu Photonics Deutschland GmbH. Hamamatsu Photonics France S.A.R.L. Hamamatsu Photonics Italia S.r.l. Hamamatsu Photonics UK Limited Hamamatsu Photonics Norden AB
Asia/ Other	Hamamatsu Photonics (China) Co., Ltd. Hamamatsu Photonics Taiwan Co., Ltd. Beijing Hamamatsu Photon Techniques Inc. Hamamatsu Photonics Korea Co., Ltd. Hamamatsu Photon Medical Technology (Langfang) Co., Ltd. Hamamatsu Photonics Scientific Instrument (Beijing) Co., Ltd. Hamamatsu Photonics Israel Ltd.

*Established in July 2020 to manage all subsidiaries and affiliated companies in the European region.

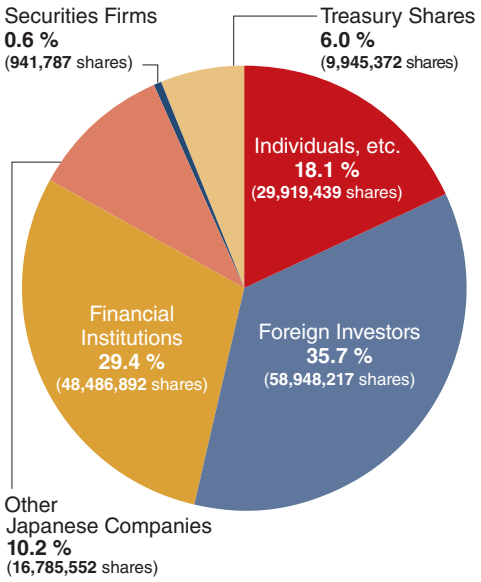
Stock Information (As of September 30, 2020)

Total Number of Authorized Shares (Common Stock)	500,000,000
Number of Shares Issued	165,027,259 (Including 9,945,372 shares of treasury shares)
Number of Shareholders	19,286
Transfer Agent and Registrar	Sumitomo Mitsui Trust Bank, Limited

Name	Shares Held	Percentage of Total Shares Outstanding
The Master Trust Bank of Japan, Ltd. (Trust Account)	14,871,600	9.6%
Toyota Motor Corporation	8,400,000	5.4%
Custody Bank of Japan, Ltd. (Trust Account)	6,617,800	4.3%
Custody Bank of Japan, Ltd. (Trust Account 9)	4,672,600	3.0%
Hamamatsu Photonics K.K. Employees	4,453,261	2.9%
JP Morgan Chase Bank 385632	3,878,952	2.5%
The Nomura Trust and Banking Co., Ltd. (Investment Trust)	3,734,200	2.4%
SSBTC Client Omnibus Account	3,126,301	2.0%
Custody Bank of Japan, Ltd. (Trust Account 5)	2,990,100	1.9%
State Street Bank West Client - Treaty 505234	2,195,387	1.4%

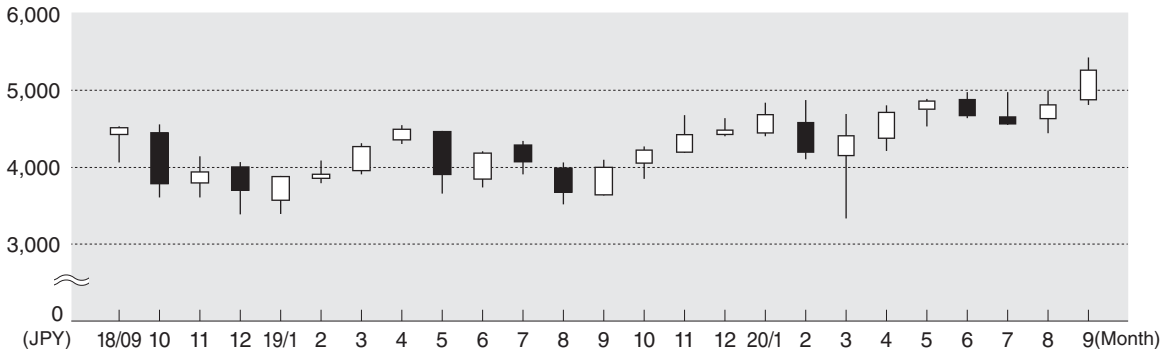
Note: 1. The company holds 9,945,372 shares of treasury shares excluded from the shares of the major shareholders listed above.
2. The percentage of total shares outstanding is calculated by excluding the treasury share. Units less than that shown above are rounded off.

Distribution of Shares by Shareholder



There is no information relevant to matters such as share options of the company.

Changes in Share Price



▼ For information about this report, please refer to the links below.

Financial Information
https://www.hamamatsu.com/jp/en/our-company/investor-relations/financial-information/index.html

CSR Information
https://www.hamamatsu.com/jp/en/our-company/csr/index.html

Product Information
https://www.hamamatsu.com/jp/en/product/index.html

HAMAMATSU

PHOTON IS OUR BUSINESS

HAMAMATSU PHOTONICS K.K. www.hamamatsu.com

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Investor Relations Office

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