

Sensing Business

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Kamezawa explains our strategy and initiatives in the sensing business.

Sensing Field: Business Overview



A high-added-value business, contributing diverse sensing solutions for customers pursuing the quality of light, color and imaging



In addition to supporting “high-quality manufacturing”, we will go beyond human vision to keep providing new customer value and solve global social issues, in the “safety, security and sanitation” field

First, I will briefly introduce the sensing business.

The sensing business is a relatively high value-added business that supports the realization of outstanding designs for customers who value quality of light, color, and imaging, and provides a variety of optical measurement solutions for the realization of inspiring images. In particular, we have provided solutions in the field of visible light to customers in the manufacturing industry who focus on the quality of images and appearance. In addition, in the field of safety, security and sanitation, we are working to broaden the scope of our value provision to address social issues worldwide by providing solutions that go beyond human vision.

Sensing Field: Business Overview – Business Field



Light source color measurement	<p>Measuring light & display: Including increasingly advanced displays, light sources for facial recognition and lighting to support everyday life</p>  <ul style="list-style-type: none"> • Display color adjustment and brightness uniformity inspection • LED light evaluation and quality management • Auto headlight inspection
Object color measurement	<p>Measuring color and appearance : exterior colors of industrial products, quality differences and characteristics by color</p>  <ul style="list-style-type: none"> • Color management for auto parts • Grading by product color for foods • Color management for printing (integrated into production printers)
Visual Inspection	<p>Ensuring the quality and function of appearance: highly-designed cars and industrial product surfaces</p>  <ul style="list-style-type: none"> • Inspection of exterior damage • Inspection of auto exteriors for gaps and unevenness • Inspection of fuel cells and other parts for defects
HSI* measurement	<p>Going beyond human vision: detailed image analysis capability, identification the contamination and the distribution of invisible substances</p>  <ul style="list-style-type: none"> • Garbage sorting for the recycling industry • Element analysis and foreign matter inspection for foods • Pharmaceutical formulation analysis

*HSI: Hyperspectral imaging (technology used to visualize information across multiple wavelengths)

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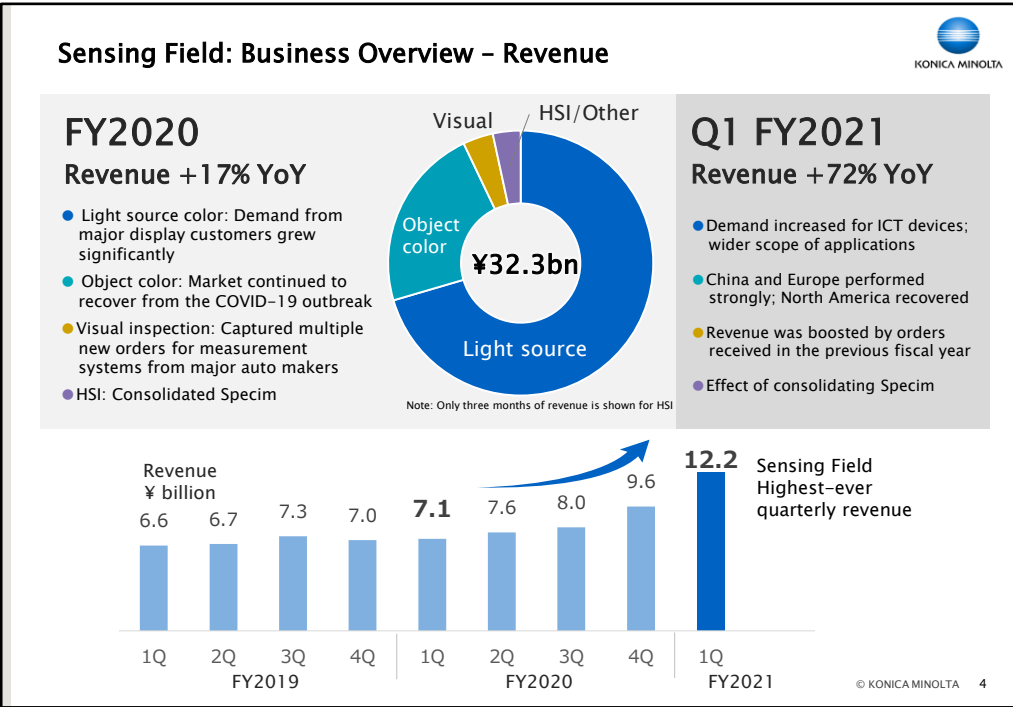
Currently, our business fields are categorized into 4 major areas.

The first is in light source color measurement field, which measure light and display, and it mainly supports the development and production of advanced displays. Applications have also expanded to light sources for facial recognition by security needs. We are also involved in measuring all types of lighting, including auto headlights.

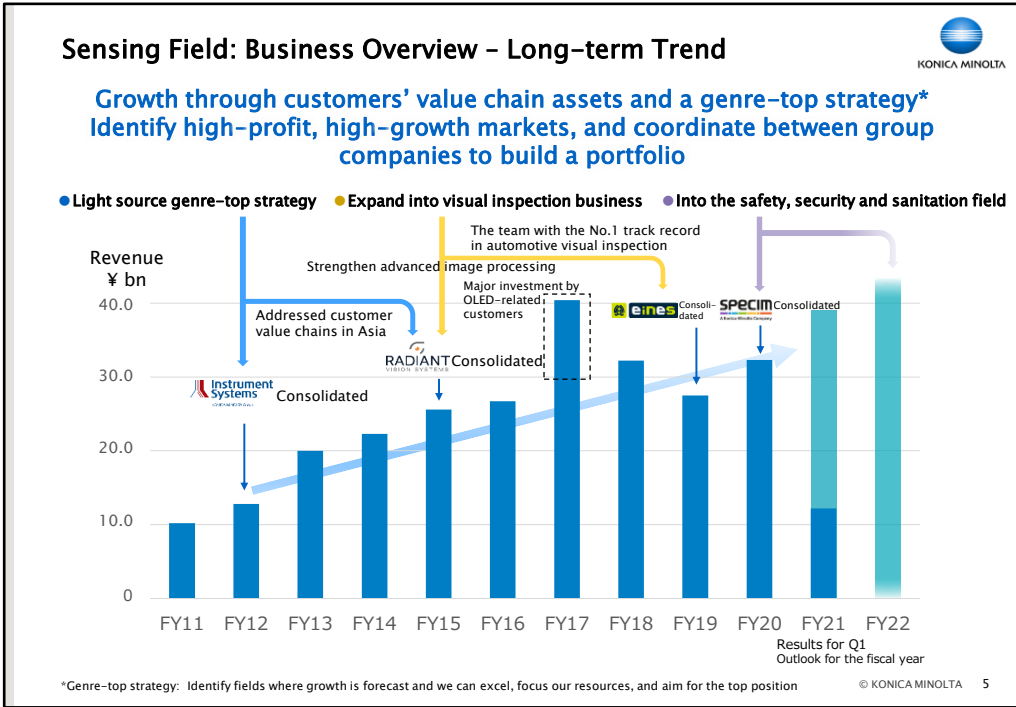
The second object color measurement measures the color and appearance of objects by exposing it to light. It is used by a wider range of customers than light source color measurement, such as managing the exterior colors of industrial products and differences in quality according to color.

The third is visual inspection. It is used to inspect products with high design properties such as cars, and surface quality of highly designed industrial products, as well as precision parts where scratches and dirt are related to functions.

The fourth is HSI (hyperspectral imaging), which we acquired at the end of last year. In this area, it is named after the technology-oriented business domain. With its detailed image analysis capabilities, it has the potential to distinguish substance contamination and distribution beyond human vision. This is an area that we are considering expanding into a variety of applications in the future.



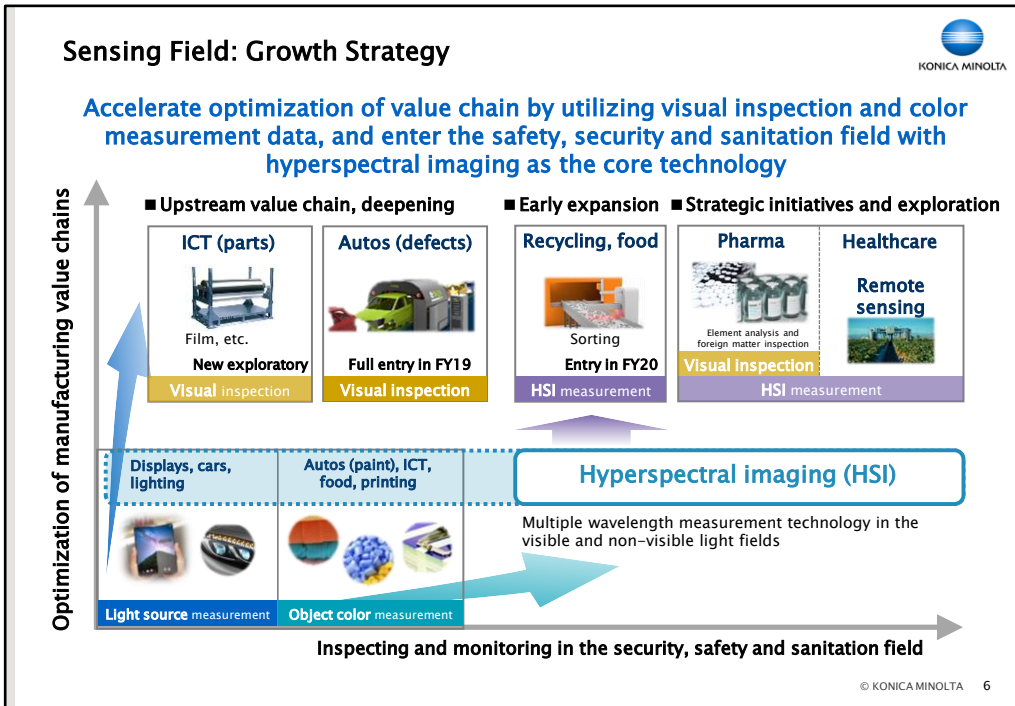
Results for FY2020 and FY2021 Q1 increased compared with the previous year, as introduced in the financial results. In particular, revenue in the FY2021 Q1 reached a highest-ever record of ¥12.2 billion, which was the result of several factors, including the following: Demand for ICT devices increased and applications in light source color field expanded, overall sales of equipment, including object color measurement, were strong in China and Europe and recovered in North America, orders received in the previous fiscal year contributed to sales by visual inspection, and the new acquisition of Finland-based Specim, in the HSI field.



Next, we review the long-term trends in revenue and major initiatives. In this business, we believe that the strategic implementation of necessary technological enhancements by further increasing customer contact with the value chain through acquisitions in areas where demand is anticipated is making a significant contribution to growth.

For example, Instrument Systems, which we acquired in 2012, is strong in the display measurement and lighting measurement fields. Radiant Vision Systems, acquired in 2015, was an essential entity to cover the Asian value chain. In addition, Radiant's efforts to capture visual inspection and image processing technology for consumer electronics have accelerated our automotive inspection businesses. This led to the acquisition of Eines, which has contributed to the most recent increase in revenue.

In 2011 and 2012, the scale of revenue in sensing business was just over ¥10 billion, but these efforts more than tripled. Our decision to acquire Specim last year is based on a similar approach to accelerate our group-wide efforts to recycle, food, and pharmaceutical analysis, for which demand is expected in safety, security and sanitation field.



In this way, it is a very important point to consider and select the areas in which demand is expected in the future. As indicated at the time of the acquisition of Specim last year, sensing business has 2 directions centered on Core Business.

The first is to deepen the links between Core Business customers and the value chain (vertical axis). Second, we will broaden the scope of our activities through the application of highly analytical techniques in the areas of safety, security and sanitation, such as recycle, food, pharmaceuticals, healthcare, and remote sensing (horizontal axis). We have chosen HSI as one of our highly analytical technologies and will proceed with this as our axis, but we are also mindful of the possibility that the range of technologies and assets that will be needed in the future will become wider.

Sensing Field: Projected Market Scale



Factors behind increase in demand for our measuring instruments

Particularly in society during and after the COVID-19 outbreak

- Demand for ICT devices has increased,
- Applications for display products have increased,
- There has been a trend toward automation and labor-saving

New inspection needs are emerging due to new materials and new technologies

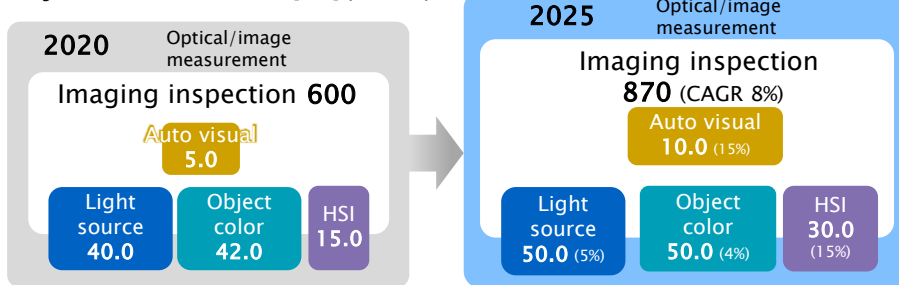
Medium- to long-term factors

Promote ESG (environmental, social and governance) factors

- Response to energy saving and renewable energy; electric vehicles
- Effective use of resources; recycling
- Investment in safety, security and sanitation field

Enhance quality of life

Projected market scale*1 [¥bn] (CAGR %)



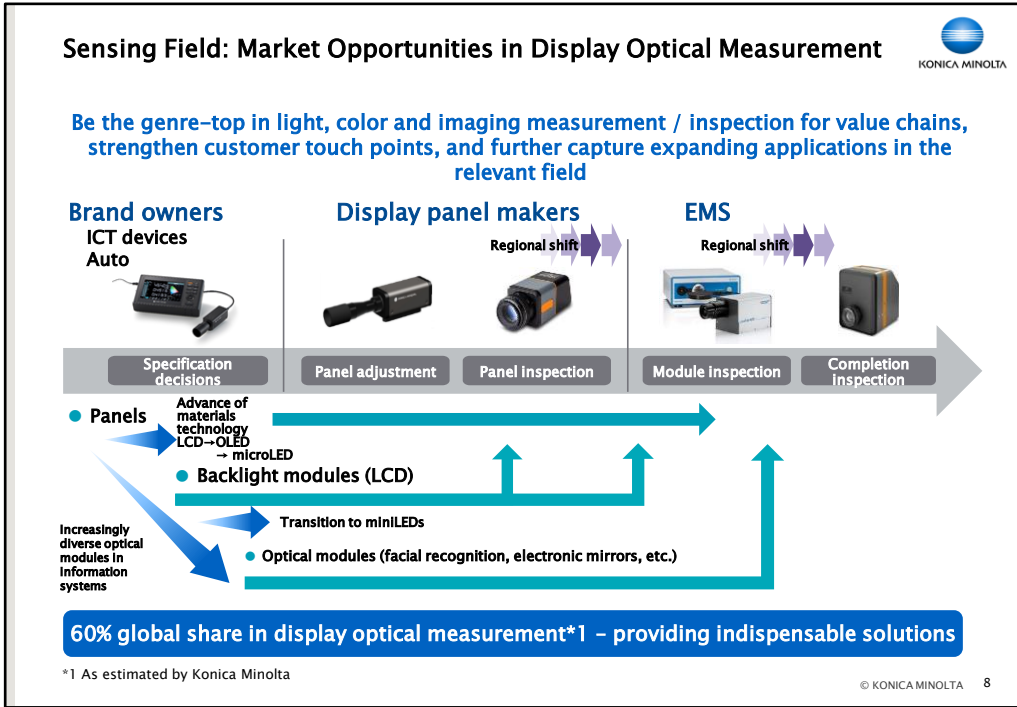
*1 Scale of market as estimated by Konica Minolta; excluding printing

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Now I explain how we see the future of our focus areas in the sensing business.

First, light source color measurement and object color measurement are positioned as areas where we can seize the cutting edge and outperform by building close ties with customers even while growing stably. In optical measurement, color measurement, and imaging inspections, we see not only quality improvement, but also an area that expands from the perspective of ESG and automation as a key point of view. High-growth areas include visual inspection for automotives and other industries and HSI.

In the following slides and beyond, we will introduce the main points of each initiative.



First, we will introduce the movement of display optical measurement, which is a key application in light source color measurement field.

We see our market share as 60%. We formed teams that can broadly cover the value chain, from display specifications to production, through acquisitions, and increased the number of touch points with customers. As a result, we have received various requests from customers in new cases.

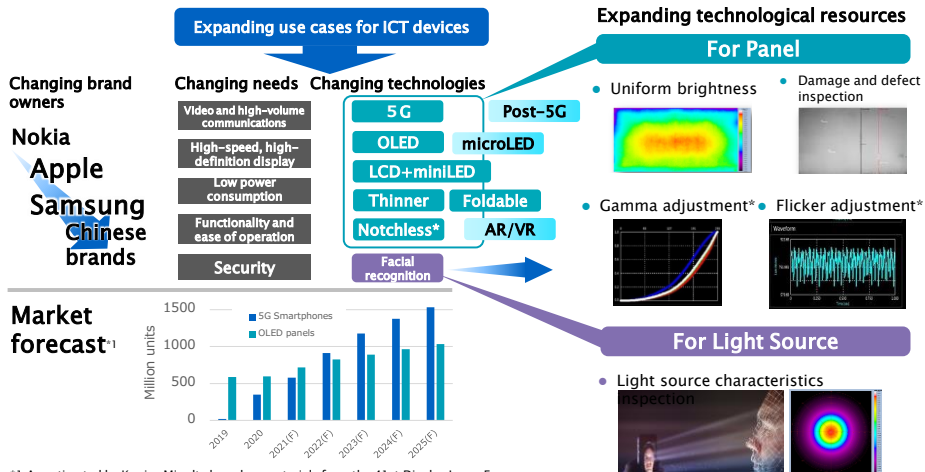
In recent years, panel materials are changing, especially in LCD, OLED, and micro LED. We have started to receive orders for measuring instruments for backlight modules in response to the trend toward mini-LEDs. In addition, there is demand for optical modules other than displays as mobile phones and automobiles become important bases and terminals for information systems, such as the installation of face recognition devices in human machine interface such as ICT terminals and the use of electronic mirrors in automobiles. We will steadily take advantage of these factors to achieve growth.

As a manufacturer, we place great importance on building close relationships with our customers so that we can be firmly contacted as the customers roll out the systems that had been adopted in the China are deployed in ASEAN in the future.

Sensing Field: Market Opportunities in Display Optical Measurement



Technological resources will expand through the provision of solutions in response to changing needs for ICT devices and changing customer technologies, and contribute to creating new entry barriers.



¹ As estimated by Konica Minolta based on materials from the 41st Display Japan Forum
 *Notchless: Increased display size through methods such as positioning the camera at the bottom of the display
 *Gamma adjustment: Non-linear adjustment to the input/output relationship for human perception of brightness and color
 *Flicker adjustment: Adjustment to prevent screen flickering

In this slide, we introduce some examples of changes in terminals needs and technological changes using ICT terminals as an example. These technological changes have forced our responses to change, resulting in an increase in technology assets.

There are 2 types of technological assets described here: those that have existed and whose specifications are constantly changing, and those for which previously less emphasis has been placed on but are now being added. In both cases, customer demands are constantly changing, and if we can respond to those demands, we will be able to create new barriers to competitors, so we are giving top priority to these efforts.

Sensing Field: Market Opportunities in the Object Color Measurement Field



Quality management applications in a variety of different markets, including autos, ICT and chemicals
Quantification (digitalization) of subtle color differences that are indistinguishable through human eyes
or experience

Contribute to DX of increasingly global supply chains

Visualizing color differences

Contributing to product quality management

- Auto exteriors and interiors
- ICT appearance



- Color inconsistencies in processed foods



- Pharmaceuticals/ cosmetics



Color creation

Helping customers build product quality

- Optimal paint and resin recipe



- Printer color adjustment



Continuing to provide value through advanced knowledge of color and light,
and a stable customer base

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Next, we introduce our initiatives in object color measurement field. This is broadly divided into applications such as "visualizing color differences" and "contributing to color creation." Customers are diverse, including automobiles, ICT, and chemical products. Beyond providing hardware and software, an important feature is the presence of experts on color and light. We have established a direct sales organization with experts and work with distributors to promote response as a global team. Based on our strengths, such as our ability to identify subtle color differences and extremely low hardware variability, we will use DX to ensure that customers can proceed with data management in their value chains with peace of mind. And our policy is to further strengthen our long-term relationships with customers.

Sensing Field: Market Opportunities in the Auto Field

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We will expand our businesses through enhanced solutions for creating environmentally friendly vehicles, issues of color and light due to new materials and technological progress, and issues faced by the supply chain in society during and after COVID-19.

New

- Expand sales of systems for simultaneous measurement of colors and gloss suitable for material and parts management at multiple sites

CM-36dG

Core business fields

Expand

Color and light, Visual Inspection, Gloss, Appearance

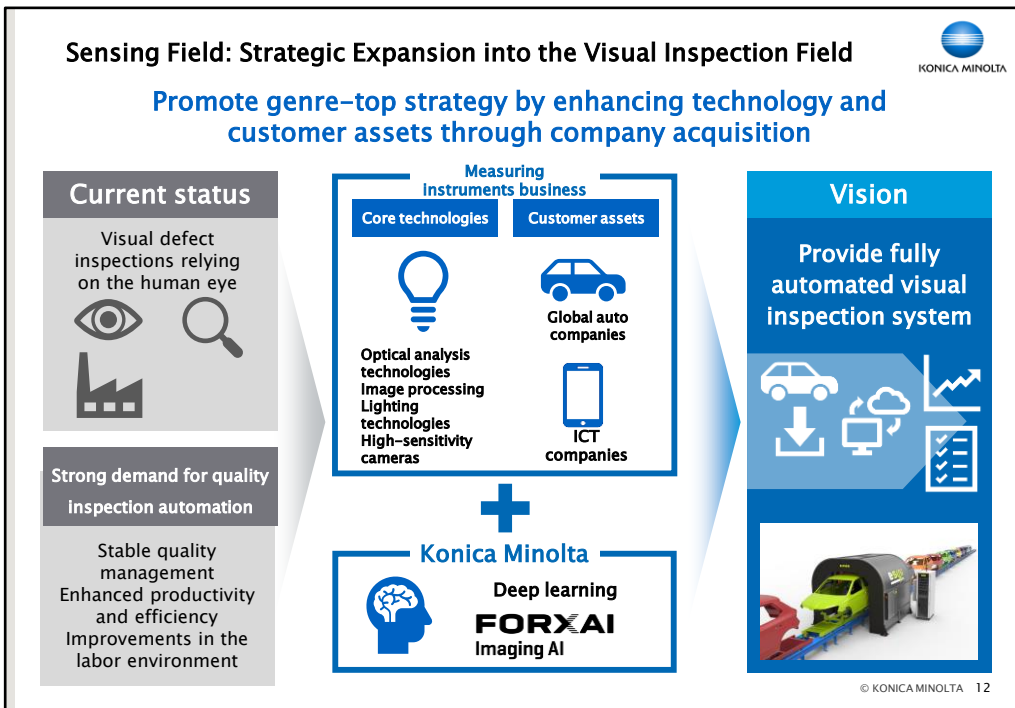
Materials and paints, Molded products, Assembly, Body

Globalization, Shift to carbon neutral and electrification

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The automotive field is a key application of object color measurement. In the automotive industry as well, the more supplier options by thoroughly managing materials and parts in a globalized supply chain, the more flexibility you will have in case of emergency. In January of this year, we launched a system to measure the color and gloss of materials at the same time with high precision, and we are working to manage the system with digital values at dispersed sites.

In automotive industry, which is undergoing a once-in-a-century revolution, investments related to the shift to electrification are expected in the future. While this is an opportunity for object color measurement as well, I will briefly explain that our opportunity is not limited to object color measurement in the following slides.



Next, I would like to refer to visual inspection, which is expanding as a new field.

Even in the automation of defect inspections that used to rely on human eye, our strategy is to differentiate our group's hardware and software technologies by combining them with areas and genres that are highly-designable, high production volumes, and for which existing technologies do not provide an answer.

Customers include automobile companies that are expanding globally, as well as ICT terminal manufacturers and supply chains so on.

Our core technologies include analytical technologies represented by optical simulations, image processing technology, lighting technologies to create flaws, and high-sensitivity cameras that can be distinguished without differences in shade. Recently, we combine deep learning not only to identify defects, but also to identify the types of defects and provide feedback for process improvements. We also need to quickly identify answers even if there is a change in the customer's environment. So we will evolve our Group's deep learning and imaging AI technologies, which will also give us the opportunity to grow more as a differentiating technology, and ensure our Genre-top positions.

Sensing Field: Progress of Business in the Visual Inspection Field

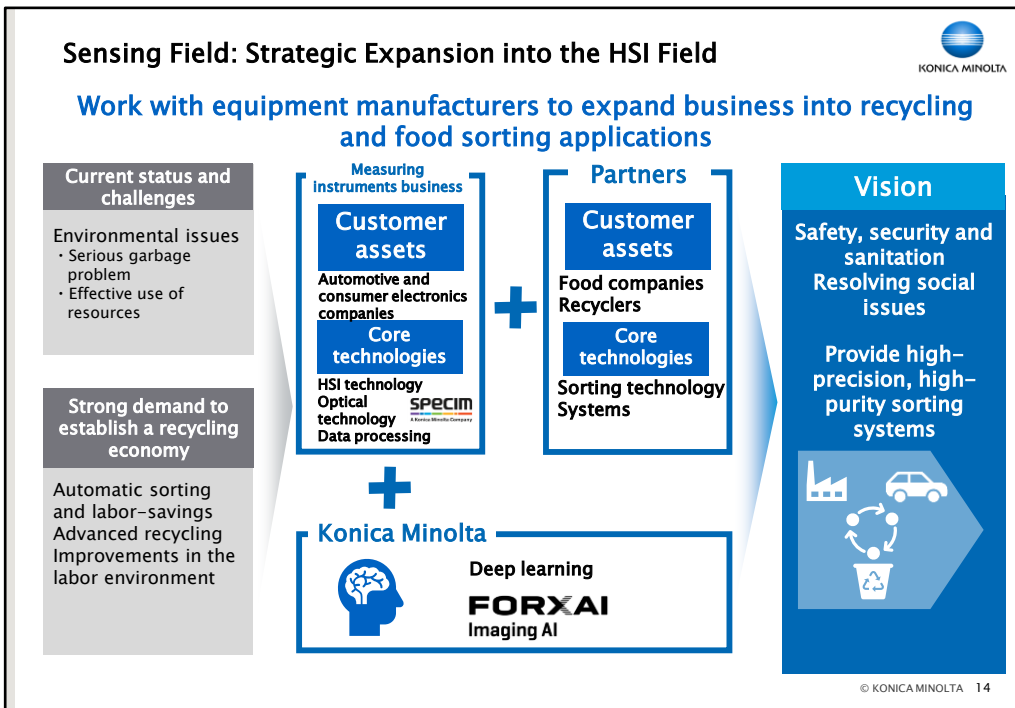
Expanding visual inspection from European to Asian and American automakers through group collaboration, and expanding applications from paint defect inspection to flush and gap, and auto parts inspection

Some of our customers : Ford, Volkswagen, Major EV maker (U.S.), etc. Major Auto maker (Japan), etc.

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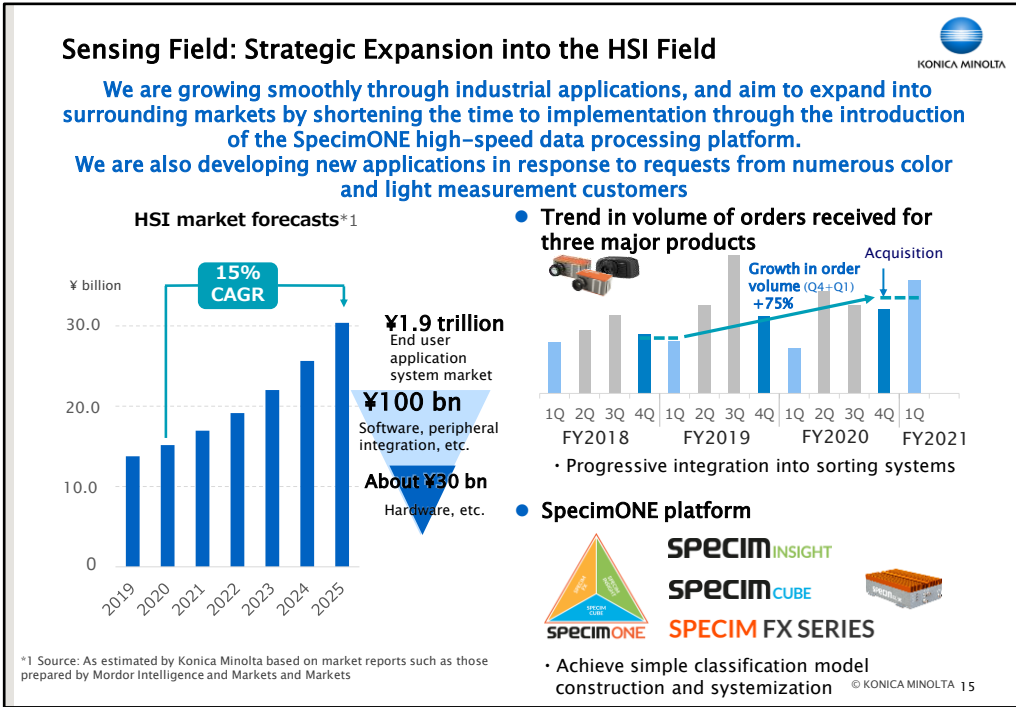
With regard to automotive visual inspection, since the acquired Eines is located in Spain, it has been expanding mainly to European automakers. After joining our Group, Eines has been expanding its track record not only in Europe, but also in Asia and the United States. In situations where it is difficult to move people due to COVID-19 outbreak, installation to major EV-affiliated companies in the U.S. is handled by Radiant Vision Systems's technical team, and we are making effective use of our group strengths. In addition, it is derived from a dome-shaped system that automatically inspects paint defects, and we are accelerating the deployment of this system to an automatic inspection system for flush and gap. Flush or gap in the car doors and fenders can cause noise when driving, and can interfere with door opening and closing. Due to the COVID-19 outbreak, some capital investment were postponed, but the demand for automation of the inspection seems to be great.

In addition, I would like to share with you about our contribution to the environmental friendliness of automobiles. Fuel cell parts require precision in components to prevent fuel leaks, and scratches and dirt on parts will affect the functional performance. However, microscopic abnormalities are difficult to distinguish with a normal camera because they are not shaded in the image. That's why our visual inspection system is used. Future opportunities are expected to include the development of fuel cells in Asia. We are committed to solving social issues through our support for precision manufacturing, which requires new materials and structures in this way.



The fourth is the HSI field. The key is the precise image analysis capabilities. Since we have the ability to go beyond human vision and find contamination and distribution of substances, we will aim to expand environmental issues and the effective use of resources.

Acquired Specim has HSI-specific technology assets, which include optical technology and the processing technology of large volumes of data. To date, we have advanced to food companies and recycling manufacturers through partners in sorting systems. In the future, we will also propose and expand this business based on BtoB links with food companies, automotive, and consumer electronics.



We assume that the market size HSI is aiming for will be ¥100 billion when software and peripheral systems are integrated in addition to the hardware market, which is approximately ¥30 billion.

We assume a growth rate of 15% due to the development of technologies and applications. Looking at Specim's unit growth, it has increased to +75% in 2 years since prior to the spread of COVID-19 infections, suggesting that applications for industrial use are proceeding steadily. In order to accelerate customer adoption in the future, we have introduced a platform called SpecimOne, which is responsible for high-speed data processing. From the perspective of the surrounding markets, we believe that the factors that make integration easier are now in place.

In addition, in the HSI field, we have received a number of requests from customers in our Core Business which is color measurement and optical measurement, so we are currently developing applications.

Sensing Field: Strategic Expansion into the HIS Field



Example of introduction in recycling sorters



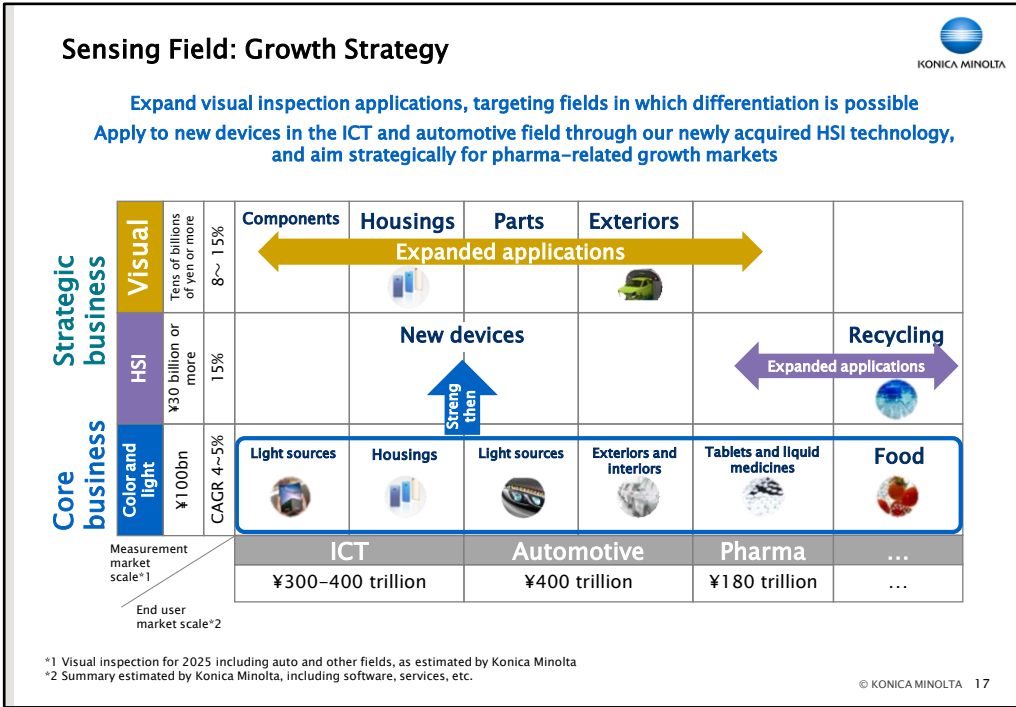
<https://www.youtube.com/watch?v=9dbMWY76Pe8>

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Here is a video showing an example of a recycle sorter with a camera by Specim.

(Video)

This was a message from our customers and partners about the speed and sorting capabilities of Specim's FX17.



We summarize our initiatives in our growth strategy.

The first is visual inspection, and we are selecting areas where we can differentiate ourselves. In the future, we will expand the area in the direction of parts and materials, and expand its applications.

Second, in addition to expanding newly acquired HSI technologies in recycling and food, we will also apply them to new analytical testing in the development and production applications for new devices by our Core Business customers.

Going forward, we will use HSI hardware and data processing technologies as a triggering opportunity to add assets of our Core Business to strategically target growth markets related to pharmaceuticals.

Sensing Field: Scale of Growth and Drivers



Both core and strategic businesses are progressing according to plan (Medium-term Business Plan DX2022), and the expansion of applications by our global team in the visual inspection and HSI fields is essential, in order to achieve FY2022 targets.
In addition, we will actively consider partnerships aimed at expansion in ESG-related and other fields

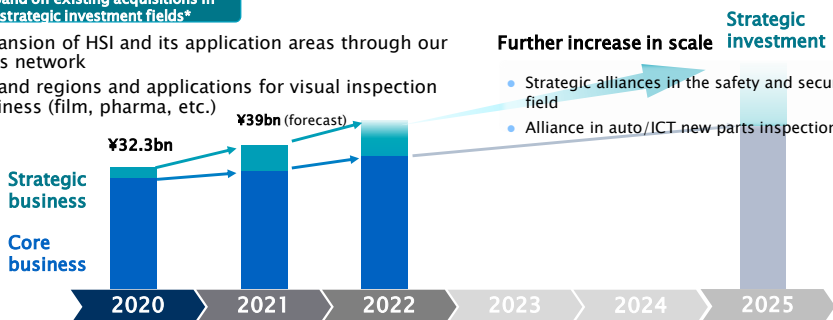
Measures to achieve 2022 goals

Deepen core businesses

- Prepare new applications for devices for displays during H2 FY2021
- Ensure that we capture the expansion of customer value chains in India and other parts of Asia

Expand on existing acquisitions in strategic investment fields*

- Expansion of HSI and its application areas through our sales network
 - Expand regions and applications for visual inspection business (film, pharma, etc.)
- Further increase in scale**
- Strategic alliances in the safety and security field
 - Alliance in auto/ICT new parts inspection



*Strategic investment fields: visual inspection, HSI applications

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Finally, we summarize the scale of growth and drivers.

The results for FY2020 and the progress made in the FY2021 Q1 were in line with the plan explained in November 2020.

To achieve our targets for FY2022, in the Core Business, it is important to prepare for new applications of display devices, and then capture the expansion of customer value chains in India and other Asian countries.

In the acquired visual inspection and HSI, our global team will work to expand the regions and applications in both fields. In addition, we will actively consider partnerships aimed at expanding ESG-related domains, including non-organic areas.

End



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Appendix Sensing Field: HSI Technology



Whereas human eyes perceive the colors of visual light in terms of three bands – red, green and blue – HSI perceives a wide range of wavelengths by splitting them into dozens or hundreds of bands, thereby enabling it to distinguish and inspect colors with a precision beyond human vision

*Illustration of HSI processing

