

# Business Activity

## Investment Support Through Open Innovation



Startup companies

21



Venture capital firms

12

## Procurement Partner Quality Management System Assessments



Conducted for

101 companies

## Customer Satisfaction



87.0%

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## Materiality 1

# Creating Social Value Through Core Technologies



## Reason for Priority

Companies are considered public institutions and have a responsibility to contribute to the sustainable development of society through transparent and fair business activities.

Moreover, in recent years, amidst the emergence of social issues of global importance, companies are required to innovate in ways that will transform social systems and lifestyles, and to contribute to solving these issues through their businesses.

## Nikon's Approach

Imagine society in 2030, it is likely that not only will people's values, lifestyles, and outlooks on life shift, but so too will social frameworks on topics like climate change and resource scarcity shift. Furthermore, there will likely be an accelerated shift in technologies, such as with the advent of Industry 5.0. In the midst of this mega-shift, we believe that people will focus more on creative, self-fulfilling work and value-driven consumption, and that there will be greater co-creation between humans and machines.

In April 2022, Nikon announced a new Medium-Term Management Plan in which its Vision 2030 (for the year 2030) is to become a key technology solutions company in a global society where humans and machines co-create seamlessly.

Over its 100 years of history, Nikon has cultivated ultra-precise Monozukuri (manufacturing) capabilities, eminently present in its lithography systems. It has also cultivated a brand that has popularized digital cameras worldwide and greater trust among its stakeholders. Leveraging these strengths, we will provide solutions closely tied to customer experience value and the generation of innovation, and expand possibilities for people in a world where humans and machines co-create more seamlessly. We will also contribute to the realization of a prosperous and sustainable society by providing innovative value that will help address societal and industrial challenges, including those presented in the SDGs.

# Nikon's Social Value Creation

## Strategy

The Nikon Group aspires to be a company that contributes to the sustainable development of society through the creativity of new value through its businesses based on its Corporate Philosophy of Trustworthiness and Creativity. In its Sustainability Policy, we are committed to helping solve environmental and social challenges as well as achieve Sustainable Development Goals (SDGs) through our business activities by delivering unique Nikon products and services. In addition, we have selected Creating Social Value through Core Technologies as a materiality. To put this into practice, in April 2022, Nikon announced a Medium-Term Management Plan with sustainability strategy as one of its management foundations.

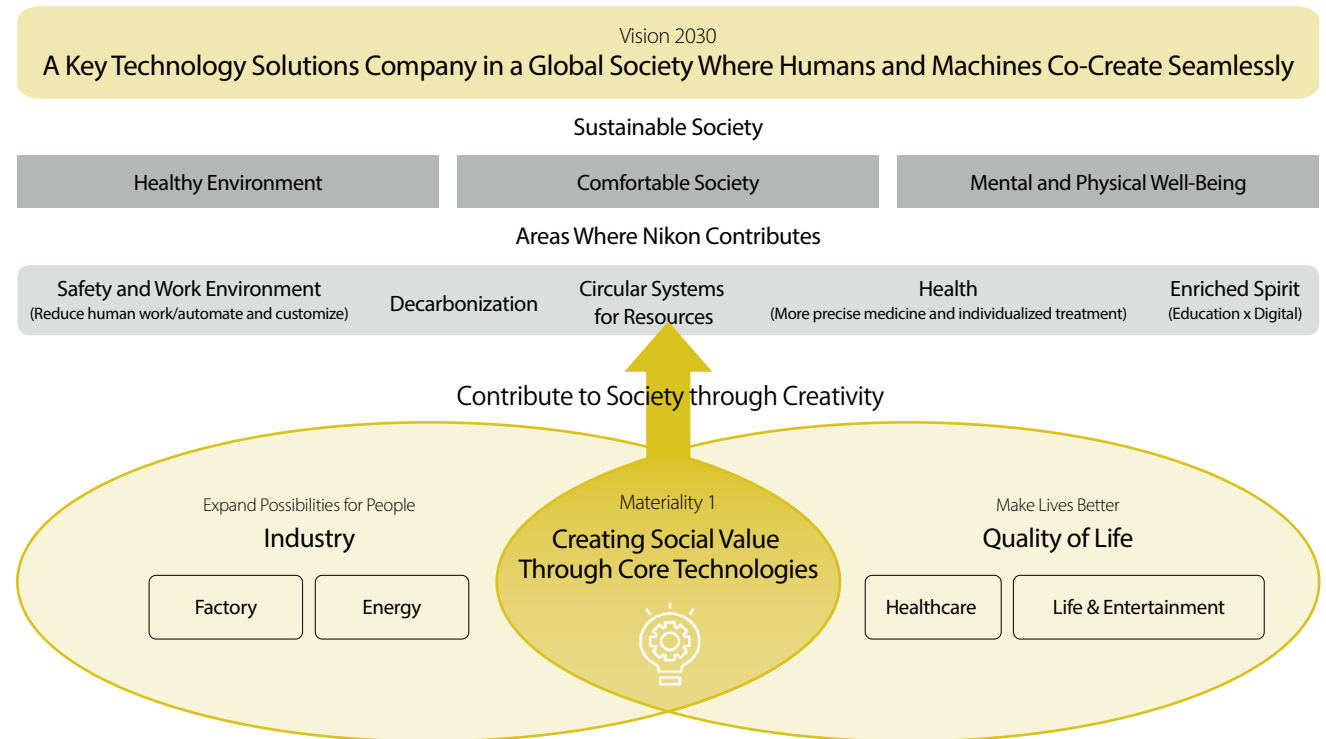
Under this plan, our Vision 2030 is to become a key technology solutions company in a global society where humans and machines co-create seamlessly. With this, we will focus our efforts on building industries that will expand possibilities for people and quality of life (QOL) that will make lives better in the fields of Factory, Energy, Healthcare, and Life & Entertainment. Specifically, in the Factory area, we will become a lead player in flexible manufacturing systems with Robot Vision and Material Processing. We will also contribute to the diversification and sophistication of devices with digital lithography. In the Energy area, we will leverage optical processing machines to promote energy efficiency improvements with fine processing and re-use with additive processing. In the Healthcare area, we will support drug discovery that lightens the burden on doctors and patients, aiming to achieve regenerative medicine for everyone. In the Life

& Entertainment area, we will support a society where people are connected in ways that transcend time and space and virtual and reality with image infrastructure production technologies

In a world where humans and machines co-create

more seamlessly, we will use these efforts to contribute to the achievement of the SDGs and the realization of a sustainable society, especially in the areas of safety and work environment, decarbonization, circular systems for resources, health, and enriched spirit.

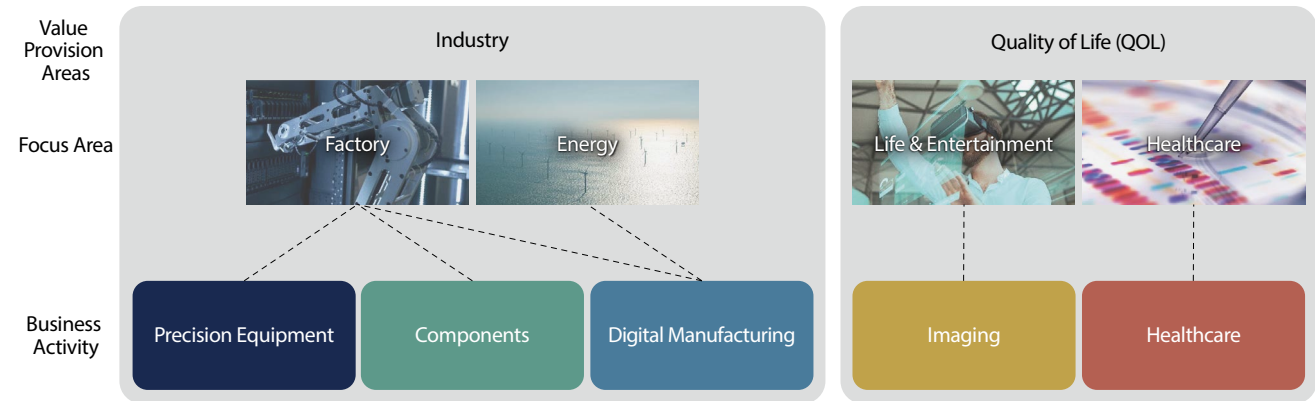
### ● Contributions to Society Through Creativity



## Areas and Businesses of Contribution in the Medium-Term Management Plan

In its Medium-Term Management Plan, Nikon aims to use its Components, Digital Manufacturing, and Precision Equipment businesses to provide value in the area of Industry. Likewise, we aim to use our Imaging Products and Healthcare businesses to provide value in the Quality of Life area. In this context, we aim to contribute to a sustainable society and grow our own company by focusing on five areas, with the delivery of integrated solutions, including finished products, services, and components as growth drivers.

### ● Areas and Businesses Where Nikon Provides Value



### ● Contributions Through Business Activities

Areas Where Nikon Contributes		● Precision Equipment ● Components ● Digital Manufacturing ● Imaging ● Healthcare
<b>Safety and Work Environment</b> (Reduce human work/automate and customize)	<ul style="list-style-type: none"> <li>Contribute to work environments and public transportation infrastructure through sensing, imaging and displays, etc.</li> <li>Contribute to urban planning and resilient social infrastructure with image analysis and optical telecommunications technology</li> <li>Contribute to space industry and technology by providing satellite modules, etc.</li> </ul>	
<b>Decarbonization</b>	<ul style="list-style-type: none"> <li>Increase energy efficiency in society with additive and fine processing using optics</li> <li>Enhance manufacturing efficiency in robots with sophisticated hands and eyes and device manufacturing processes</li> <li>Contribute to a society where people connect transcending time and space and real and virtual leveraging image production technologies</li> <li>Contribute to a healthy global environment with longer lasting light sources and more durability in our products</li> </ul>	
<b>Circular Systems for Resources</b>	<ul style="list-style-type: none"> <li>Reduce the burden of waste and promote re-use among our customers through turbine repairs and ultra-precision processing, controls and measurement, etc.</li> <li>Aim to achieve a recycling society by strengthening equipment re-use and refurbished systems sales</li> <li>Leverage digitalization to help reduce needs</li> </ul>	
<b>Health</b> (More precise medicine and individualized treatment)	<ul style="list-style-type: none"> <li>Reduce the burden on doctors and patients and support drug discovery with early and high-precision evaluation of ailments</li> <li>Achieve regenerative medicine for everyone with Contract Cell Manufacturing solutions</li> <li>Support medicine with high-precision robot modules</li> </ul>	
<b>Enriched Spirit</b> (Education x Digital)	<ul style="list-style-type: none"> <li>Contribute to rich and creative visual expression and culture with imaging equipment and 3D and 4D technology, etc.</li> <li>Leverage cameras, microscopes and telescopes to stimulate interest in outer space and the natural sciences and contribute to</li> <li>Education and training that transcends time and space and real and virtual</li> </ul>	

## Major Initiatives

### Research and Development (R&D)

The Technology Strategy Committee at Nikon, chaired by an Executive Vice President, leverages analyses of macro social issue trends to comprehend business environments, conduct market studies and evaluations, and develop new areas of focus for Nikon's efforts. For example, the Next Generation Project Division and the Digital Solutions Business Unit have been working together since the previous Medium-Term Management Plan's period to expand business for optical and EUV-related components, a short-term growth driver in the Medium-Term Management Plan, and materials processing and robot vision, a medium-term growth driver in this plan.

The Technology Strategy Committee also formulates technology strategies and R&D plans for existing businesses. These serve as the foundation for the Advanced Technology Research & Development Division's duties for R&D of technologies shared by business units and R&D of future technologies.

### Open Innovation

Nikon has adopted open innovation, which actively utilizes external resources, as a means of accelerating the development of new products and services and the launch of businesses that will lead to solutions for expanding and intensifying social issues.

Specifically, this includes not only corporate venture capital investment, but also direct investment in start-up

firms through the establishment of a private fund, as well as arrangements for providing support and incubation for start-ups and employees that have developed technologies or ideas with strong potential. As of March 31, 2024, we are providing investment support to 21 startup companies and 12 venture capital firms.

#### Value Provided Through Business Activities-1

Areas Where Nikon Contributes;  
**Health**

#### Contributing to the Field of Drug Discovery

#### Addressing Unmet Medical Needs

There are many diseases and conditions for which effective treatments have not been discovered. Collectively, they are known as unmet medical needs. They include treatments for serious diseases such as cancer, serious conditions such as dementia, and non-life threatening, QOL-impacting conditions, such as insomnia and migraine. Meeting these unmet medical needs is a compelling reason to accelerate both our understanding of disease mechanisms and the development of new drugs.

#### ECLIPSE Ji, Smart Imaging System That Supports New Drug Development

Nikon launched the JOICO microscope in 1925, and in the nearly 100 years since then, we have developed technologies and expertise in observing and evaluating cells.

The ECLIPSE Ji is Nikon's first digital inverted microscope for research use. It features a design that has no eyepiece despite being an optical microscope, and when used with the NIS-Elements SE imaging software, the process from image acquisition to analysis and data display is completely

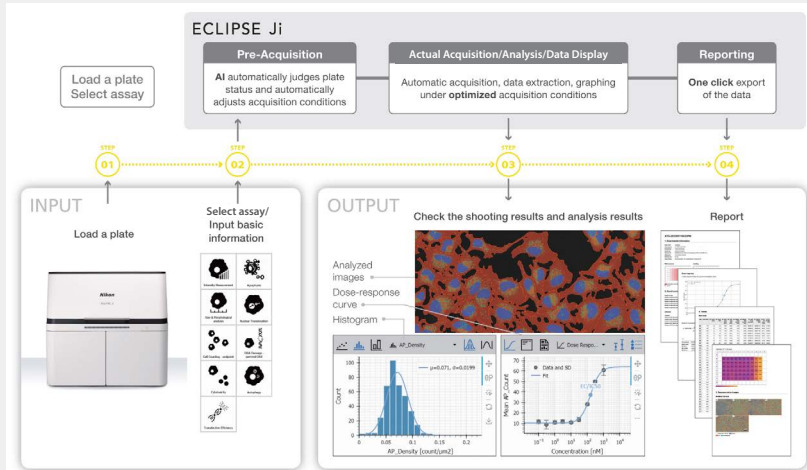


Figure 1.

automated. The microscope is equipped with software that uses AI-driven deep learning to automate operations, making it easy to operate without the expertise in microscopy that an operator normally requires.



**Benefits of AI Automation**

Cell-based drug efficacy evaluation technology

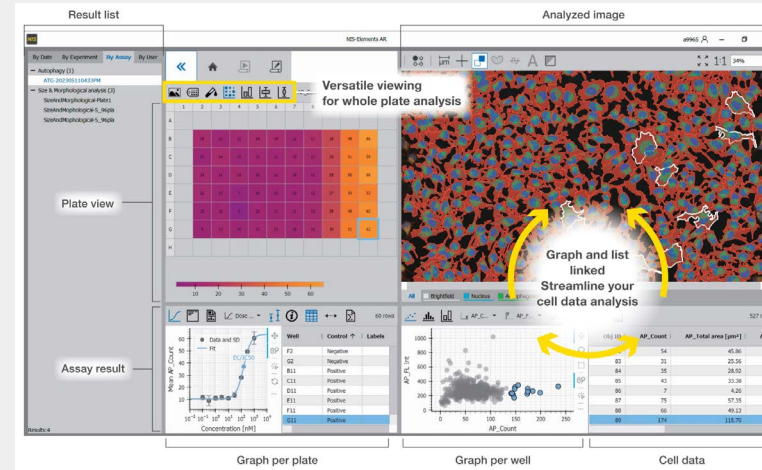


Figure 2.

is contributing to the efficiency of new drug development.

However, in order to accurately and speedily evaluate the efficacy of a drug, it is still necessary to acquire and analyze cell images, which in turn requires specialized knowledge of microscopes and their advanced operating techniques.

The ECLIPSE Ji smart imaging system streamlines the process from sample set-up to report output by employing AI-driven automated operations, allowing researchers to focus on analyzing and discussing the data they have obtained. Furthermore, because there is no variability introduced by humans, automatic operation is also expected to improve analytical success rates (Figure 1).

Moreover, by using data from individual cells, it is possible to analyze data outliers and thus capture trends across cell populations as a whole,

contributing to the efficiency and acceleration of research and development (Figure 2).

**Business Supporting Drug Discovery Research and Development**

Nikon has identified drug discovery support as one of the growth drivers in the Medium-Term Management Plan (fiscal years 2022 to 2025). We contribute to drug discovery and new drug development by providing various solutions utilizing our proprietary advanced optical technologies and image processing and analysis technologies. We will contribute to improving health and QOL by supporting the fields of drug discovery and new drug development, aiming to create a society where each individual can receive optimal treatment.

### Value Provided Through Business Activities-2

Areas Where Nikon Contributes;  
**Safety and Work Environment**

### Contributing to Solving Issues in the Japanese Livestock Industry

#### Growing Labor Shortage

Japan's livestock industry is facing a serious shortage of labor due to the declining birthrate, aging population, lack of successors, and a decrease in the number of new workers entering the industry. One of the factors is thought to be the industry's harsh working conditions and environment. To overcome the challenges facing the livestock industry, the introduction of DX and AI has been gaining momentum in recent years.

Nikon has developed NiLIMo, a live monitoring system that uses AI and image analysis technology to detect signs a cow is calving or about to start calving and then notify the farmer. Proof-of-concept testing was conducted with the cooperation of beef cattle producers in Kumamoto Prefecture, Japan, and Nikon Solutions Co.,Ltd. began marketing the system in 2024.

As calving nears, a calf-carrying cow exhibits particular characteristic behaviors, such as making increased movement, repeatedly standing up and sitting down, and raising her tail. The monitoring system uses multiple cameras installed in the cow shed to capture images of the calf-carrying cow, with equipment installed on the farm then analyzing these images using AI to detect her characteristic pre-calving behaviors. After the data has been analyzed, a text or voice message is sent to the farmer's smartphone via dedicated application that they have downloaded.



Detection of calving using AI

present at the calving, thereby reducing the number of calving incidents.

Thus, the NiLIMo live monitoring system not only significantly reduces the burden on farmers, but it also assists livestock operations by reducing adverse incidents during calving. Furthermore, centralized management and real-time sharing of cattle information and behavioral history will also help farmers improve their operational efficiency.

#### Supporting Japanese Livestock Industry and Worldwide Supply and Demand of Food

Nikon is committed to overcoming the challenges of the livestock industry in Japan with systems that incorporate AI as well as with our proprietary image processing technology.

Moreover, the imbalance between supply and the increasing demand for food due to population growth is becoming a global problem. In addition to supporting Japan's livestock industry, we will also use our unique expertise and technology to help solve global food problems that will arise in the future and other social issues.

#### Reducing Burden on Farmers and Helping Management

This system allows farmers, even when they are away from the cow shed, to know when their cows are likely to calve. This reduces the number and duration of day and, more significantly, nighttime rounds the farmer has to make. It also ensures that the farmer is



Decreased feeding and drinking

Increased movement

Repeatedly standing up and sitting down

Tail raising

Amniotic sac emerges

Calf's feet emerge

Delivery

Characteristic behaviors of cows at calving time, with behaviors that NiLIMo can detect highlighted in yellow

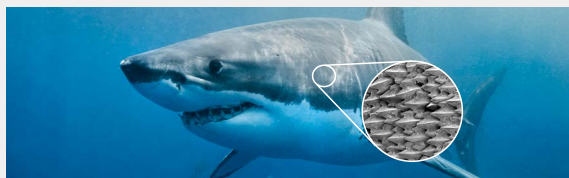
**Value Provided Through Business Activities-3**

Areas Where Nikon Contributes;  
**Decarbonization**

**Riblet Processing that Contributes to Carbon Neutrality**

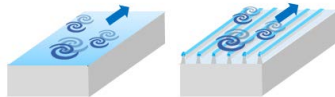
**Shark Skin-like Riblets**

A riblet is a biomimetic technology based on the microscopic pattern of shark skin. Sharks have evolved the surface of their skin to have a longitudinal grooved shape, reducing the frictional resistance of contact with the water and making it possible to swim faster and more efficiently. Riblets are a microstructure consisting of artificial longitudinal grooves inspired by this evolution. Research began in this area several decades ago, and swimwear with this microstructure applied to its surface garnered great attention after its use led to new world records being set.



**Riblet Mechanism for Reducing Frictional Resistance**

Riblets reduce contact frictional resistance by using vertical grooves to create distance between vertices and the wall surface and reduce the contact area.



Without riblets

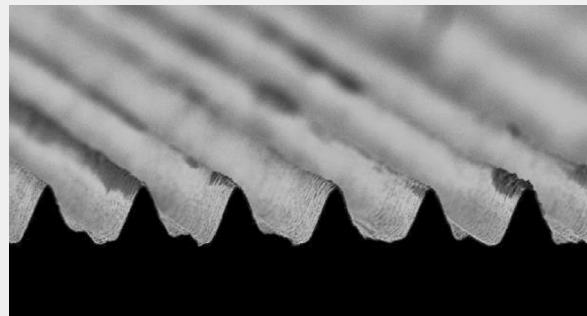
With riblet processing

**Benefits of Riblet Processing**

By imparting a riblet shape to an object moving against water or air, it can help reduce frictional resistance. For example, riblet processing on aircraft fuselages and race car bodies can reduce frictional resistance to the air, thereby improving fuel efficiency and increasing speed. Riblet processing on blades used in applications such as wind turbines, gas turbines, and jet engines offer potential improvements in energy efficiency.

**Nikon's Unique Laser Processing Technology**

Laser processing generally involves irradiating a laser beam onto an object, such as a metal, to cut or drill a hole. Nikon's high-precision laser processing technology enables the precise formation of minute three-dimensional shapes. In order for maximal riblet effectiveness, they must be machined to the



Cross-section of riblet processing (viewed under electron microscope)

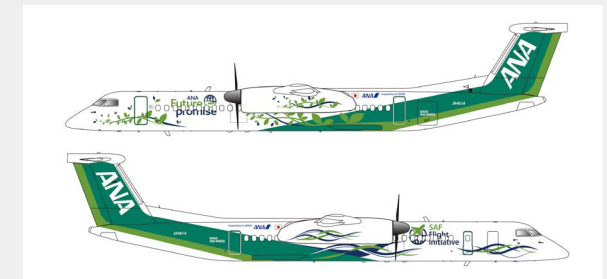
optimum shape for each object. Nikon's technology allows for this.

Furthermore, advanced optical technology enables processing a wide variety of materials, including metals, resins, and fiber-reinforced plastics.

**Proof-of-Concept Testing on Passenger Aircraft**

Applying riblet processing to aircraft fuselages is expected to reduce frictional resistance between the fuselage and the air, thereby improving fuel efficiency and reducing CO<sub>2</sub> emissions. Japan Airlines Co., Ltd. (JAL) and All Nippon Airways Co., Ltd. (ANA) started conducting proof-of-concept tests in 2022. These tests involved applying riblet processing to a section of the fuselages of some of their passenger aircraft.

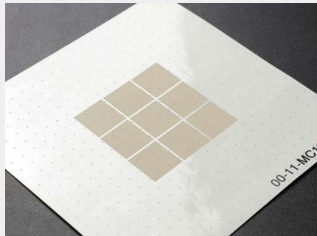
Applying the riblet film to the area of an aircraft's fuselage where it is most effective is expected to improve fuel efficiency by 2%. Moreover,



An ANA DHC-8-400 aircraft with a sheet of Nikon riblet processing applied to it came into service on October 23, 2023. The Aircraft here is in special ANA Future Promise livery.







if this were adopted across the entire ANA fleet, it is predicted it would result annually in a reduction in jet fuel consumption of approximately 95,000 tons, a cut in fuel costs of approximately 8 billion yen, and lower CO<sub>2</sub> emissions of approximately 300,000 tons.



Riblet processing applied as film to the fuselage of ANA aircraft

### Estimated Benefit of Riblet Film Applied to ANA's Aircraft Fleet

<p>Improved fuel consumption</p>  <p>Approx. <b>2%</b></p>	<p>Annual jet fuel use reduction Approx. 95,000 tons/approx. 124,000 kiloliters</p>  <p>25m-long swimming pools Equivalent to Approx. <b>260</b></p>
<p>Annual fuel cost savings</p>  <p>Approx. <b>80</b> billion yen</p>	<p>Annual CO<sub>2</sub> reduction</p>  <p>Approx. <b>300,000</b> tons</p>

\*1 Effects calculated based on the following main conditions: Theoretical reduction effect of 6.17% x 80% processing of fuselage surface x 90% flight time at cruising altitude, applied to currently owned aircraft (calculated by Nikon)

## Becoming Carbon Neutral with Riblet Processing

As the damage and losses due to climate change become more serious, efforts to reduce CO<sub>2</sub> emissions are accelerating in various fields in order to achieve the 1.5°C target, a target limiting any increase in global average temperatures to 1.5°C. In addition to aircraft, ships, and wind turbines, the use of riblet processing is expanding to include gas turbines, helicopters, rolling stock, drones, pumps, and household appliances.

We will contribute to the realization of carbon neutrality by developing businesses that take advantage of our unique riblet processing technology.

### Illustration of Riblet Processing on Aircraft

In the future, we aim to adopt Nikon-developed equipment for riblet processing on aircraft fuselages.

