

- Aircraft for the Japan Ministry of Defense
- Parts for commercial aircraft
- Missiles/Space equipment
- Commercial helicopters
- Jet engines
- Aerospace gearboxes

Vision

A leading company that consistently creates new value for the world through excellent aerospace technologies and *monozukuri* manufacturing quality

Opportunities

- Defense Aircraft**
  - Sustained domestic defense equipment development and production
  - Prospects of defense equipment exports
- Commercial Aircraft**
  - Medium- to long-term growth in air passenger and air freight volume, in line with economic growth in emerging countries
- Jet Engines**
  - Growing demand in line with expansion of commercial aircraft market

Risks

- Defense Aircraft**
  - Reduced equipment prices due to defense budget streamlining
- Commercial Aircraft**
  - Fiercely competitive environment, reflecting competition for market share between Boeing and Airbus
  - Uncertainty regarding future of wide-body aircraft, due to the increased presence of LCCs\*
  - Rise of manufacturers in emerging countries
- Jet Engines**
  - Decreasing demand due to economic recession
  - Development risks related to introducing cutting-edge technologies

\* LCCs: Low-cost carriers

Core Competence

- Aircraft**
  - Technological capabilities as manufacturer of finished aircraft with experience in the defense business (system integration capabilities)
  - Technological capabilities based on international joint development with Boeing, and sophisticated, large-scale production facilities
  - High quality and productivity through the Kawasaki Production System (KPS)
- Jet Engines**
  - Sophisticated technological capabilities built through international joint development projects and developing engines for defense aircraft
  - High quality and productivity through leading-edge production technology

Business Direction under MTBP 2019

- Defense Aircraft**
  - Steady progress on existing development projects and production contracts
  - Expand orders for new projects
- Commercial Aircraft**
  - Consider participation in next-generation aircraft projects
- Jet Engines**
  - Secure inclusion in new engine projects by improving development capabilities
  - Provide additional development and production for projects in which we are already participating
  - Consider entering the maintenance, repair, and overhaul (MRO) business

Operating Environment and Strategies

As global air passenger and air freight volume expand over the medium to long term due to economic growth in emerging countries, we expect continued growth in demand for commercial aircraft and jet engines. In this operating environment, we will implement a range of strategies in pursuit of ongoing growth.

In the defense aircraft sector, we will move steadily toward mass production of the P-1 patrol aircraft and C-2 transport aircraft while seeking to capture orders for modernized and derivative types of aircraft. We will also export defense equipment in line with government policy.

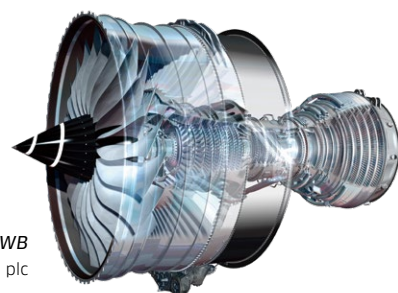
In the commercial aircraft sector, we will further strengthen our relationship with Boeing and work to increase production capacity through streamlining using robotics and other means while advancing considerations of participation in next-generation aircraft programs.

In the jet engine sector, we will work to further stabilize quality, reduce costs, and reinforce supply chains for

projects in which we already participate while adopting IoT and other advanced technologies to improve productivity. We will further reinforce our technological strengths in compressors, combustors, and gears—strategic components for Kawasaki—and use these strengths as a foundation for participating in new projects. In addition, we aim to gradually secure engine maintenance capabilities with a view to entering the MRO business.

In April 2018, Kawasaki integrated the former Aerospace Company and the jet engine business of the former Gas Turbine & Machinery Company, creating the Aerospace Systems Company. By integrating our aerospace-related businesses, we are looking to continue to reinforce cost competitiveness, collaborate to expand business, and develop new businesses.

Trent XWB  
©Rolls-Royce plc

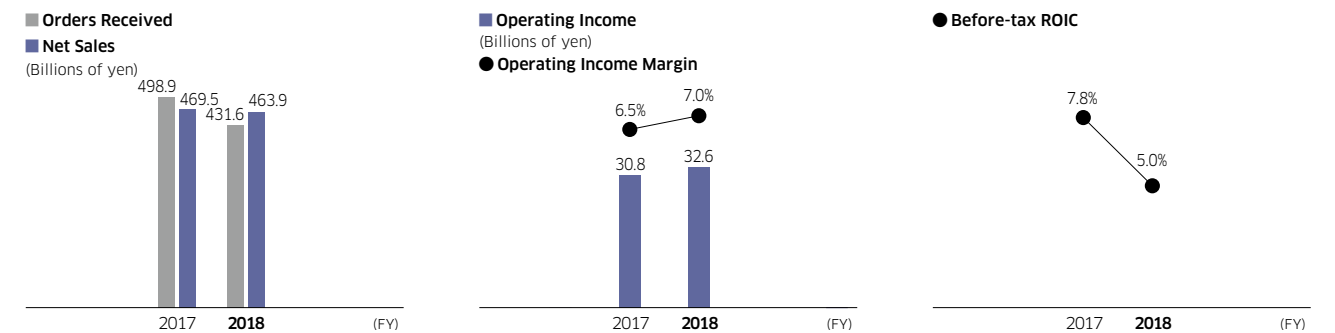


Hiroyoshi Shimokawa

President,  
Aerospace Systems Company



Display of a P-1 patrol aircraft and C-2 transport aircraft by the Ministry of Defense at the Paris Air Show



\* Due to internal company reorganization, effective April 2018, only results for fiscal 2017 (restated) and fiscal 2018 are shown.

Initiatives to Create Social Value

The Aerospace Systems Company has designated as its vision for 2030 providing air transportation systems combining excellent environmental performance with excellent safety and reliability. To achieve this vision, we are participating in the development of Boeing 787 and 777X aircraft as well as jet engines, such as the Trent series and PW1100G-JM, to contribute to the steady supply of low fuel consumption aircraft and low fuel consumption engines. We will also focus on the production and sale of

the BK117 low-noise helicopter, which is expected to be used in firefighting, disaster response, and ambulance services. Furthermore, we aim to participate in the joint international development of new, environmentally conscious aircraft and engines and thereby contribute to environmental improvement.



<b>Goals for the MTBP 2019</b>	<ul style="list-style-type: none"> <li>• Provide environmentally conscious aircraft, helicopters, and engines and participate in new programs</li> <li>• Produce components for Boeing 787</li> <li>• Sales of BK117 units: Produce finished units and components</li> <li>• Produce components for Trent 1000, Trent XWB and PW1100G-JM low fuel consumption engines</li> </ul>
<b>Fiscal 2018 Results</b>	<ul style="list-style-type: none"> <li>• Components for Boeing 787: 146 units sold</li> <li>• Sales of BK117 units: One finished unit and 79 components</li> <li>• Produce components for Trent 1000, Trent XWB, and PW1100G-JM low fuel consumption engines</li> </ul>



## Energy System & Plant Engineering

- Main Products**
- Energy/Marine Plant
    - Industrial-use gas turbines/cogeneration systems
    - Industrial plants (cement, fertilizer, and others)

- Gas engines
- Power plants
- Diesel engines
- LNG tanks
- Steam turbines for marine and land applications
- Municipal waste incineration plants
- Aerodynamic machinery/Marine propulsion systems
- Tunnel boring machines
- Crushing machines

### Vision

A distinctive equipment, system, and plant manufacturer that uses technologies and quality underpinned by sophisticated product development expertise and engineering know-how to globally provide products and services that help protect the environment and earn high customer satisfaction, mainly in areas of energy and the environment.

### Opportunities

- Growing demand for energy and infrastructure in emerging and resource-rich countries
- Growing demand for distributed gas-fueled power generation facilities prompted by lower LNG fuel prices
- Tightening environmental regulations
- Demand to build new or replace various power generation facilities following the Great East Japan Earthquake
- Demand for infrastructure replacement in Japan ahead of the 2020 Tokyo Olympics

### Risks

- Delayed projects due to prolonged slump in price of oil
- Weakening investment incentive paralleling economic slowdowns in emerging countries and resource-rich countries
- Prolonged slump in the shipping market

### Core Competence

- Ability to provide solutions leveraging synergy from combining Kawasaki-brand products, such as the combined cycle power plant (CCPP) standard package, which combines a gas turbine, steam turbine, and waste heat recovery boiler, as well as gas engine/gas turbine hybrid projects
- Environment-friendly technologies and development capabilities in core products and systems as well as comprehensive engineering capabilities developed through wide-ranging projects
- Locally rooted sales system leveraging overseas sites

### Business Direction under MTBP 2019

- Create new technologies, products, and added value that contributes to reducing environmental burden
- Reinforce project responsiveness by effectively utilizing and sharing resources
- Advance overseas business development through initiatives closely tailored to local communities and customers and build a foundation for future earnings growth

### Operating Environment and Strategies

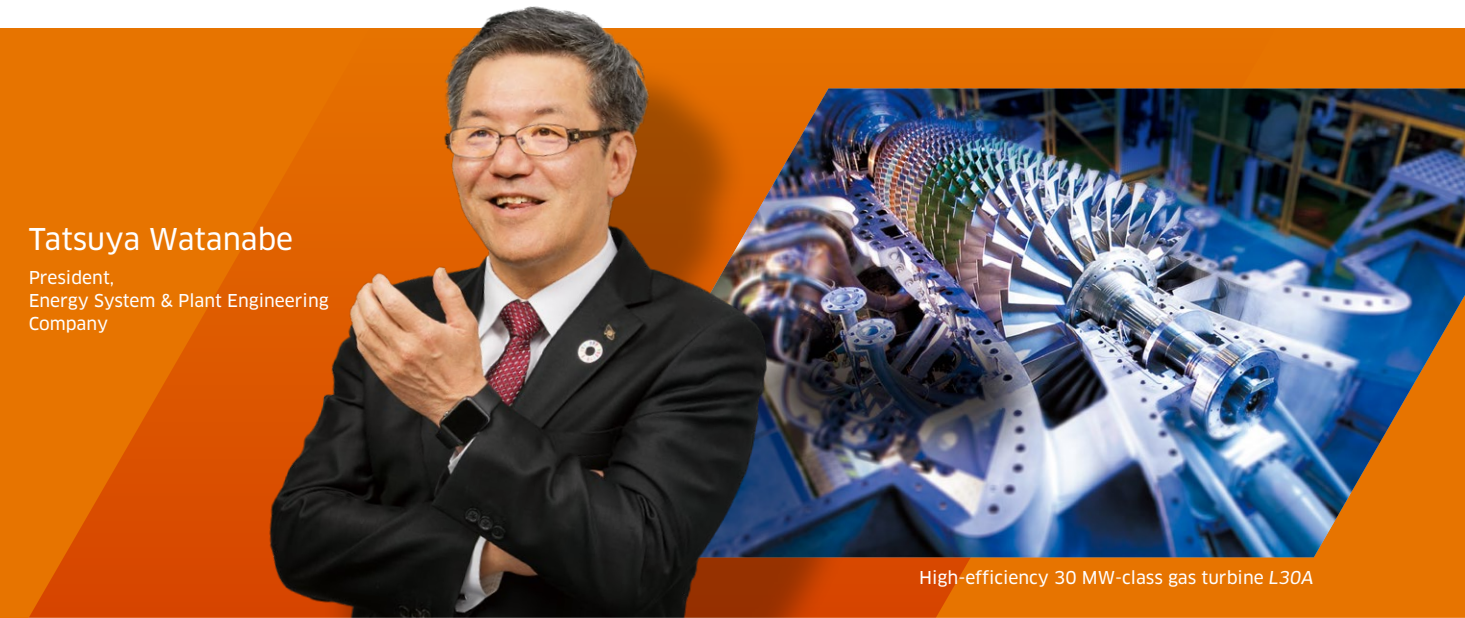
In the energy and marine sectors, demand for gas-fired power generation is expanding, and distributed power generation needs are also increasing, especially in Asia. In this business environment, we will accelerate business development based on system solutions combining core products to achieve business growth, especially on the sales front in Southeast Asia.

In the plant sector, we anticipate stable domestic and overseas demand, reflecting infrastructure development and heightened interest in environmental protection, especially in emerging countries, including those in Southeast Asia. However, price competition is fierce, and finding ways to sharpen cost-competitiveness is an issue that requires our attention. In this environment, we aim to secure orders by providing unique, high-value-added

products and strengthening our sales systems and maintenance and after-sales services. When bidding for orders, we will be more selective, emphasizing profitability over scale. We will also reinforce quality assurance and risk management systems to reduce costs from defective products and improve profitability.

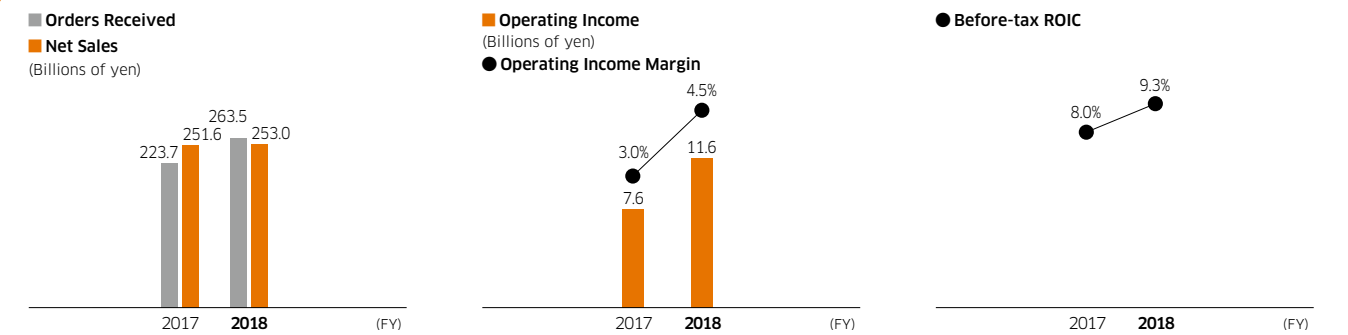
Furthermore, aiming to expand sales of the CCPP standard package, which combines a Kawasaki gas turbine, steam turbine and waste heat recovery boiler, we will reinforce our overseas sales systems. We are also advancing investment in hydrogen-related projects and product development aimed at future business growth and the realization of a carbon-free society. To this end, we plan to begin operations of a pilot hydrogen supply chain in 2020.

Gas-to-gasoline (GTG) plant



Tatsuya Watanabe  
President,  
Energy System & Plant Engineering  
Company

High-efficiency 30 MW-class gas turbine L30A



\* Due to internal company reorganization, effective April 2018, only results for fiscal 2017 (restated) and fiscal 2018 are shown.

### Initiatives to Create Social Value

The Energy System & Plant Engineering Company has designated as its vision for 2030 being a distinctive equipment, system, and plant manufacturer that uses technologies and quality underpinned by sophisticated product development expertise, manufacturing technology, and engineering know-how to globally provide products and services that help protect the environment and earn high customer satisfaction, mainly in areas of energy and the environment.

To achieve this vision, we aim to advance both economic growth and environmental protection by providing energy-saving, highly resource-efficient equipment, such as gas turbines that realize the world's highest level of efficiency and environmental performance, gas engines that realize the

world's highest level of performance, and other power generation facilities. We are working to combine core products and incorporate in-house know-how, reinforce our ability to handle overseas projects, and create new solutions. We will contribute to infrastructure improvement by providing such products as tunnel boring machines and cryogenic storage facilities while also contributing to environmental protection in urban areas through deliveries of energy-saving waste incinerators, water treatment facilities, desulfurization/denitrification devices, and other systems.



### Goals for the MTBP 2019

- Expand supply of Kawasaki's power plants, which boast world-class generating efficiency and power-saving performance, in Southeast Asia, where electricity demand is growing rapidly, to meet needs for economic development and greater environmental friendliness in emerging countries
- Develop products with greater environmental burden alleviating effects and respond to environmental regulations
- Advance development of hydrogen gas turbines that contribute to CO<sub>2</sub> emissions reduction

### Fiscal 2018 Results

- Deliveries of standard power generation facilities to overseas customers: 4 units
- Deliveries of waste incinerators: 3 units



Vision

A shipbuilding and offshore structure engineering group pursuing innovation in cutting-edge fields with a focus on hydrogen technologies and low-temperature, high-pressure gas technology, submarine technology, and overseas projects.

Opportunities

- Increasing demand for vessels with low environmental burden due to tightened environmental regulations
- Recovery in carrier demand, owing to growing demand for LNG
- Greater automation, using IoT and AI
- Expanding operations to meet needs for an increasing fleet of submarines

Risks

- Increasingly fierce competition with China and South Korea
- Prolonged slump in shipping market

Core Competence

- Low-temperature and high-pressure gas-related technologies accumulated through the development and construction of LNG and LPG carriers
- Quality and cost competitiveness of the overall Group, including Chinese joint ventures (NACKS, DACKS\*)
- Energy-saving, environmental burden-reducing technologies, and ability to develop new ship designs
- Sophisticated technology specific to submarines

\* NACKS, DACKS: Shipbuilding joint ventures established in Nantong, Jiangsu Province and Dalian, Liaoning Province, with China COSCO Shipping Corporation Limited (China COSCO)

Business Direction under MTBP 2019

- Rebuild merchant ship business, with emphasis on deeper integration of operations at Sakaide Works, NACKS and DACKS
- Accelerate new product development and commercialization
- Steadily advance liquefied hydrogen carrier development

Operating Environment and Strategies

For two years—fiscal 2015 and fiscal 2016—this business segment booked sizable losses, prompting business structure reforms led by the president. The basic policy driving these reforms is to maintain gas-related vessels as our main business while moving the axis of merchant ship construction from Japan to China. We have made steady progress in reducing fixed costs in Japan and increasing

our construction capacity in China. As large-scale LNG projects that had been stalled begin to firm up and various environmental regulations tighten, the market is expected to improve, and we aim to continue structural reforms.

In the merchant ship business, we will concentrate domestic construction at the Sakaide Works and reinforce base functions, such as human resource development and engineering, while promoting greater integration of operations with our Chinese joint ventures through such approaches as taking orders together and dividing construction between us. These efforts will help sharpen our cost competitiveness and improve profitability. In addition, we will pursue sales expansion of our ship operation and performance analysis support system (SOPass), which combines ship-related knowledge accumulated by Kawasaki with big data technology. In addition, we will steadily advance development of liquefied hydrogen carriers.

In the submarine business, we will reinforce our R&D framework, aiming to secure orders for next-generation submarines. At the same time, we will apply our accumulated wealth of submarine-related technologies to the development of such products as autonomous underwater vehicles (AUVs).

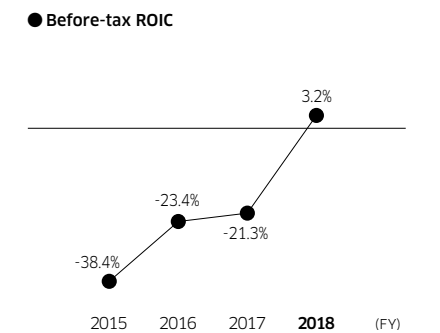
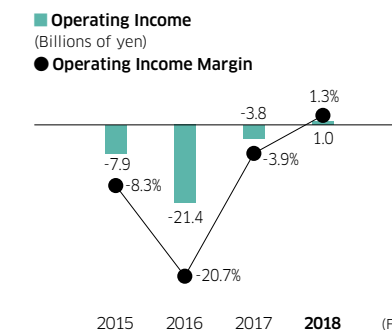
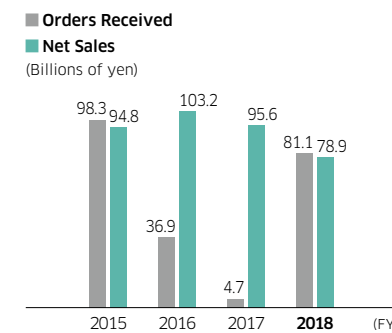


Yoshinori Mochida

President, Ship & Offshore Structure Company



LNG carrier



Initiatives to Create Social Value

The Ship & Offshore Structure Company is contributing to environmental conservation by promoting the spread of LNG-fueled ships and developing and building large hydrogen-fueled liquefied hydrogen carriers. Compared with heavy oil, the use of LNG enables substantial reductions in emissions of atmospheric pollutants, such as nitrogen oxide (NOx) and sulfur oxide (SOx). By developing and building a variety of LNG-fueled vessels, we are helping to meet NOx and SOx emissions regulations for ships to prevent air pollution over the sea. Furthermore, we are providing our LNG-fueled propulsion systems for ships constructed by other shipbuilders, and working to commercialize LNG fuel gas supply systems (FGSSs) to

promote the operation of environmentally friendly LNG-fueled vessels around the world. We are also developing high-capacity liquefied hydrogen carriers. As hydrogen emits no CO<sub>2</sub> when used as fuel, it is the ultimate in clean energy. By commercializing the world's first ships that can economically carry large volumes of hydrogen, Kawasaki will promote the spread of hydrogen energy and contribute to the realization of a CO<sub>2</sub> emission-free society. In addition, we are developing hydrogen-fueled ship propulsion systems.



Goals for the MTBP 2019	<ul style="list-style-type: none"> <li>• Complete construction of a small liquefied hydrogen carrier (pilot ship)</li> <li>• Complete the development and commercialization of FGSSs</li> <li>• Receive multiple orders for LNG-fueled ships</li> <li>• Receive orders for FGSSs</li> </ul>
Fiscal 2018 Results	<ul style="list-style-type: none"> <li>• Developed a large LNG-fueled bulk carrier in January 2019</li> <li>• Advanced construction of a small liquefied hydrogen carrier</li> </ul>



Vision

The world's most trusted rolling stock system supplier, moving and inspiring customers worldwide based on strong teamwork and the highest level of technology and quality.

Opportunities

- Continuous brisk demand for subway and commuter train systems in the North American market
- Brisk demand in emerging countries in Asia
- Firm replacement demand in the domestic market
- Expanding recurring demand, including that for components, maintenance, and repair and rebuild work across markets

Risks

- Manufacturers from emerging countries entering the North American market, sparking fierce price competition
- Country risk in new markets for Kawasaki

Core Competence

- High-tech expertise built on comprehensive heavy industry strengths
- Ability to fulfill contracts cultivated from extensive domestic and overseas track record
- Partnership capabilities with other companies in execution of overseas projects

Business Direction under MTBP 2019

- Rebuild the quality control system, pursue orders with a thorough focus on profitability, and maintain and improve non-price competitiveness, leveraging outstanding technical expertise
- Steadily fulfill large orders already received in the North American market and work to secure orders in emerging Asian countries
- Aggressively develop highly profitable recurring revenue businesses that leverage our extensive track record of orders delivered and expand revenue across the rolling stock life cycle by reinforcing our core competence

Operating Environment and Strategies

Against a backdrop of economic development in emerging countries and transport infrastructure repair and rebuild work under way in developed countries, demand for rolling stock remains strong, especially overseas. At the same time, demand in recurring revenue businesses, including components and maintenance, is expanding. However, the entry of manufacturers based in emerging countries has intensified competition, necessitating approaches to boost profitability through enhanced non-price competitiveness and business model reform.

This business recorded significant losses in fiscal 2017 and fiscal 2018. Taking this very seriously, we established the Rolling Stock Business Restructuring Committee, chaired by the president, to drastically reinforce project management and improve quality control.

Furthermore, based on a policy of putting quality before quantity, we will focus on projects in which we can demonstrate Kawasaki's superiority while expanding recurring revenue businesses in Japan, aiming to increase profitability, which has been an issue.

In the North American market, we will steadily fulfill existing orders from such customers as the New York City Department of Transportation. We will also work to build a stable revenue base by commercializing track monitoring using IoT and focusing on such businesses as components, repair and rebuild, and maintenance.

The Asian market presents huge growth potential. In this market, we will seek business expansion through such means as securing orders for projects financed by ODA loans in emerging countries in line with the Japanese government's policies of promoting exports of railway infrastructure.



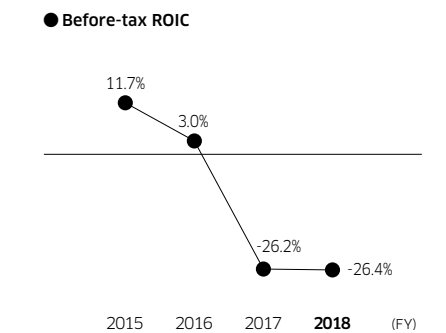
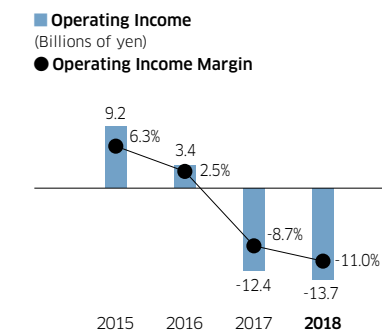
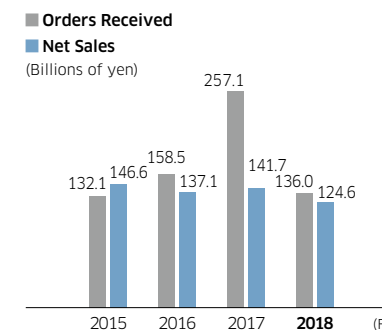
Series 2700 limited express diesel railcar for Shikoku Railway Company

Kazutoshi Honkawa

President, Rolling Stock Company



Type 6000 subway cars for the Kobe City Transportation Bureau



Initiatives to Create Social Value

The Rolling Stock Company has designated as its vision for 2030 helping to build better global transportation infrastructure by manufacturing rolling stock that is safe and comfortable to ride in, highly reliable, highly cost efficient over its life cycle, and energy saving to minimize the burden on the environment. To this end, we will promote participation in high-speed train projects at home and abroad and continue to provide rolling stock to customers in Japan, North America, and Asia while seeking to participate in projects to build new rolling stock infrastructure in emerging Asian countries. In addition, to

better meet customer needs, we will further develop monitoring technologies that combine sensing, image analysis, and IoT technologies; work to maintain and improve safety and dependability; improve train maintenance efficiency; and contribute to the realization of train systems boasting excellent cost efficiency over their entire life cycle.



Goals for the MTBP 2019	<ul style="list-style-type: none"> <li>• Execute large projects in North America (R211 cars for the New York City Subway) as planned</li> <li>• Execute projects financed by ODA loans in Asia (Dhaka Metro MRT Line-6 in Bangladesh) as planned</li> <li>• Expand stock businesses to improve customer maintenance efficiency and maintain safe, dependable transportation</li> <li>• Launch sales of components that leverage sensing and image analysis technologies and roll out component and service businesses aimed at improving maintenance efficiency</li> </ul>
Fiscal 2018 Results	<ul style="list-style-type: none"> <li>• Rolling stock units delivered: 474</li> <li>• Conducted tests with railway companies aimed at launching sales of components that leverage sensing and image analysis technologies</li> </ul>



Vision

Guided by the “Kawasaki, working as one” philosophy, continue to grow as a manufacturer with primary focus on high-value-added domains in the power sports and general-purpose engine markets.

Opportunities

- Motorcycles
  - Medium- to long-term market expansion in emerging countries
  - Stable demand in developed countries and progress in the development of IoT applications, advanced safety features and other technologies
- Utility vehicles
  - Expanding market in North America
- General-purpose gasoline engines
  - Firm growth, reflecting U.S. housing market expansion

Risks

- Motorcycles
  - Intensifying price competition in emerging markets
  - Tightening environmental regulations
- Utility vehicles
  - Intensifying price competition
  - Rising materials prices and tariffs due to escalating U.S.-China trade friction

Core Competence

- Strong, clearly differentiated brands, such as *Ninja* and *Z*
- World-leading product development expertise
- Technological capabilities to develop and produce high-performance, high-quality products
- Global production, sales, and service structure

Business Direction under MTBP 2019

- Increase product competitiveness by introducing new models and expanding the model lineup
- Improve profit margins by raising sales prices and cutting costs and control growth in fixed costs, especially R&D expenses
- Promote inventory adjustment and other measures to increase free cash flows

Operating Environment and Strategies

Markets in developed countries, especially for motorcycles in Europe and utility vehicles in the United States, are expected to continue to see stable growth, while strong medium- and long-term growth is expected in emerging markets. However, conditions are growing more challenging, as raw materials costs and tariffs increase, reflecting U.S.-China trade tensions, and new manufacturers in emerging countries enter markets. As such, Kawasaki needs to improve its productivity.

In this environment, we will anticipate the needs of customers and draw on world-class product development expertise and our strong, highly differentiated brands, such as *Ninja* and *Z*, to quickly bring attractive, highly competitive models to market. At the same, we will work to establish Kawasaki as a high-end brand through such means as customer relationship management. Furthermore, we will implement initiatives aimed at establishing and strengthening systems to control and streamline our global management resources from the perspective of overall optimization. By implementing this and other strategies, we will strengthen our financial platform (increase the operating income margin and free cash flow).

Initiatives to Create Social Value

The Motorcycle & Engine Company has designated as its vision for 2030 developing, manufacturing and delivering environmentally friendly motorcycles, as well as models with “fun-to-ride” appeal and advanced rider-support features. To realize this vision, in line with the philosophy that drives product development at Kawasaki, the concepts of “Fun to Ride,” “Ease of Riding,” and “Better Environmental Performance,” we are working to improve motorcycle performance, enhance rider-support features,

MULE PRO-MX



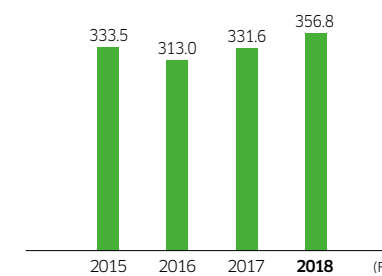
Yuji Horiuchi

President, Motorcycle & Engine Company

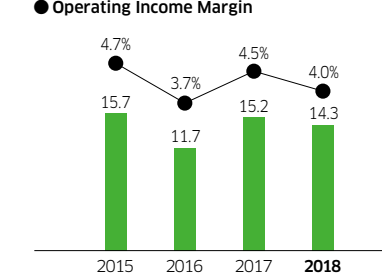


Ninja ZX-10RR Note: The unit pictured is a racing model

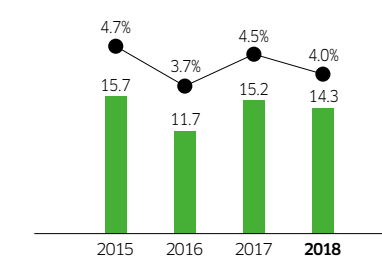
Net Sales (Billions of yen)



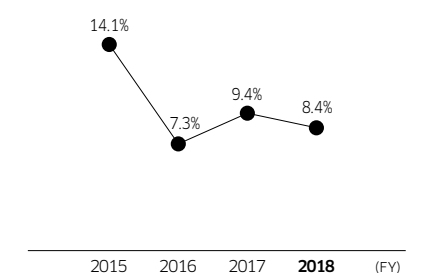
Operating Income (Billions of yen)



Operating Income Margin



Before-tax ROIC



and respond to tougher exhaust gas, noise, and other environmental regulations. With regard to C-ITS\* functions, Kawasaki has joined the Connected Motorcycle Consortium, established by the motorcycle industry to focus on development, and aims to put C-ITS-compliant motorcycles on the market as soon as possible. In electric motorcycles, hybrid motorcycles, and other motorcycles powered by clean energy, we are building and evaluating

the performance of prototypes with an eye to future business development.

\* C-ITS: Cooperative Intelligent Transport Systems



<p><b>Goals for the MTBP 2019</b></p> <ul style="list-style-type: none"> <li>Realize comfortable and convenient transportation by launching connected motorcycles with data transmission functions and help users ride with confidence by adopting rider support functions</li> <li>Clear the EU's strict emissions regulations and other environmental regulations around the world</li> <li>Every fiscal year, achieve at least a 1.5% average increase in WMTC* fuel economy on new models over the previous models</li> </ul> <p>* WMTC: Worldwide-harmonized Motorcycle Test Cycle</p>
<p><b>Fiscal 2018 Results</b></p> <ul style="list-style-type: none"> <li>Ninja H2 SX: Achieved excellent fuel economy and low emission levels with world-class engine performance</li> <li>Versys 1000: Achieved smoother power delivery with a new electronic throttle control system. Cleared the EU's Euro5 exhaust gas standard. A new electronic cruise control maintains the selected speed with the push of a button, helping reduce rider fatigue and increase enjoyment on long rides.</li> <li>2019MY Ninja H2 SX SE+ and Versys 1000 SE: Realized smartphone connectivity. The “RIDEOLGY THE APP” enables users to set their riding mode and receive alerts of incoming calls or messages on the motorcycle's LCD display for more pleasant riding.</li> </ul>



Vision

The world's top brand in motion control, creating and providing total solutions for providers of medical and healthcare services as well as for industry, including automobiles, construction machinery, and electronic equipment, with a focus on hydraulic components and robots boasting a level of performance and quality far surpassing that of any rival.

Opportunities

- Hydraulic machinery**
  - Expanding demand due to world-wide infrastructure building, mainly in emerging countries
- Robots**
  - Increasing fields of application through the realization of collaboration with humans in working operations
  - Rising demand aimed at eliminating labor shortages and improving quality
  - Progress in use of robots beyond industrial applications (such as medical treatment and nursing care)

Risks

- Hydraulic machinery**
  - Shift to in-house production of hydraulic machinery by construction machinery manufacturers and market entry of manufacturers from emerging countries
  - Rapid cooling of the Chinese construction equipment market
  - Delayed recovery in the marine hydraulic equipment market due to sluggish conditions in the ship-building industry, and intensifying price competition
- Robots**
  - Increasingly fierce price competition with rival companies
  - Prolonged stagnation in semiconductor markets

Core Competence

- Hydraulic machinery**
  - Accumulated world-class, leading-edge technology, systemization capabilities and brand power for excavator hydraulic machinery
  - Ability to respond to customer requests
- Robots**
  - Ability to develop applications and make system proposals matched to diverse customer requirements
  - Global service structure
- Shared**
  - New product development capabilities in the field of motion control based on the integration of hydraulic technologies and robotics

Business Direction under MTBP 2019

- Hydraulic machinery**
  - Maintain and expand high share of excavator market, pursue sales expansion in construction and agricultural machinery sectors, and advance product and market development with an awareness of mega-trends
- Robots**
  - Existing customer sectors: Increase market share by expanding the scope of applications for the automotive industry, line building operations, and sales in the human-robot collaborative product field
  - New customer sectors: Integrate robotics with IoT/AI technologies to establish new businesses, develop products based on synergies with hydraulic technologies, and launch and expand sales of robotically assisted surgical devices

Operating Environment and Strategies

Sales of hydraulic machinery for the construction equipment market are expected to steadily grow over the medium and long terms in line with growing infrastructure development, mainly in emerging countries, even if market conditions change in the short term.

Kawasaki is the leader of the global market for excavator-use hydraulic machinery. Going forward, we will maintain and expand our market share by leveraging world-class, leading-edge technology, the ability to turn such technology into systems, our brand strength, and responsiveness to customer needs. We will also actively explore promising new businesses, such as construction and agricultural machinery beyond excavators, to realize further growth and improve stability in segment performance.

In the industrial robot business, we expect demand in existing customer sectors to continue expanding to offset labor shortages and achieve higher quality. We also predict that robots will be used in a wider range of applications, including in collaboration with humans in work operations as well as in medical treatment and nursing care.

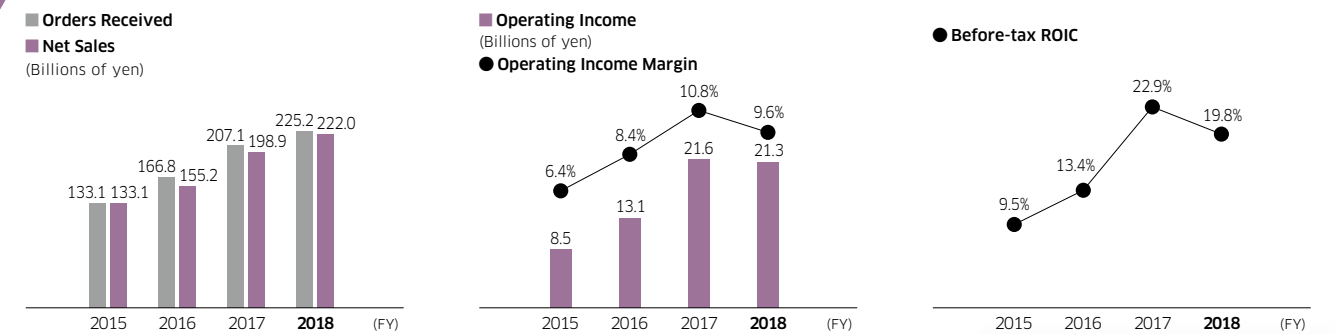
In existing customer sectors, we will expand applications for automakers, create products for EV and HV manufacturing, expand line building operations, and expand sales of *duAro*, a robot designed to collaborate with humans in work operations. In addition, we will expand sales and market share by providing solutions that draw on the Group's experience accumulated through robot development for a wide range of applications within the

Yasuhiko Hashimoto

President, Precision Machinery & Robot Company



BX300 spot welding robot



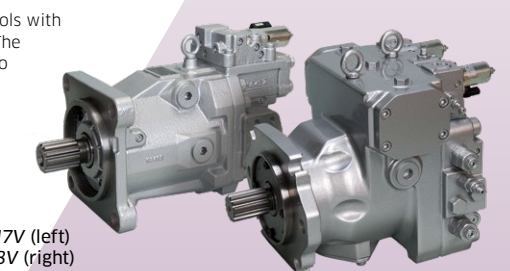
Kawasaki Group and by enhancing the sales and service structure. In new customer sectors, we aim to establish new business fields by integrating robotics with IoT/AI, as with *Successor*,\* and to commercialize the robotically assisted surgical devices currently in development at Medicaroid, a joint venture with Sysmex Corporation.

We will continue to pursue synergy by integrating hydraulic machinery and robot production and developing new products combining the technologies of each. By doing so, we will reinforce the businesses of the Precision Machinery & Robot Company as a whole.

\* *Successor*: Technology in which expert engineers use remote controls with kinesthetic feedback to safely operate robots and perform tasks. The robots memorize these movements, which they can then convey to the next generation of operators. Using AI to learn from recorded inputs, the system can also generate automated operational programs.



duAro collaborative Dual-Arm SCARA Robot



Hydraulic motor M7V (left)  
Hydraulic pump K8V (right)



Hydraulic pump for construction machinery

## Initiatives to Create Social Value

### Precision Machinery Business Division

The Precision Machinery Business Division has designated the following as its vision for 2030.

- Make Kawasaki hydraulic machinery and systems the global standard by expanding sales to customers around the world and achieve stable production and supply
- Support the development of next-generation of human- and environment-friendly construction machinery through Kawasaki products to contribute to the improvement of infrastructure, mainly in emerging countries
- Promote the development and sale of energy-saving products, hydrogen-oriented products and renewable energy-oriented products to contribute to the reduction of environmental burden
- Combine new technologies, such as ICT, IoT and AI, with Kawasaki's robot technology and hydraulic control technology to create new value

To achieve this vision, we are working to establish systems for stable production and supply and advancing R&D into hydraulics systems aimed at creating ICT-linked, automated and unmanned next-generation construction machinery for customers while advancing product development and sales in the pursuit of full-scale entry into agricultural machinery and industrial vehicle sectors. In addition, following the adoption of our high-pressure hydrogen regulator by a European automaker, we have commenced primary mass-production and are now advancing development toward secondary mass-production. Also of note, total sales of Eco-Servo, an energy-saving and low-noise hydraulic hybrid system, have reached 4,000 units, and we are working on a compact electro-hydraulic actuator for humanoid robots, as well.



<b>Goals for the MTBP 2019</b>	<ul style="list-style-type: none"> <li>• Establish production sites and stable supply systems that are globally optimized in terms of cost, quality and delivery time and further expand sales in the construction, agricultural, manufacturing and marine machinery fields in order to make Kawasaki products the global standard by supplying our hydraulic machinery and systems to customers around the world.</li> <li>• Establish firm foundations in new businesses, such as high-pressure hydrogen regulators for automobiles and fields based on synergies with the robot business</li> <li>• Hydraulic machinery production and delivery volume: 940,000 units</li> </ul>
<b>Fiscal 2018 Results</b>	<ul style="list-style-type: none"> <li>• Hydraulic machinery production and delivery volume: 720,000 units</li> </ul>

### Robot Business Division

The Robot Business Division has designated as its vision for 2030 improving access to high-quality medical care through the development of medical robots in developed countries facing demographic graying as well as using robot technology to support medical supplies production, nursing and medical care and the development of therapies and treatments that reduce the physical burden on patients while developing and manufacturing robots that collaborate with humans in work operations and making them intelligent enough to help address labor shortages, mainly in developed countries. To achieve this vision, we have

positioned medical robots as a business that will support aging societies and established Medicaroid Corporation—a joint venture with Sysmex Corporation—through which we are developing robotically assisted surgical devices and applied robots using industrial robot technology with the goal of creating new businesses. We also seek to promote collaboration with humans in work operations, focusing mainly on *duAro*—our Dual-Arm SCARA Robot—to cultivate demand for greater automation at manufacturing sites.



<b>Goals for the MTBP 2019</b>	<ul style="list-style-type: none"> <li>• Increase our market share with existing automotive sector customers, reinforce proposition capabilities for line building solutions, expand sales channels for general production equipment in China, expand sales of robots for use in collaborative work with humans, and introduce robotically assisted surgical devices in the medical field</li> <li>• Promote the integration of IoT, AI and robotics technologies and the development of products based on synergies with hydraulics technologies</li> <li>• Robots delivered: 40,000</li> </ul>
<b>Fiscal 2018 Results</b>	<ul style="list-style-type: none"> <li>• Robots delivered: 20,000</li> </ul>