

## New Robot System, "Successor," Launched

Kawasaki recently launched "Successor," a new robot system that reproduces the movements of skilled technicians through remote collaboration. Kawasaki will first introduce the system in the robot manufacturing line at our Nishi-Kobe Works and begin limited sales to some of our customers in FY2018, and will begin general sales in FY2019.

"Successor" is a system equipped with a newly-developed remote control device that enables remote communication and collaboration between humans and robots.



The system is compatible with a wide range of Kawasaki robots.

By means of a remote device, the system can take movements performed by skilled technicians and convert them into automated operations performed by a robot. Also, artificial intelligence enables the robot to learn recurring functions and achieve precise reproduction of movements. As a result, the possibility of applying robotics to fields such as those below, in which robotization has been difficult thus far, is now open:

1. Fields in which dependence on human skills is heavy (e.g., product assembly and outfitting), or variations in product uniformity are so significant (e.g., die-cast products and pressed parts) that the involvement of human expertise is necessary in order to complete the manufacturing process.

2. Fields in which many sensors must be used, or where whole lines and plants must be modified in order to achieve automation, or where programming will take too much time and not make up for the cost and time.

3. Fields pertaining to non-mass-produced products, such as made-to-order products and individual parts, in which product shapes differ slightly and product models are changed frequently.

Furthermore, the system can take movements that expert workers have enabled the robot to learn, and pass them on to newcomers as skills through a feedback system that can reproduce tactile sensations, force sensations, visual sensations, auditory sensations, etc.

## First Order Received for "SOPass"

Recently, Kawasaki received the first-ever order for their Ship Operation and Performance analysis support system (SOPass) from Mitsui & Co., Ltd. SOPass is a newly developed system that makes use of big data technologies, and this first system will be installed on a liquefied natural gas (LNG) carrier built by Kawasaki and chartered by Mitsui.

In addition to the inclusion of new cloud-server features and machine learning, SOPass improves upon and integrates the functions of existing systems, including the Kawasaki-Integrated Maritime Solutions comprehensive ship information system, which provides information regarding optimal routes for standard cargo vessels, and the LNGC-NEO<sup>1</sup> and LNGC-ISS<sup>2</sup> ship operation control support systems, which are designed specifically for LNG carriers and enable fuel consumption analysis. SOPass also includes newly developed LNG cargo management optimization functions – the first of their kind in the industry – intended for use in LNG carriers.

Installing SOPass, which can be used on a wide variety of vessels, enables optimal route proposals and visual representation of cargo and engine area operating conditions for more economical and safer ship operations.



<sup>1</sup> LNG Carrier Satellite Network Observation  
<sup>2</sup> LNG Carrier Integrated Solution Support

## Four 2018 Models Exhibited in Milan

Kawasaki showcased four new models at EICMA<sup>1</sup> 2017, which was held in the suburbs of Milan, Italy, in November. Models shown included the Ninja H2 SX, Ninja H2 SX SE, Ninja ZX-10R SE, and Z900RS CAFE, all developed for the European market.

The Ninja H2 SX high-performance sports touring model and the high-grade model Ninja H2 SX SE both come equipped with supercharged engines. These are the newest additions to the Ninja H2 series, which includes the popular Ninja H2 and Ninja H2R models – recipients of widespread praise thanks to stunning performances. In addition to high engine output and powerful acceleration, both models are easy to ride and boast superb fuel efficiency thanks to the use of a

next-generation Balanced Supercharged Engine, making for a more impressive touring performance.

The Ninja ZX-10R SE supersport model, a high-grade version of the Ninja ZX-10R, was designed to achieve performances similar to that of the Ninja ZX-10R/ZX-10RR. Jonathan Rea won the Superbike World Championship<sup>2</sup> three years running, from 2015 to 2017, with these models. Toward this end, designers have equipped the Ninja ZX-10R SE with highly advanced electronic suspension, enabling both race-circuit performance and an extremely high degree of user comfort.

The Z900RS CAFE, a variation on the Z900RS retro sports bike, carries on the traditions of Kawasaki's historic Z1 model. Incorporating

the Z900RS's classical styling and excellent driving performance, the Z900RS CAFE is designed with sportier, cafe racer<sup>3</sup> specs and includes a front cowl, lowered handlebar positioning, and a unique seat design.

Kawasaki plans to release the Ninja H2 SX, Ninja H2 SX SE, and Z900RS CAFE in Japan, and the Ninja ZX-10R SE overseas.

<sup>1</sup> One of Europe's biggest motorcycle shows. EICMA stands for Esposizione Internazionale Ciclo Motociclo e Accessori.  
<sup>2</sup> A world-famous road race using modified factory-production motorcycles.  
<sup>3</sup> A type of customized motorcycle. In the 1960s, young British motorcycle enthusiasts would gather at cafes and customize their bikes for greater speed, hence the term "cafe racer." This type of bike is usually characterized by features such as low handlebar positioning, the inclusion of only a single seat, and a front cowl.



## Kawasaki Commences Sales of M5A Gas Turbines

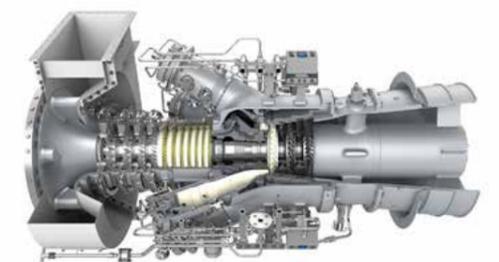
Kawasaki has completed development of the 5 MW class M5A gas turbine, a fully made-in-Japan product offering ultra-high efficiency. The company launched sales of this product both in Japan and overseas in November.

The M5A offers 32.6% generating efficiency, the world's highest among 5 MW models, and the PUC50D cogeneration system using the M5A enables 84.5% combined generating efficiency – the highest in its class. This high combined efficiency helps cut energy costs and reduce CO<sub>2</sub> emissions. In the area of environmental performance, use of the latest dry low emission (DLE) technology has enabled the

achievement of 52.5 ppm (0% for O<sub>2</sub>) nitrogen oxide (NO<sub>x</sub>) emission volumes. In terms of maintenance, Kawasaki has designed the M5A to facilitate more efficient overhaul and replacement operations and enable simplified interim inspections (borescope inspections), which help improve annual operating rates (uptime).

The M5A represents the crystallization of Kawasaki's small and medium-size industrial-use gas turbine development technologies cultivated over the years. The integration of leading-edge technologies, based on the company's experience in developing

power-generation gas turbines that boast a track record of more than 11,000 units delivered to customers around the globe, makes for a highly reliable product from the user's perspective.



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