

World's first Liquefied Hydrogen Carrier *SUIISO FRONTIER* Launched



On December 11, 2019, Kawasaki held a ceremony marking the naming and launch at Kobe Works of the *SUIISO FRONTIER* (Kawasaki hull No. 1740), the world's first liquefied hydrogen carrier.

This vessel was developed to provide a means of transporting liquefied hydrogen at 1/800 of its original gas-state volume, cooled to -253°C , safely and in large quantities over long distances by sea. Kawasaki plans to install a 1,250 m³ vacuum-insulated,

double-shell-structure liquefied hydrogen storage tank, currently being manufactured at Harima Works, on the ship and complete the vessel's construction by late 2020. Once complete, the *SUIISO FRONTIER* will be used for technology demonstration testing in Japanese FY 2020 aimed at the establishment of an international hydrogen energy supply chain* in which liquefied hydrogen produced in Australia will be shipped to Japan.



* Planned implementation as part of New Energy and Industrial Technology Development Organization's Demonstration Project for Establishment of Mass Hydrogen Marine Transportation Supply Chain Derived from Unused Brown Coal.

Supply chain demonstration framework

Kawasaki Exhibited 12 Models at the Tokyo Motor Show, Including 3 World-Premiere Models, Along with the Victorious Machine from the Suzuka 8 Hours Race

At the 46th Tokyo Motor Show 2019, Kawasaki exhibited 12 models, including three world-premiere models (the Z H2, Ninja ZX-25R, and W800), and the Ninja ZX-10RR race machine that proved victorious at this year's Suzuka 8 Hours Endurance Road Race. The Tokyo Motor Show was held at Tokyo Big Site and the neighboring Odaiba area, and was open to the public for 11 days from October 25.



Z H2 (Reference Model)

The new Z H2 proudly takes its place as the flagship of Kawasaki's Z Supernaked series. Offering high power and intense acceleration, complemented by everyday versatility and superb fuel economy, the 998 cm³ liquid-cooled 4-stroke inline-four balanced supercharged engine features performance settings specific to the Z H2 to ensure smooth acceleration at low-mid rpm.



Ninja ZX-25R (Reference Model)

Introducing the Ninja ZX-25R, an all-new 250cc supersport model powered by a brand new inline-four engine - the only one in its class as of October 2019. The smooth-revving 249 cm³ liquid-cooled DOHC 16-valve inline-four offers both robust low-mid range torque and strong high-rpm power.



W800

The new W800 is a retro model with strong links to Kawasaki's original big bike, the 1966 650-W1, the first model of the W brand, and the machine that first gained Kawasaki recognition as a manufacturer of large-displacement motorcycles.

Kawasaki Establishes Satellite Ground Station to Pursue Space Debris Removal Operations

Kawasaki established a satellite ground station at its Gifu Works facility, to be used in the operation of space debris removal satellites. The ground station will be used for sending commands to and receiving data from a space debris removal demonstration satellite, planned for launch in FY 2020, and to be used in demonstration tests. In addition, Kawasaki will utilize the ground station in efforts aimed at the company's entry into the satellite data services field, with activities including sending and receiving data in coordination with satellites manufactured by other companies, and analysis and provision of satellite data.

The ground station comprises a satellite data sending/receiving antenna 3.7 meters

in diameter and a telemetry room (control room). The antenna features a hexapodal structure with movements driven by six extendable jacks. It provides easy continuous orbital tracking toward the zenith (straight upward) and can send and receive transmissions at S-band frequencies and also receive transmissions at X-band frequencies. Furthermore, it boasts automatic tracking functionality which detects radio wave direction to accurately track satellite position.

In addition to the operations of space debris removal demonstration satellite, Kawasaki hopes

to pursue novel satellite data usage business operations by utilizing the satellite ground station to provide analytical results from various types of satellite data to users and pursuing optimal coordination with existing Kawasaki business operations.



Model of the demonstration satellite (left), satellite ground station antenna (right).

Kawasaki to Release Successor[®]-G Remotely-operated Robotic System for Grinding, Deburring and Surface Finishing

In April, Kawasaki will release its Successor[®]-G remotely operated robotic grinding system, which can be used in grinding for welded structures, and deburring and surface finishing for cast products.

Based on the Successor[®] robotic system developed by Kawasaki's Robot Business Center, which was designed to re-create the movements of experienced engineers utilizing coordinated, remotely-controlled operations, the Successor[®]-G harnesses the technological synergy attained by combining the Energy System & Plant Engineering Company's knowledge on production of large structures with the Corporate Technology Division's software. This enables remote operations for various tasks, and in the future a tracing feature that mimics and repeats worker movements and an automated assessment capability based on image processing for product finishes will also be added. Other enhancements scheduled for

the system include an ability to carry out three-dimensional measurements and provide numeric representations of finished-surface variations (roughness) in order to automatically generate operation data, thus contributing toward more sophisticated automatic assessment of surface finishes.

Grinding, deburring and surface-finishing operations require the use of protective clothing and equipment, steadying of heavy grinder equipment while carrying out tasks, and working in physically challenging environments with large amounts of dust and sparks as well as handling dangerous, high-speed rotating blades. In consideration of these conditions, worker shortages are anticipated in the coming years, resulting in a growing demand for labor saving solutions, automation and safety measures. However, because the skills of

human workers are needed to handle variations among products in grinding, deburring and surface-finishing operations, the achievement of automation over a short time span is inhibited by numerous challenges. In addition, when work is carried out manually by human personnel, the final-product quality varies according to skill levels.

The Successor[®]-G re-creates the movements of veteran workers via remote operation to achieve automation, thus contributing to better work environments for employees and consistent product quality.



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