

## First U.S. Aerostructures Assembly Line to be Established

Kawasaki will establish an assembly line for the cargo doors of Boeing's state-of-the-art commercial airplane, the 777X, at Kawasaki Motors Manufacturing Corp., U.S.A. (KMM), which is Kawasaki's U.S. local subsidiary located in Lincoln, Nebraska. This is the first time for Kawasaki to establish an aerostructures production line in the U.S. The necessary equipment is scheduled for installation in the work area of about 2,800 square meters in the existing building prior to March 2017, so that the factory can start operation from May 2017.

The 777X is the newest member of Boeing's

bestselling 777 family, the market-leading twin-engined large passenger airplane. Production is set to begin in 2017, with the first delivery targeted for 2020.

Kawasaki is engaging in the development and manufacturing of forward and mid fuselage panels, main landing gear wells, pressure bulkheads and cargo doors for the 777X. For the assembly work of the cargo door at the Lincoln factory, Kawasaki will use an automatic riveter and a painting robot developed in-house to enhance the automation and speed of production and ensure high quality, thereby increasing the

efficiency in production.

The Lincoln factory began its operation with the production of motorcycles in 1974, as a factory of Kawasaki Motors Corp., U.S.A. (and thereafter came under the control of KMM in 1981, when KMM was founded). The factory currently produces, among others, all-terrain vehicles, the Jet Ski<sup>\*1</sup> personal watercraft, and railway vehicles. The factory has introduced the Kawasaki Production Systems (KPS)<sup>\*2</sup>, Kawasaki's original production systems developed through mass-production activities over many years. It will extend these systems to the production of aerostructures as well.



KMM Lincoln factory



Cargo door for the Boeing 777

<sup>\*1</sup> Jet Ski is a registered trademark of Kawasaki.

<sup>\*2</sup> Based on the Just In Time Systems, these systems use Kawasaki's proprietary logical production management techniques, which were developed and tested in-house by applying them on production lines, and which can be implemented in any production line, regardless of whether it is a mass-production or single-production line.

## Medicaroid Corporation's U.S. Subsidiary Commences Operations in Silicon Valley

Medicaroid Corporation, a joint venture between Kawasaki and Sysmex Corporation, has established a subsidiary called MEDICAROID, INC. in San Jose, U.S.A. MEDICAROID, INC., which commenced operations in January 2016, will cooperate with Medicaroid in medical robot technology development, marketing activities and regulatory affairs for approval by the U.S. Food and Drug Administration (FDA), with the aim of expanding business going forward.

The scope of application robotic-assisted

surgery, which was first introduced in the 1990s in the United States, is expanding rapidly as a type of minimum-invasive treatment, as various instances of clinical research and studies have shown evidence of its safety and efficacy. In Japan, medical robots were approved as authorized medical devices in 2009 and have begun to be applied in surgical treatment for prostate cancer and other diseases.

The United States is the world's largest market for medical robots, accounting for approximately half of the total. The region

around the Bay Area of San Jose, known as Silicon Valley, is a leading area for medical robot technology, being home to distinguished IT companies, universities, medical institutes and medical robot companies.

Through MEDICAROID, INC.'s operation in this leading-edge environment, Medicaroid will develop the U.S. market for made-in-Japan medical robots utilizing the R&D and manufacturing capabilities of Kawasaki and Sysmex, thereby contributing to the advancement of medicine.

## Joint Research for Development of Algorithms for Autonomous Underwater Vehicles

Kawasaki has signed an agreement for a joint research program with Heriot-Watt University, U.K. for the development of algorithms for autonomous underwater vehicles (AUV) which will be utilized in offshore oil & gas fields. The project has already started in September 2015 and will continue for four years.

Kawasaki has been developing state-of-the-art underwater technologies, and employing specialist know-how, it is now developing leading key technologies for AUV operation. The offshore oil & gas industry is targeted as the initial market, particularly to address the demand for maintenance work on subsea pipelines laid on the seabed.

Through this joint research program, Kawasaki and Heriot-Watt University will develop, test and verify algorithms for position specification of target objects so that an AUV can autonomously locate and track pipelines underwater. Specifically, an AUV equipped with these algorithms is expected to track along a subsea pipeline at close range, including buried and invisible sections, using data from multiple sensors.

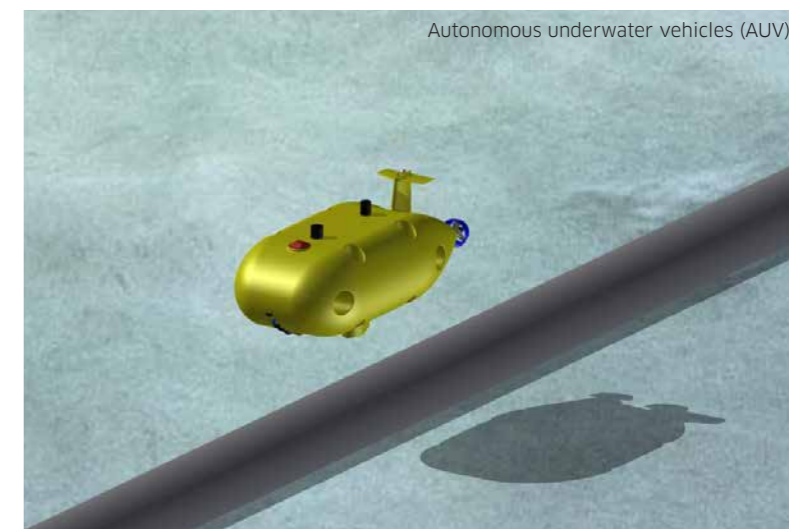
Kawasaki's partner, the Ocean Systems Laboratory\*, Heriot-Watt University, is well-known as a leading organization for research and development of new technologies in the offshore field, and it has

expertise in control and autonomy of underwater vehicles for both offshore oil & gas and renewable-energy applications.

The know-how of Heriot-Watt University to develop tracking algorithms will be backed up with Kawasaki's abundant on-site experience at offshore fields and technologies for manufacturing the vehicles, as well as programming the control method for auto-docking. Through these technologies, Kawasaki will make progress in the research and

development of leading-edge AUVs.

This joint research program will continue until August 2019, after which Kawasaki will build a demonstration model of an AUV incorporating the above algorithms. The AUV will be used to carry out final verification tests in a real subsea environment in the North Sea or elsewhere in 2020, with the aim of bringing a production model to the market in due course.



Autonomous underwater vehicles (AUV)

\* The Ocean Systems Laboratory is a key laboratory within the Edinburgh Centre for Robotics, which is a £35M joint venture between Heriot-Watt University and the University of Edinburgh, supported by EPSRC (The Engineering and Physical Sciences Research Council), Industry and the Universities. It is a multidisciplinary science and engineering research laboratory that innovates, applies and teaches world-class advances in autonomous systems, sensor modeling/processing, and underwater acoustic system theory/design for offshore, marine science, renewable energy and security applications.

## Named a Thomson Reuters Top 100 Global Innovator in 2015



The Top 100 Global Innovators list is compiled by the global information services firm Thomson Reuters Corporation. Based on their patent data, the company selects 100 innovative corporations and institutions through analysis of each candidate's intellectual properties and patent-related activities. The Top 100 Global Innovators list was first released in 2011, and 2015 marked its fifth publication.

This year's top innovators were chosen based on four selection criteria: overall patent volume, patent grant success rate (ratio of patents approved to patent applications submitted), global reach of the portfolio, and patent influence as evidenced by citations. Kawasaki was selected due in large part to its high marks in the patent grant success rate and global reach of the portfolio categories.

Joji Iki, Senior Executive Vice President (left) and Yoshiko Tanahashi, Vice President, Japan Sales, IP & Science, Thomson Reuters (right).