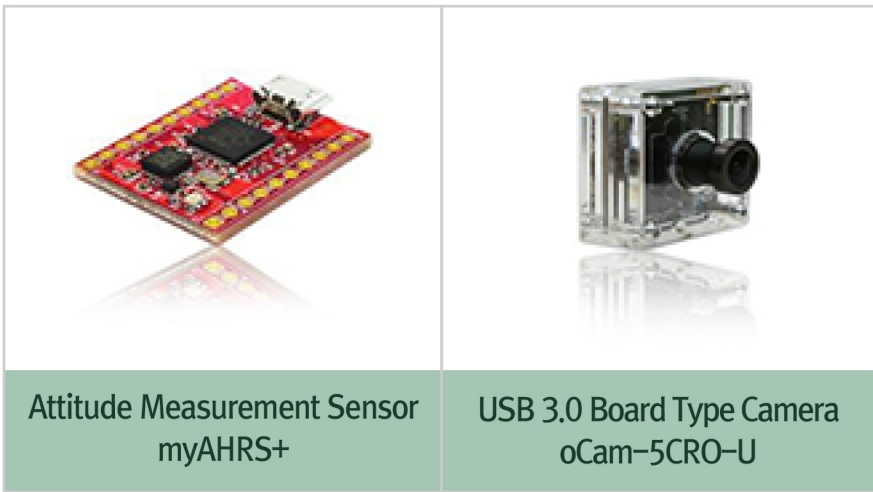


K-ROBOT NEWSLETTER

KOREA INSTITUTE FOR ROBOT INDUSTRY ADVANCEMENT

WITHROBOT Co., Ltd



Attitude Measurement Sensor
myAHRs+

USB 3.0 Board Type Camera
oCam-5CRO-U

WITHROBOT Co., Ltd is the company who supplies an image processing and an embedded system, which are mounted on robots. The company has been supplying various core parts of a solar wafer post process vision examination system, a MEMS base smart attitude measurement sensor, a micro-controller for embedded system including a vision system camera that is used by a connection to ports.

www.withrobot.com

ROBOTIS Co., Ltd



DYNAMIXEL X

Released Smart Actuator 'DYNAMIXEL X'

The newly presented 'DYNAMIXEL X' series is the product of 'MX' series mounted with touchless magnetic encoder, which series was announced in 2012. It is a successor of 'DYNAMIXEL Pro' mounted with a cycloid decelerator that was announced in 2014. It is expected to bring a new innovative wind to the smart actuator market.

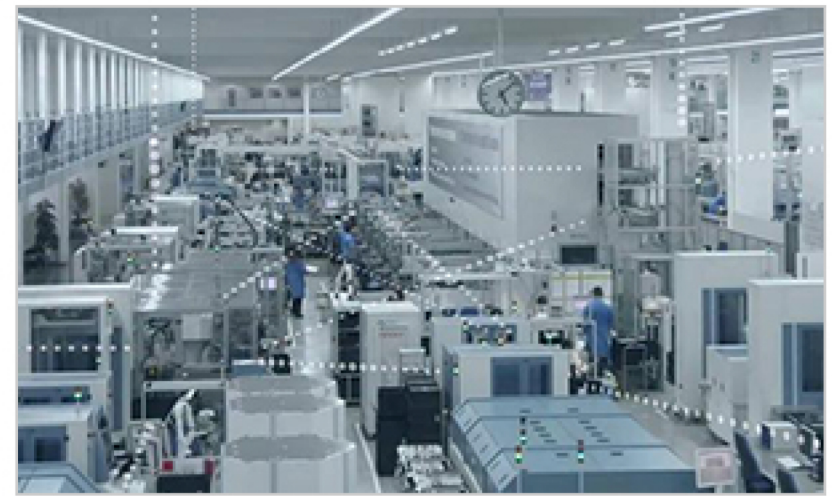
www.robotis.com

2016 Market Creation Type Robot Parts Supply Project



With an effort to continuously develop a technology in domestic robot industry, an international competitiveness of robot industry has increased higher. Yet such limitation has been pointed out that domestic robot industry highly depends upon overseas core robot parts. Without the technology independency and import substitute of core robot parts, it is difficult to dream of the advancement to a

2016 Completed Selection of Fair Innovation Support Project for Robot Utilizing Small & Medium Manufacturers



This year, the government will conduct a support project of a robot engineering consulting service, a robot system installation and a robot utilization education targeting small & medium manufacturers who will engage in the innovation of production process by utilizing robots. Through this, small & medium manufacturers have a strategy that will actively introduce robots to increase their competitiveness, and...

Status of Korea Robot Exhibition [ROBOUNIVERSE PHOTOS]



WITHROBOT Co., Ltd

ROBOTIS Co., Ltd

2016 Market Creation Type Robot Parts Supply Project

2016 Completed Selection of Fair Innovation Support Project for Robot Utilizing Small & Medium Manufacturers

WITHROBOT Co., Ltd

myAHRS+ (My Attitude Heading Reference System plus)

oCAM (USB 3.0 Board Type Camera)

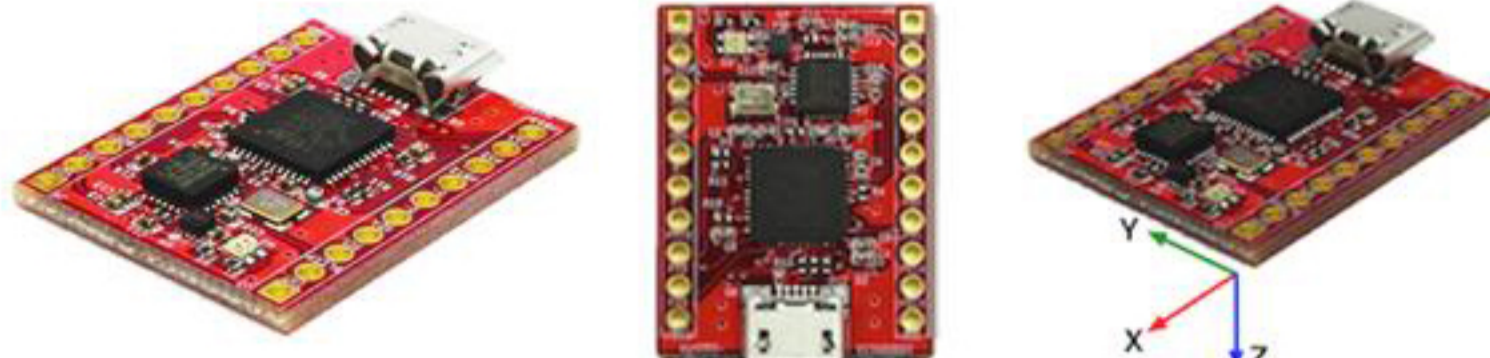


WITHROBOT Co., Ltd is the company who supplies an image processing and an embedded system, which are mounted on robots. The company has been supplying various core parts of a solar wafer post process vision examination system, a MEMS base smart attitude measurement sensor, a micro-controller for embedded system including a vision system camera that is used by a connection to ports.

Recently, WITHROBOT Co., Ltd has started a full-scale global marketing by releasing an attitude measurement sensor of robot's core part, 'myAHRS+(My Attitude Heading Reference System plus)' and a USB 3.0 support board-type camera, 'oCAM'.

'Attitude Measurement Sensor myAHRS+'

myAHRS+ can measure the attitude of robot or drone (roll, pitch, yaw) in three dimensional space by using triple axis acceleration sensor, tripe axis gyroscope sensor, and magnetometer sensor and integrating output of each sensor. The myAHRS+ sensor has been mounted with an algorithm that can integrate measured values out of each sensor in a small size ARM processor. It has been integrated to a small size board with 21mm L x 27mm W. The sensor has a merit to be used for easy connection to PC by supporting USB and i2c interface.



When this sensor is mounted on a humanoid robot, it is available to understand the attitude and position of robot in three dimensional space. It can be installed not only in robot but also in vehicle or drone and utilized for a precision measurement of position. The sensor not only supplies a driver for the open source type ROS (Robot Operating System) but also provides a technical support. It seems that the sensor shall be beneficial to companies or developers who develop programs utilizing ROS. WITHROBOT Co., Ltd has revealed its excellent performance compared to the prices of competitive companies of 'Razor IMU' and 'XSense MTi30-AHRS'. The company has developed a sensor data filter and an integrated algorithm with its own technical skill.

	Our Product	Competitor's Product 1	Competitor's Product 2
Model	 +Details myAHRS+	 +Details Razor IMU	 +Details XSense MTi30-AHRS
Price	\$75	\$74.95	\$2,000
Sensors	Triple axis 16-bit gyroscope : ± 2000 dps Triple axis 16-bit accelerometer : ± 16 g Triple axis 13-bit magnetometer : ± 1200 iT	Triple axis 16-bit gyroscope : ± 2000 dps Triple axis 13-bit accelerometer : ± 16 g Triple axis 12-bit magnetometer : ±8000 uT	Not disclosed, Gyro bias: 18degree/h Accelerometer bias: 40ug Magnetometer noise density: 200uG/root Hz
Output Rate	100 Hz	50Hz ~ 100Hz	10KHz
Output Data	Attitude : Euler angle, Quaternion Sensor Data: acceleration, rotation rate, magnetic field	Attitude : Euler angle, Quaternion Sensor Data: acceleration, rotation rate, magnetic field	Attitude : Euler angle, Quaternion Sensor Data: acceleration, rotation rate, magnetic field
Connectivity	USB : Virtual COM PORT UART : Up to 460,800 bps I2C : Up to 400KHz	UART: up to 57600bps I2C: Up to 400KHz	USB/UART/RS232C /RS485/RS422

<Comparison between 'myAHRS+' and 'Razor IMU' under Same Condition>




Image 1
Compared to the same linear acceleration noise, myAHRS+ has shown stronger result

[▶ CLICK LINK](#)

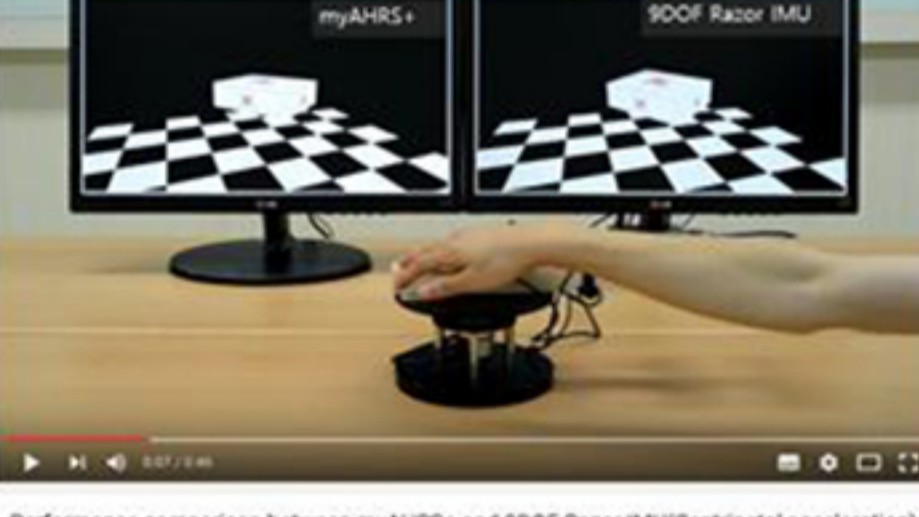


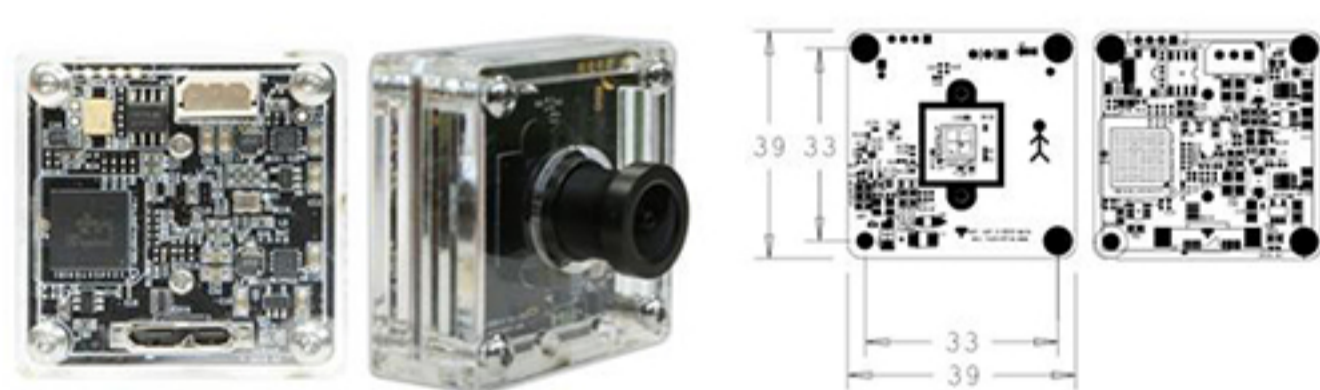
Image 2
Compared to the same angular speed noise, myAHRS+ has shown stronger result

[▶ CLICK LINK](#)

WITHROBOT Co., Ltd has started a full-scale overseas exportation since October last year, and current overseas sales gets ahead of domestic sales. During the next year, the company plans to release the product that will be added with a motion recognition function.




'USB 3.0 Board Type Camera oCam'

WITHROBOT Co., Ltd has released a USB 3.0 board type camera, 'oCam' along with myAHRS+. It is a product that has been developed to fit to a drone or a small size humanoid. While a robotic vision system for industrial robots emphasizes the performance rather than the price, size, and consumed electric power of camera, size and consumed electric power and price are important along with its performance for a drone or a small size humanoid that has been recently emerged. 'oCAM' is the camera for a vision system that has been developed for such market demand. As 'oCAM' supports the USB 3.0 interface, data transmission rate becomes better to reduce a burden on CPU. Accordingly, CPU source can be used for a highly advanced image processing rather than its own image transmission.



<Model No. oCam-5CRO-U and Board Detail Image>

To minimize the size of product, CMOS image sensor and additional circuit have not exceeded 4cm of each length and width. Without a separate power supply device, the camera can be operated only with the power of USB bus. It can be also used in LINUX and a small size embedded board as well as Window PC as it supports UVC(USB Video Class). It is expected to be adopted actively for the object trace or the image recognition of robot. WITHROBOT Co., Ltd has revealed that the camera has a high price competitiveness compared to the products of competitors, 'See3CAMCU50' and 'DFM24UP031-ML'. and a flexibility for easy application to various applied fields. WITHROBOT Co. Ltd has developed its own firmware and software for a hardware camera control from image sensor to communication. Its supplying price is 99 dollars.

	Our Product	Competitive Product 1	Competitive Product 2
Model	 oCam-5CRO-U	 +Details See3CAMCU50	 +Details DFM 24UP031-ML
Price	\$99	\$189	\$379 (렌즈와 홀더는 제외)
Maximum Resolution	5 Mega	5 Mega	5 Mega
Frame Rate	120 fps @VGA 8 fps @5MP	30 fps @VGA 8 fps @5MP	30 fps @VGA 15 fps @5MP

Through videos and professional media (English magazine), WITHROBOT Co., Ltd plans to provide various examples that can be applied to robots. Along with this, the company plans to release a camera model additionally that has adopted more various sensors.

<Short Cut to Reference Data>

[myAHRS+](#)

[oCam](#)

Product Website (Korean/English)	Video Demo
Relevant Technical Data	ROS Development Website
Overseas User Forum	

Relevant Technical Data	Video Demo
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Please inquire the following contact point if you have any question on robot or robot company.

Bucheon Techno park 401-1301(1), Pyeongcheon-ro 655, wonmi-gu, Bucheon-si, Gyeonggi-do, 14502, Korea
 Tel : +82-70-8789-4561 / Fax : +82-32-234-5807
 E-mail : global@icross.org
<http://www.icross.org> / www.R0130T.com



WITHROBOT Co., Ltd

ROBOTIS Co., Ltd

2016 Market Creation Type Robot Parts Supply Project

2016 Completed Selection of Fair Innovation Support Project for Robot Utilizing Small & Medium Manufacturers



**ROBOTIS Co., Ltd,
Released Smart Actuator 'DYNAMIXEL X'**

The world best company of smart actuator market for robot, ROBOTIS Co., Ltd (C.E.O, Kim, Byung-soo) has announced a new product 'DYNAMIXEL X' series and stepped forward to target the global market.

The newly presented 'DYNAMIXEL X' series is the product of 'MX' series mounted with touchless magnetic encoder, which series was announced in 2012. It is a successor of 'DYNAMIXEL Pro' mounted with a cycloid decelerator that was announced in 2014. It is expected to bring a new innovative wind to the smart actuator market.

A hit product of ROBOTIS Co., Ltd, 'DYNAMIXEL', is an all-in-one actuator module for the driving device of robot. In 2009, it was rewarded for the president award in Korea Robot Grand Prize. In 2012, it was acknowledged for its technical skill and marketability after being selected for the 'World First Class Product' by the government. It is a core product that can well reveal the technical competitiveness of ROBOTIS Co., Ltd. Especially, the DYNAMIXEL of ROBOTIS attracted an attention at 'DRC (DARPA Robotics Challenge)' hosted by DARPA (Defense Advanced Research Projects Agency) under the Ministry of Defense in the U.S. last year. At that time, eight teams out of fifteen, who had been advanced to the final, used the DYNAMIXEL of ROBOTIS, which in turn confirmed its reputation again.

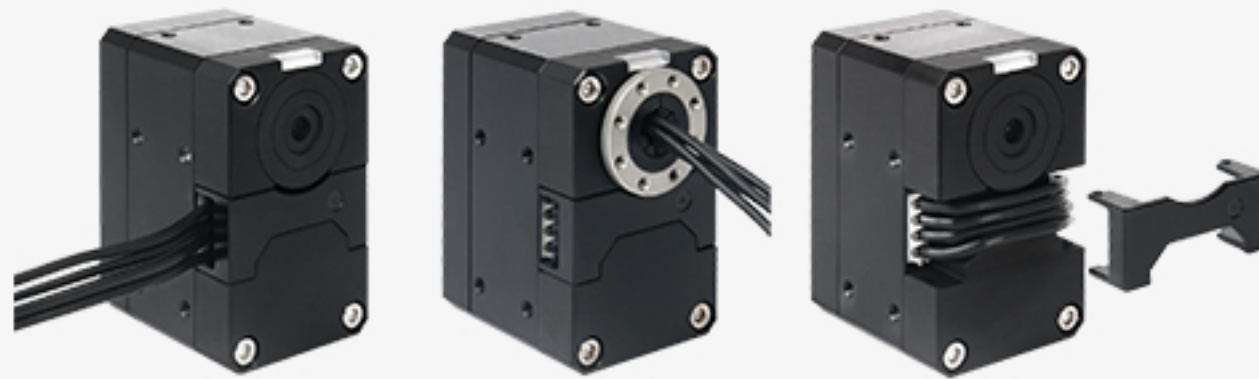


'Increased Durability and Convenient Assembly by The Application of Aluminum Case'

The 'DYNAMIXEL X', newly announced at this time, clearly differs from the existing product. First, its radiant heat performance and driving efficiency have been raised highly by manufacturing the case around motor and decelerating gear with aluminum. Accordingly, its product life has also been increased. Compared to the existing DYNAMIXEL product, it is worthy of notice that its volume has been decreased by 31%, yet its output power has been rather increased. It means that it has become simple to design robot. It is a drastic change as there is no need of using nut after a screw tightening hole has been added to the aluminum case.

'Adoption of Innovative Hollow Type Cable Combine Structure'

DYNAMIXEL also adopts a hollow type cable combine structure. Through this, it is available to minimize the fatigue and detachment of cable and prevent the entanglement of cable. It is available to accomplish the effect to solve the problem in communication defect while enhancing the safety of cable. ROBOTIS has adopted such actuator structure for the first time.



<From the left, examples of Hollow Type, Basic Type, Detachment Preventive Type Cable Combine >

'Provide Various Control Algorithm'

DYNAMIXEL X has raised the completion of control algorithm compared to the existing product. It has provided a reliable torque control function by realizing a precision current sensing algorithm and has become possible for a smooth and precise control through the profile control. Also, providing total six control methods, it has become possible for developers to select proper control methods being adapt to use purpose or environment under various environments.

'Pleasant Price and Aggressive Expansion Policy'

DYNAMIXEL X also provides a price benefit compared to the existing product. Despite the fact that it is a new product with various technologies and excellent performance, it seems greatly beneficial to customers as the price of ROBOTIS' existing products has been set the same as or lower than those prices of overseas competitors.

ROBOTIS Co., Ltd plans to expand an aggressive marketing on the basis of professional group and community that have been formed worldwide. ROBOTIS Co., Ltd plans to understand the demand of customers continuously and reflect it to the product design. ROBOTIS also plans to continuously release various models of different output power, deceleration ratio, communication method and exterior type responding to customers' demand. Through professional group and community, ROBOTIS presents a goal to realize a smart actuator that customers sincerely want by communicating with developers actively.

ROBOTIS Co., Ltd has led the market with a small size actuator DYNAMIXEL that is easy to be used for the educational robot kit or to establish a robotic system for research. Upon this opportunity of release in DYNAMIXEL X, it is expected to solidify the position of ROBOTIS as a professional company much more in domestic and overseas markets. DYNAMIXEL X series, which ROBOTIS Co., Ltd has accumulated for ten years and completed its developing knowhow of robot actuator, is expected to become another strong competitive power for ROBOTIS to advance to new markets of future professional service robot field.



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Bucheon Techno park 401-1301(1), Pyeongcheon-ro 655, wonmi-gu, Bucheon-si, Gyeonggi-do, 14502, Korea
 Tel : +82-70-8789-4561 / Fax : +82-32-234-5807
 E-mail : global@icross.org
<http://www.icross.org> / www.R0130T.com



WITHROBOT Co., Ltd

ROBOTIS Co., Ltd

2016 Market Creation Type Robot Parts Supply Project

2016 Completed Selection of Fair Innovation Support Project for Robot Utilizing Small & Medium Manufacturers

2016 Market Creation Type Robot Parts Supply Project



With an effort to continuously develop a technology in domestic robot industry, an international competitiveness of robot industry has increased higher. Yet such limitation has been pointed out that domestic robot industry highly depends upon overseas core robot parts. Without the technology independency and import substitute of core robot parts, it is difficult to dream of the advancement to a true powerful nation of robot industry.

For technology independency and import substitute, the government has been actively supporting the domestic production of core robot parts which have the weak industrial basis. It has been evaluated that The Ministry of Trade, Industry and Energy and The Korea Institute for Robot Industry Advancement have promoted 'The Market Creation Type Robot Parts Supply Project, which largely contributes to the production of core domestic robot parts. This project substitutes the import core robot parts with high dependency on overseas and enhances the foreign competitiveness of domestic robot industry for finished product. The technology in robot parts shall be expanded to various rear industries of appliances, automobile, and machine industries to promote the improvement in the self generation of robot parts industry and the creation of a safe robot market.

This year, The Ministry of Trade, Industry and Energy and The Korea Institute for Robot Industry Advancement plan actively for the domestic production of core robot parts by selecting The Bucheon Industry Promotion Foundation as a general institution. The supply project of robot parts selected in this year through public contest has a goal for the domestic production of four kinds of robot parts. These parts have had a high dependency on overseas parts. The development tasks for four types of robot parts are ▲ Quadruple axis driving module applicable to the process of manufacturing and inspection for small size precision parts ▲ driving module for gun barrel cleaning robot ▲ unmanned linear actuator with high output power and energy saving ▲ absolute encoder for robot position control.

'Supplying Project of Quadruple Axis Driving Module for The Process of Manufacturing and Inspection for Small Size Precision Parts'

The first development task is the supplying project of a quadruple axis driving module that is applicable to the process of manufacturing and inspection for the small size precision parts, which project is to substitute the import quadruple axis driving module from Fanuc of Japan with the domestic quadruple axis driving module. Hongjin Engineering and Robotro will compose of a consortium for the development of this project. Including governmental contribution, 250 million won fund and existing goods shall be invested. This project has a content such that the domestic quadruple axis driving module shall be improved to fit to the small precision vision examination system, and test beds shall be manufactured for the triple axis driving module performance test and the reliability verification test in order to evaluate the performance of quadruple axis driving module. Along with this, the project shall promote the performance of domestic quadruple axis driving module and the verification of its reliability, its domestic substitution by using test beds. Its domestic substitution from foreign quadruple axis is expected to result in effects of the reduction in import robot parts, the decrease in the import price of foreign robot system through domestic production, and the establishment of a smart factory through the active introduction of robots to the automated assembly and inspection facilities.



'Supplying Project of Driving Module for Gun Barrel Cleaning Robot'

The second one to introduce is the supplying project of a driving module for gun bore cleaning robot. This project has a goal to substitute the DC planetary gear motor of SESAME company in Taiwan that has been applied to 'Auto bore cleaner kit' driving module, with the domestic sensorless BLDC planetary gear motor. HSG Motor Co., Ltd and Ecomotor Co., Ltd will compose of a consortium for the development, and its total invested project cost shall be 333 million won of funds and existing goods including governmental contribution. They will improve the domestic sensorless BLDC planetary gear motor (motor + planetary decelerator + driver) to fit to the driving part of gun barrel cleaning robot, and manufacture a performance tester to evaluate the performance of sensorless BLDC planetary gear motor and a reliability tester to evaluate reliability. In addition, under the same condition as the foreign DC planetary gear motor, they will promote the optimization through performance evaluation and performance improvement.

The application to the driving part of gun barrel cleaning robot shall be able to lead not only the domestic market but also the world market. It is expected to secure the competitiveness of national defense through the military supplies. This domestic planetary gear motor can be also used for the future artificial intelligence smart car rental.



'Supplying Project of Unmanned High Output Power, Energy Saving Linear Actuator'

The third one to introduce is the supplying project of unmanned high output power & energy saving linear actuator. This project is to substitute the rotary servo motor of German Pegasus that has been applied to UAV (unmanned aerial vehicle) with the domestic linear servo motor. IR robot and Sungwoo Engineering will compose of a consortium for the development, and 200 million won of funds and existing goods shall be invested including governmental contribution. Adapting to the demand of high reliability of unmanned aerial vehicle, they will improve the temperature characteristic of controller and the reliability of wear resistance of parts in driving system of vehicle; and to verify the wear resistance of servo and the durability of circuits at the actual driving and servo itself whether they could exceed 300 operation hours by mounting it on the actual unmanned aerial vehicle. It is expected to have an effect of import substitution by substituting a small size linear servo motor for unmanned aerial vehicle with a domestic servo, which currently depends entirely on foreign products. It seems that the project will help to secure the price competitiveness of domestic unmanned aerial vehicle. Especially, it is expected to contribute to the export expansion of unmanned aerial vehicles in the fields of private transportation, public transportation and military transportation.



'Supplying Project of Absolute Encoder for Robot Position Control'

The fourth one to introduce is the supplying project of absolute encoder for robot position control. The project is to substitute the high resolution optic encoder of Panasonic in Japan that has been applied to machine tools and robot driving modules with the domestic high resolution absolute type magnetic encoder. SEIN FLEX Co., Ltd and McSYS Co., Ltd will compose of a consortium for the development. Total 250 million won of funds and existing goods shall be invested including governmental contribution.

They will improve the domestic high resolution absolute type magnetic encoder to fit to the machine tools and driving modules for robots and manufacture a performance tester to evaluate the performance of high resolution absolute type magnetic encoder and a performance tester to evaluate the performance of AC servo motor for machine tools and robots. It will be possible to use this part for the encoder for future robot servo motor and for the application to various industrial groups. In addition, it can be utilized for the wheel sensor magnetic of automobile, and for the application to various fields of industrial machine tools.



If the present domestic production of four types of core robot parts would be successfully accomplished, the competitiveness of domestic robot industry should be more enhanced and the effect of import substitute of core parts should be largely expected. Especially, it seems that the core robot parts shall be applied widely to rear industry and industrial automation field. Thus, it is expected that the project shall contribute to the upgrade of the overall level of Korea's parts industry by one more level.

WITHROBOT Co., Ltd

ROBOTIS Co., Ltd

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2016 Completed Selection of Fair Innovation Support Project for Robot Utilizing Small & Medium Manufacturers

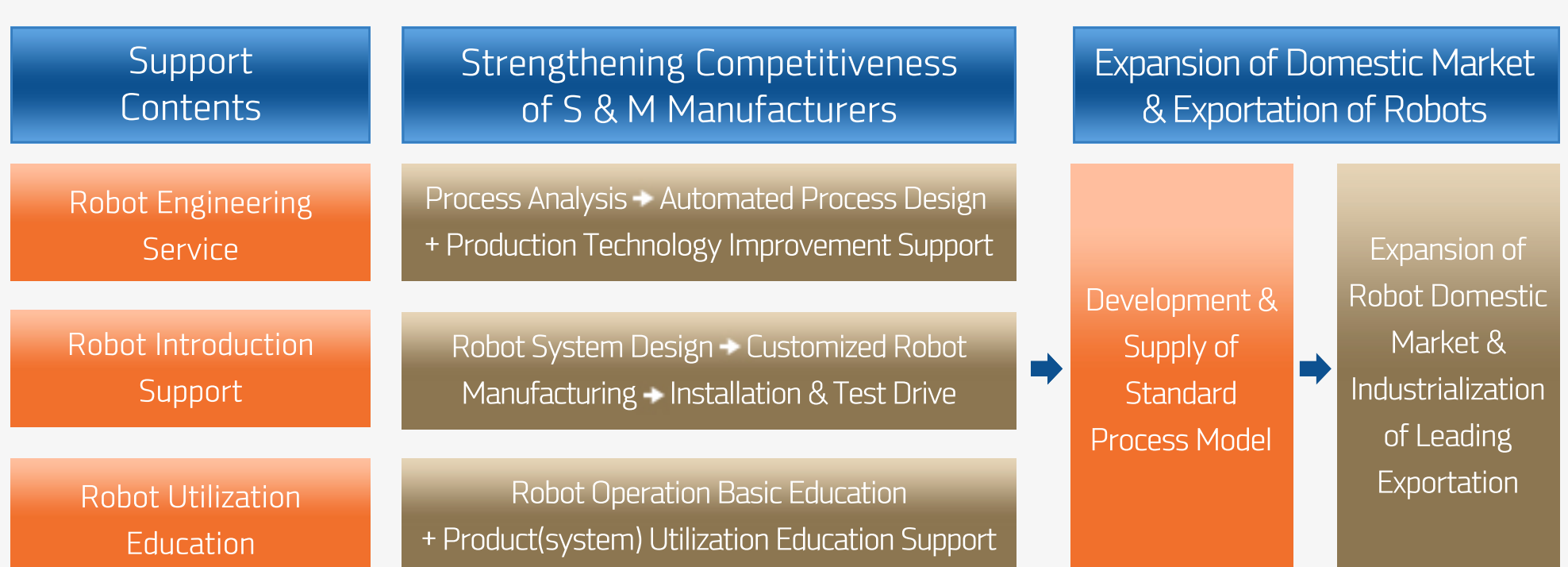


2016 Completed Selection of Fair Innovation Support Project for Robot Utilizing Small & Medium Manufacturers

- Confirmation of 2.75 billion won support to 13 companies, Support of strengthening the competitiveness of small & medium manufacturers-

This year, the government will conduct a support project of a robot engineering consulting service, a robot system installation and a robot utilization education targeting small & medium manufacturers who will engage in the innovation of production process by utilizing robots. Through this, small & medium manufacturers have a strategy that will actively introduce robots to increase their competitiveness, and prepare a basis to expand domestic market and exportation. Such plan is a promotion as a part of the strategy 'Manufacturing Business Innovation 3.0'.

< Assistance Process to Fair Innovation Support Project for Robot Utilizing S & M Manufacturers >



Recently, the Korea Institute for Robot Industry Advancement has conducted a public contest for 'Support Project Task for the Process Innovation of Robot Utilizing S & M Manufacturers' and selected thirteen S & M manufacturers to support total funds of 2.75 billion won. Selected companies shall receive a fund to purchase robot for manufacturing purpose and a fund to install the robot system that are needed to introduce a robot system inside the production factory. During the task period ('16.7~'17.5), it is scheduled to verify the effect out of the introduction of robots such as the increase in productivity. The government plans to utilize the result for three years after the termination of task and to monitor its improvement in productivity continuously to expand its result.

The increase in productivity out of the introduction of robots has been already proved in 'Market Creation Type Supply Project'. The Korea Institute for Robot Industry Advancement promoted 'Market Creation Type Robot Supply Project' from 2011 to 2014 and supported total 12.2 billion won governmental expenditure to fifty nine manufacturers in the S & M manufacturing field. From the result of verification on the performance of this project, it showed that the production amount was increased by 44.5%, and industrial disaster was decreased by 2.3% from 4.3% to 2.0%. Defect rate also was lowered from 5.29% to 1.36%. At this time, those S & M manufacturers who have been selected for 'Support Project for Process Innovation of Robot Utilizing S & M Manufacturers, expect to have an effect of improvement in productivity and reduction in industrial disaster.

The Korea Institute for Robot Industry Advancement has presented a selection principle around the manufacturing fields, which are predicted to cause a large ripple effect, such as ▲ a manufacturing field with higher utilization of robots worldwide ▲ a manufacturing field with urgent utilization of robots due to a lack of manpower despite the large number of companies ▲ the expansion of productivity and sale with the application of robots. Selected manufacturers under such principle are the press and welding for automobile parts, the precision process for parts, the heat treatment for parts, the chemical polishing for cosmetics container, the loading and unloading part or material and the plastic working, the precision casting, coating, injection molding and inspection. Selected companies shall receive governmental expenditure within 50% of total project cost. Small & medium size manufacturers shall receive maximum 300 million won (within 600 million won of total project cost) and large size manufacturers shall receive maximum 1 billion won (within 2 billion won of total project cost).

The representative examples among selected thirteen tasks in this year are 'The establishment of the robotic automated press process for vehicles' parts, and 'The establishment of the robotic automation of chemical polishing process for cosmetics metal container'.

'The establishment of the robotic automated press process for vehicles' is to establish an entire line robotic automated system that is connected from material supply to press, welding, inspection and shipping which are the entire process of manufacturing vehicle's body parts. YUWON Co., Ltd and YUJIN MS Co., Ltd will participate in the task. They will establish a system of 32 units of robots for press process, 10 units of robots (6-axis multiple joint robot) for welding and inspection, a vacuum gripper and a vision for material recognition.

Yonwoo Co., Ltd, WaterWorks Yujin Co., Ltd, and Incheon Creative Economy Innovation Center will participate in the task of 'The establishment of the robotic automation of chemical polishing process for cosmetics metal container'. The chemical polishing process for cosmetics metal container is the process to handle hazardous chemical materials of nitric acid, sulfuric acid, and hydrochloric acid that workers try to avoid. They have a plan to establish a robotic automation line by introducing robots to the chemical polishing process for metal processing. They will introduce 4 units of 6-axis multiple joint robots per process for rack movement, a gripper for rack gripping, a chemical tank, a rinsing tank and PLC. They will promote the task that will introduce a multiple axis robot to the coating spray process for kitchen utensils such as frypan, etc.



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Bucheon Techno park 401-1301(1), Pyeongcheon-ro 655, wonmi-gu, Bucheon-si, Gyeonggi-do, 14502, Korea
 Tel : +82-70-8789-4561 / Fax : +82-32-234-5807
 E-mail : global@icross.org
<http://www.icross.org / www.RO130T.com>

