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Press Release

A next step in wearable robotics.

South Korean start-up company, Angel Robotics, focuses on wearable robots for rehabilitation, including robotic suits that allow people with complete paralysis of the lower extremities to walk.

At the global Cybathlon event in November 2020, the team from South Korea won both gold and bronze medals in the powered exoskeleton race. Contestants Byeonguk Kim and Juhyeon Lee crossed the finish line in 3 minutes 47 seconds and 5 minutes 51 seconds respectively and became the heroes of the event.

Notably, they were both from the Angel Robotics team. Angel Robotics had provided the two medallists with both material and moral support in keeping with the slogan “Robotics for better life”. Founded in 2017, [Angel Robotics](#) was started by Professor Kyoungchul Kong from the Mechanical Engineering department at the Korea Advanced Institute of Science and Technology (KAIST). The company focuses on wearable robots for rehabilitation and health care.

At the first Cybathlon, Angel Robotics also won the bronze medal in an exoskeleton race using a maxon motor. The WalkON Suit used in the competition is a robot for people with complete paralysis of the lower extremities. For the second event, Angel Robotics’ main focus was on considerably reducing the weight perceived by the user to allow them to stand for extended periods while wearing the robot. The company also made sure that it was possible to cover a distance of at least 40 meters when continuously walking for 1 minute, and improved the suit to match the normal able-bodied walking speed of about 2 - 4 km/h. To date this is the fastest speed reported worldwide for people paralysed from the waist down. The maxon EC 22 DC motor and the ESCON Module 50/8 DC motor controller are used in the linear actuator of the robot’s ankle and help to instigate a smooth and natural movement for walking and overcoming obstacles.

The company has also developed other robots like the Angel Suit robotic walking aid designed to assist people with partial paralysis or the elderly with weak muscular strength. There also is Angel Legs M, a robotic medical rehabilitation device used in hospitals for rehabilitation treatment and training.

Angel Legs M is a robot for people with partial paralysis of the lower extremities who have problems walking. Sensors in the robot analyse the user’s movement and, when the need for support is detected, the robot provides appropriate strength. When the user lifts their leg, the weight of the leg is reduced, and when the foot touches the ground, supporting force is provided. The maxon EC 45 flat DC motor, MILE encoder, and the ESCON Module 50/8 controller implement the robot’s hip joint and knee joint movement and are used to provide smooth and meticulous supporting strength.

Angel Robotics’ senior researcher Byunghun Na (R&D team) had the following to say about maxon: “When it comes to wearable robots, the weight and size of the motor are very important considerations. The output is important, too, but in order to minimise the load on a user who may have limited strength and to make it easier to get in and out of the suit and to create an acceptable robot design, the motor drive has to be as light and small as possible. Among brushless DC motors for various purposes, maxon motors are light and small for their output and highly efficient. They are suitable for robots that are sensitive to size and weight. maxon has different kinds of DC motor groups and it is easy to choose a DC motor for the

desired output. Since the stability and inner structure are excellent, we are able to increase user confidence in rehabilitation robots.

Given social factors like the increasing ageing population, wearable robots are set to become an essential robot technology for all of mankind, not only for the disabled. To achieve this, maxon is taking the lead in continuous product development and technological enhancement in service of a better life for everyone.

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The press release is available on the internet at: www.maxongroup.net.au



*Team Angel Robotics won the Gold and Bronze medals in the powered exoskeleton race of the Cybathlon 2020.
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Byeonguk Kim won Gold at the Cybathlon 2020 © maxon Group

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maxon is a developer and manufacturer of brushed and brushless DC motors, as well as gearheads, encoders, controllers, and entire mechatronic systems. maxon drives are used wherever the requirements are particularly high: in NASA's Mars rovers, in surgical power tools, in humanoid robots and in precision industrial applications, for example. To maintain its leadership in this demanding market, the company invests a considerable share of its annual revenue in research and development. Worldwide, maxon has more than 3000 employees at nine production sites and is represented by sales companies in more than 30 countries.