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SOC Robotics Announces First Prototype Power Assisted Wheelchair

Introducing the Power Assisted Wheelchair (PAW) Prototype and openPAW initiative

VANCOUVER – Feb 10, 2010 - SOC Robotics is pleased to announce delivery of the first prototype Power Assisted Wheelchair control system to Brad Zdanisvsky for ongoing system integration. SOC Robotics is working to develop a power assisted wheelchair (PAW) with Brad Zdanivsky who became quadriplegic in his late teens following a car accident. Brad, an avid rock climber (see wordpress.verticalchallenge.org), needed a solution for day-to-day wheelchair mobility. He didn't want a full powered wheelchair as it doesn't give him exercise but his un-powered wheelchair is hard on his shoulders and his health and life expectancy – especially on uphill grades. So Brad set out to create a smart power add-on device that attaches to existing wheelchair frames with a target price of under $1500. Other PAW solutions on the market are heavy, expensive and require component upgrades.

SOC Robotics is supplying the control electronics and mechanical hardware components for the PAWmotion prototype and Brad is providing the software to operate the SOC hardware. The hardware consists of friction drive motors on each wheel together with motion control electronics, wheel and frame mounted sensors (accelerometer, compass), rechargeable batteries and soon a stereovision option for collision avoidance.

Brad will license his software under an open source project named openPAW making it freely available worldwide to a community of medical researchers, software programmers and developers who will add function and refinement to Brad's work.

The first PAWmotion hardware is operational and Brad is adding the software for function. Other people associated with UBC will also play a role in the OpenPAW project. Future refinements and developments are expected to evolve quickly to improve the basic PAWmotion platform.

What will PAWmotion do? Electric power will be delivered to the wheels between power strokes provided by the operator. The PAWmotion kit will sense when power is needed and deliver it to each wheel in accordance with the sensory feedback to the system. The goal is to make the wheelchair operator feel like they are operating the wheelchair on a flat surface in a straight line regardless of whether they are going up hill, down hill, across hill, or over off-camber grades. On downhill grades the PAWmotion system will brake (and in future, recharge the batteries); on uphill grades it will counter the effects of gravity and provide power to flatten out the hill; on cross-grades it will power one wheel more than the other to counter the tendency of the wheelchair to follow the fall line of the grade. The system won't get "pushy" with the operator but will instead run seamlessly in the background to complement the operator even if the operator is using one arm and one foot for propulsion.

PAW Hardware
The PAW hardware uses several currently available SOC Robotics embedded processor products such as the Wasp with 3-axis accelerometer and 3-axis rate gyro, the ZB10 Zigbee wireless module and the MM130 stepper motor driver. A special power management module is under development that integrates the motor drive logic with position sensors and a Zigbee wireless

module. The wheel sensor pack consists of a Wasp with 3-axis accelerometer, 3-axis rate gyros and a Zigbee wireless mode. The wheel sensors modules are being integrated into a single module that will provide a compact mobile wireless Inertial Measurement Unit (IMU).

Availability and Pricing
The PAWmotion platform is not available to researchers at this time but is expected to cost in the $1500 range when released later in 2010. The individual embedded electronics are available now and information concerning these devices is on our web site at www.soc-robotics.com.

About SOC Robotics
SOC Robotics (SOC) designs and manufactures advanced electronic and electro-mechanical systems for the global robotics and embedded-systems markets. SOC has a broad portfolio of intellectual property (IP) designed in-house that embraces embedded DSP, motion control, web server, vision processing and sensor technologies. Customers worldwide include universities, researchers, industrial engineers, military test labs, consumer electronics and security companies, rapid prototype PCB developers and medical device engineers. SOC Robotics products, tools, and software modules are uniquely inter-operable and end user programmable with rich-feature sets. SOC components combine to create an array of cost effective robotic systems that perform with industrial level accuracy. Products include SCARA, SMT, and Solder robots and linear actuators together with proprietary and open-source software modules. Customers may embed SOC electronics into their own products or industrial processes, or assemble individual components to create turnkey robotic systems for industrial, tactical, or educational applications.

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