

Elumotion announces the next generation *Elu2-Hand* for Robotic and Prosthetic Applications

Bath, UK – Apr19, 2010. Elumotion Ltd, expert provider of robotics and prosthetic electromechanical subsystems, today announced the *Elu2-Hand* a market driving advance in highly controllable, human-equivalent hand and finger technology.

The *Elu2-Hand* is the latest addition to Elumotion's portfolio of human format upper body components. It offers significant weight and cost saving over other anthropomorphic robot hands and the opportunity for rapid development of prostheses with market leading capabilities.

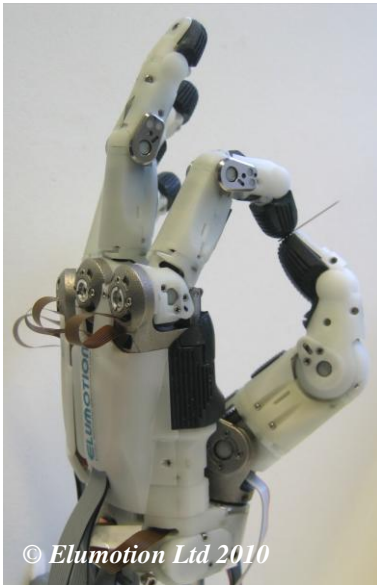
“The *Elu2-Hand* provides our customers with the ability to develop high-performance, reliable and affordable robotic and prosthetic solutions. We have designed this dexterous and potentially sensor rich hand to enable essential innovation in control and interface technologies. Soon operators will be able to experience a richer set of touch and position sensations using prostheses and haptic systems incorporating our hand” said Dr Graham Whiteley, CTO. “The *Elu2-Hand* demonstrates Elumotion's expertise in designing human-equivalent motion and our dedication to working with companies to bring highly cost-effective, human-compatible devices to market.”

Matching the scale and form of the human adult hand, the *Elu2-Hand* is ideal for interacting with people and with the diverse tools and objects designed around the ergonomics of the human hand. The hand has 9 independent degrees of freedom and readily performs coupled movements, such as ‘cupping’ of the hand as the thumb moves to oppose the fingers or flexing of the finger-tip in combination with flexing of the knuckle. This coupled approach generates a full range of convincing and functional hand movements, which are executed at human compatible speeds for ease of control. The *Elu2-Hand* weighs 900g, less than half the weight of other anthropomorphic robotic hands. It has a metal/plastic hybrid construction to reduce weight whilst maximising strength and reliability and offers scope for further optimisation to meet prosthetic weight targets when in full production.

The *Elu2-Hand* is engineered for reliability, power and precision; has three times the available power of current comparable hand prostheses and is capable of single digit tip forces of up to 4.7N. Critically and uniquely, the hand replicates human grip patterns. Combined with extensive soft pad areas this ensures only minimal grip forces are needed to retain and control objects, maximising battery life. Accurate control is ensured using close-tolerance transmission components combined to incremental position encoders and home/limit switches. For additional safety-critical applications *Elu2-Hand* has been designed to be equipped with ultra-reliable, non-contact, absolute position encoders for extra positioning redundancy. The efficient, back-drivable finger transmissions enable use of motor-current to indicate finger joint torque. In addition, the finger tips have the provision for sensors that give information on contact force vectors in three-dimensions. The actuators and sensors within the hand and finger are controlled using a single Controller Area Network bus.

The *Elu2-Hand* finger and thumb subsystems are each self-contained and can be tailored to meet a wide range of demands at a practical cost. All actuators are compactly fitted within the volume of the hand or digit, leaving spare volume for robotic and prosthetic connectors and control interfaces.

Medical applications for the *Elu2-Hand* include next generation commercial hand prostheses, which should be significantly more useful and easier to control. An important robotic application for the *Elu2-Hand* is as part of future ‘telepresence’ systems that will remove an individual from a hazardous or otherwise inaccessible place and through remote control of the robot hand retain that person's dexterity, sensitivity and skill in completing their task. The hand may also be programmed to





perform and repeat action sequences, providing short term automation solutions. Provision for multiple sensors within the hand along with the ability to repeat tasks indicate the hand can also support ergonomic product design evaluation by measuring contact forces or performing ‘life-cycle’ testing.

The *Elu2-Hand* is available to order now at a competitive price. Please see our website for details. (www.elumotion.com)

About Elumotion Ltd

Elumotion (www.elumotion.com) specialise in the development of robotic components that replicate human and biological motion. The company’s product line includes hardware and component solutions capable of performing demanding and complex physical tasks. Elumotion is currently extending its range of prosthetic component designs and engineering more power and ‘intelligence’ into the joints of their RT1 complete robotic torso. Elumotion components may be licensed individually or as a complete subsystems such as; hand, arm or torso. Elumotion’s expert engineering team offers a full range of services from concept definition and design to support services. Elumotion strives to provide expertise and guidance to help its partners produce better products at competitive prices.

Keywords

robot, prosthesis, artificial hand, prosthetic hand, robot hand, prosthetic finger, dexterous, haptic, telepresence, teleoperator, teleoperation, ergonomic, product testing, automation, automata, sensor, humanlike, HCI, biomimetic



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