Human Mind-Controlled Artificial Arm

The Defense Advanced Research Projects Agency (DARPA) launched the e-market arm of the robot technology.

APL scientists and engineers developed the technology behind DARPA Revolutionizing Prosthetics 2009 program, an ambitious effort over four years to create a prosthetic arm until there was an eclipse of the Second World War device and cable hook Most used by amputees. The program has already produced two prototype complexes, each advancing the art of the upper arm prosthesis.

The Defense Advanced Research Projects Agency (DARPA) awarded a contract for a maximum of $ 34,500,000 at Johns Hopkins University Applied Physics Laboratory (APL) in Laurel, Md., to manage the development and testing of the modular prosthesis (MPL) system in humans, using a brain-controlled interface.

The final design – MPL – has 22 degrees of freedom, including the independent movement of each finger, in a package that weighs about nine pounds (the weight of a natural branch.) Provide skills almost more than one branch natural, MPL is capable of unprecedented flexibility and mechanics is designed to meet the thought of a user.

An Austrian amputee is the first in Europe to feature a member of the new generation of prosthetics controlled by the spirit that moves and feels like a real arm, receiving orders from the brain and return the entry . Germany Otto Bock Health Care has created the first prosthetic arm of history that can be controlled by the patient’s mind.

Clinical trials are next to the mind-controlled artificial arm DARPA.

Pentagon-backed scientists are preparing to test the thought-controlled prosthetic arm in humans, reconnect their brains to fully integrate the artificial limbs.

In recent years there has been very real artificial arms, biting monkeys with bananas members robot controlled by the spirit and humans including muscle fibers were connected to artificial limbs. But this is the first time that the human brain is open, implanted with a neural interface, and then used to operate an artificial limb.

This is a giant step that will transform the devices that were a little more hooks and son 50 years ago. And the progress is courtesy of DARPA, the Pentagon is far-agency R & D, which sponsored the brain controlled the replacement of members within the Program Revolutionizing the prosthetic.

A team of scientists from Johns Hopkins, behind much of the progress of DARPA prosthetics have so far received a $ 34.5 million contract from the Agency to manage the project's next steps. The researchers will test the industry modular prosthesis (MPL) to the human person. The thoughts of the subject's desire to control the arm test, which "has 22 degrees of freedom, including the independent movement of each finger," provides information that essentially restores the sense of touch, and weighs about nine pounds. At about the same weight as the human arm.

The prosthesis is based on micro-arrays, implanted in the brain, the recording signals and transmits them to the device. The design is similar to that of mono freaky mind control experiments that were underway at the University of Pittsburgh since at least 2004.

In two years, researchers from Johns Hopkins plans to test the prosthesis in five patients. And researchers with a consortium funded by DARPA at Caltech, the University of Pittsburgh, University of Utah and University of Chicago, also hope to increase the capacity of the prosthesis to incorporate pressure and touch.

"The goal is to enable users to more effectively control the movements to perform daily tasks such as picking up a cup of coffee," manager Michael McLoughlin program for the project, "he said.

In other words, the prosthetic arm is remarkably similar to the real thing. But the gauge long-term arms MPL remains an open question. Three months ago, DARPA launched a new program to overcome several problems with models of neural prostheses – in particular the life of two years of implementation of neural recording devices.

"The arms of the man is a difficult task," says Stuart Harshbarger, of Johns Hopkins. "He can move with remarkable speed. He is calm and healing. "Proto 2, the prosthetic arm was developed by Harshbarger and a team of 30 public and private partners, may not be as good as the real thing, but it is narrowing the gap.

Most weapons of myoelectric prosthesis move three ways – elbow to elbow and wrist rotation, closing a rudimentary hand shakes. Proto original computing device,

that figure rose to seven The Proto 2 27 allows different types of movement, including flexion of individual fingers. While other myoelectric arms operate in response to muscle movements, the Proto 2 is connected directly to residual nerve fibers: A control device simply by thinking. Specifically, users may feel new arms – 80 sensors in the fingertips and palm to send signals racing back to the brain. Harshbarger said: “It is difficult not to get excited about the progress we have made.”

More than 130 veterans of the Iraq war now face the challenge of learning to live with a missing arm. To make this transition easier, the Defense Advanced Research Projects Agency, or DARPA, has launched a 55 million that combines the efforts of prosthetics experts nationwide to create a bionic arm controlled by thought than double functions of a natural member. Hopefully, in 2009, the Agency requires the Food and Drug Administration to put the arm in clinical trials.

This summer the team reached a major milestone when it finished Proto 2, a thought-controlled mechanical arms with hand and articulated fingers that can perform 25 joint motions. This ability is similar to that of a native arm, which can make 30 proposals, and supersedes the previously most agile bionic arm, the Proto 1, which could bend the elbow, turn his wrist and shoulder, and the opening and closing the fingers. A person wearing a Proto 2 could possibly play the piano.

The next steps are to reduce the size of the battery, develop more efficient engines, and refine the bulky electrodes used to read electrical signals in muscles. As for making music now, you’re on your own

How does it work?

1. Control System

Researchers are experimenting with injectable myoelectric sensors (IMES) that detect muscle activity and wirelessly transmitting commands to the prosthetic arm. The setup eliminates bulky electrodes glued to the chest. A coil of wire wound on the shoulder supplies wireless implants and relays signals to the prosthetic equipment to decipher the command and tell the arm to move. The team is also considering implanting electrodes directly on nerves or the brain itself to achieving a more natural neural control by 2009.

2. Power

Researchers are studying a pneumatic system of hydrogen peroxide to replace electric motors, which are bulky, slow and weak. Hydrogen peroxide reacts with iridium catalyst to drive the movements of the arm. The user installs a boat fresh hydrogen peroxide every morning.

3. Flexibility

Proto made February 25 joint motions: The shoulder and wrist are capable of rotation, pitch and yaw, the elbow can flex and the fingers and thumbs bend at

each jaw. Each joint brings together two lightweight “Bones” carbon fiber and aluminum alloys.

4. Building Blocks

The modular shoulder to elbow, elbow to wrist, allows physicians to tailor the needs of the patient’s limb.

Germany-based Otto Bock HealthCare has announced that the arm of his prototype prosthesis that can be controlled by thought is ready for release. The device was tested in Christian Kandlbauer – which has no such weapons and conventional prostheses on the right side – over the last four years. It is the first person in Europe who thought controlled prosthesis installed, but the investigation is completed and the finished product should be available shortly for the general public. The arm uses muscle reinnervation achieved (TMR), which uses the nerves that control arm lost control of prostheses. The nerves are transplanted into the chest during an operation six hours and allow the control of prostheses. More details of the operation of free competition and controls have not yet been filed, but is up to the source link for more information.

Source: Press release [1]

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http://www.surgicalproductsmag.com/videos/2010/07/human-mind-controlled-artificial-arm?qt-most_popular=0

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