BCI WITH WIMAGINE®

PEOPLE WITH SERIOUS MOTOR DISABILITY CAN NOW **CONTROL COMPLEX FUNCTIONAL SUBSTITUTION DEVICES**

WHAT IS BCI?

The Brain Computer Interface (BCI) project intends to prove that, after training, a person with serious motor disability (i.e. tetraplegic subjects), is capable of controlling complex functional substitution devices, such as a 4-limb exoskeleton by decoding his/her electrical activity.
The BCI principle derives from the fact that moving or imagining a movement generates the same electrical activity in the motor cortex. Electrical signals called ElectroCorticoGrams (EcoG) are recorded and decoded to control complex effectors such as moving an exoskeleton's limbs.

APPLICATIONS

The subject can control the exoskeleton by imagining movements just as if his or her own body was going to execute them! The ElectroCorticoGrams produced by the subject's intentionally imagined movement are recorded by Wimagine® implants, surgically placed into the skull in front of the motor cortex. The ElectroCorticoGrams are decoded to control the exoskeleton's arm and leg joint motors.
This application offers prospects of innovative functional substitution solutions ensuring enhanced quality of life for people with serious motor disabilities.

PATENTS 17 PATENTS

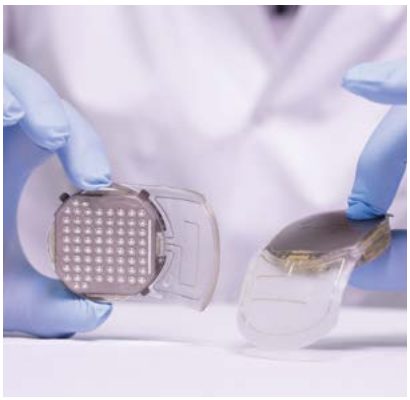
WHAT'S NEW?

Development of a high-performance, **clinical Brain Computer Interface (BCI)** is a major challenge in neuroprosthetics. Leti has designed a **BCI platform for ElectroCorticoGram (ECoG) recording and decoding, intended for clinical applications**.

Leti is the first institute in the world to have developed a fully implantable wireless EcoG recording device. This Implantable Medical Device called Wimagine® is authorized for clinical trials. It ensures long-term recording of the motor cortex's electrical activity using 64 electrodes in contact with the dura mater. The Wimagine® implant incorporates integrated circuits (ASICs) that measure the brain electrical activity, a wireless transmission module and antennas, all contained within hermetic, biocompatible medical packaging.

The EcoG signals recorded by Wimagine® are decoded in real time by innovative algorithms, which have been developed to process very large data volumes. These algorithms predict a subject's intentionally imagined movement used to control complex functional substitution devices.

The EMY exoskeleton incorporates 14 motors, controlling 2 arms, each with 4 degrees of freedom, and 2 legs, each with 3 degrees of freedom. It also features onboard PCs ensuring signal processing and system control. It's battery-powered and therefore independent of any external energy source.



WHAT'S NEXT?

The BCI platform including the Wimagine® implant, decoding software and the EMY exoskeleton **complies with European directives on Class III AIMDs** for clinical trial usage.
Professor Alim-Louis Benabid, Lead Investigator for the "BCI and Tetraplegia" Clinical Research Protocol, has been authorized by Grenoble University Hospital's clinical research and innovation department (DRCI), by the French regulatory agency for drugs and health products (ANSM) and by ethical committee CPP to start a pilot clinical trial at Clinatec®.

INTERESTED IN THIS TECHNOLOGY?

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