

2005 Award

Overcoming social exclusion through scientific and technological innovation

The laureate

First Prize
Jonathan WOLPAW – USA

The theme

For its 9th award, in 2005, the Altran Foundation for Innovation has chosen the theme "Overcoming social exclusion through scientific and technological innovation".

A brain-powered remote control for paralyzed people

Patients with locked-in syndrome have no means of communicating with their environment. By recording brainwaves at the surface of the skull, then decoding them, Professor Jonathan Wolpaw's Brain Computer Interface system enables patients to move a cursor on a computer screen, dictate a text or control a robotic arm. This invention is an extraordinary communication breakthrough for people who are completely cut off from the outside world. Thanks to the support provided by Altran consultants, the first patient was equipped with this system and was able to write and send an e-mail without any help. Some 15 patients are now using this system, which is set to be rolled out in Europe.



The Results

After one year of Altran accompaniment, the project has been a big success. The objectives have been reached and a first e-mail was sent by a patient in a completely autonomous way in April 2006.

After the Award

The Wolpaw team wants to enable other patients to use the technology and to create juridical structure in charge of the system diffusion. Besides, the project could offer new perspectives concerning software design. Examples are: added user applications, a caregiver application (to guide the caregiver through setup and performing diagnostic tests on the system, etc.) and remote access capability for the BCI project leaders to log onto individual users' machines.

"Altran's assistance was extremely valuable. The consultants' support significantly accelerated the technological development of the BCI system. And the new skills they contributed helped us turn the project into a reality." Jonathan WOLPAW

Altran Support is divided in several areas:

- Helmet development: in order to go from a prototype rarely used to an application able to work several hours per day, to solve problems related to electrode positioning and to consolidate the system's reliability.
- Work on data acquisition: to overcome difficulties linked to electrical signals of only a few microvolt processing.
- Market studies: to envision the number of applications needed, to find distribution network locations, to decide on an accurate sale price and to find financing sources.
- Besides, the BCI team works more independently on software development, system integration, etc.

Two Altran companies: Cambridge Consultants and Arthur D. Little, with around ten consultants, are involved in BCI's support.

More about the theme

This cross-disciplinary theme requires a multidimensional approach covering issues such as health, transports, housing, lifelong learning, education and training as well as access to services, employment and resources.



The Finalists

Honourable mention

François GOUDENOVE – France

WEBSOURD - The Internet helping the deaf and hard of hearing

A French partly nationalized co-operative directed by François Goudenove, WebSourd aims to bring the Internet and multimedia technology within the grasp of people with impaired hearing, with the aim of overcoming their serious accessibility problems, particularly in the sectors of information, training, employment and the arts.

Dirk LEFEBER - Belgium

ALTACRO - Helping people walk again

ALTACRO is a robot designed to teach patients to walk again, providing automated care tailored to the needs of each individual patient. The main innovation of this project consists in using pneumatic artificial muscles instead of electrical commands. Thus a comfortable human-robot interface is generated and the rehabilitation process is given an additional functionality.

Hervé LE MASNE- France

TOPCHAIR - An electric all-terrain wheelchair

Top Chair is an electric wheelchair designed for people with reduced mobility. This innovative system includes a stair climbing function. With dimensions similar to that of an ordinary wheelchair, it can tackle obstacles such as stairs and kerbs in one smooth operation, without any need for the patient to leave the chair. Another important feature is that no external help or handrails are required by the patient.

José Luis MARTÍN SÁNCHEZ - Spain

A wheelchair guided by waves emitted by the brain

The Spanish team led by José Luis Martín Sánchez, electronics laboratory, University of Alcalá, Madrid, has developed a user interface enabling people with reduced mobility to guide a wheelchair. Using concepts taken from work on virtual reality and specifically the analysis of waves emitted by the brain (electroencephalogram), the project aims at using the computer to convert such signals into commands. This is an innovative project as it distinguishes more than two different mental tasks to generate multidimensional commands and enhances the quality and quantity of data exchanged between the brain and the computer.

Gilles CANDOTTI - France

NAVWORKS

Gilles Candotti and his team at the French company CECIAA have developed NAVWORKS, a portable navigation assistance system providing blind people with useful information. The aim of the system is to provide guidance between starting and arrival points entered by the user. The system then calculates a route taking account of the specific mobility features of the visually impaired, choosing the simplest route and keeping the number of roads to be crossed to a minimum. The resulting route is provided in the form of audible information. To improve the day-to-day life of blind and visually impaired people, the French company CECIAA has vocalized some PDA functionalities.

The jury

President of the jury

M. Jean-Luc DEHAENE

Jean-Luc Dehaene was Minister of Social Affairs and Institutional Reforms from 1981 to 1988. From 1988 to 1992, he was a Deputy Prime Minister and Minister of Communication and Institutional Reforms in Belgium. He was Prime Minister and was at the head of two governments from 1992 to 1995 and from 1995 to July 1999. He is regarded as the architect of the reform of the Belgian State.

Dr Gail CARDEW – United Kingdom

Head of Programmes at the Royal Institution since April 2000, where she is responsible for the Royal Institution's science communication, science education and science policy activities.

Prof. David A. EDWARDS – United States

Professor of biotechnology at the University of Harvard (Boston, USA). Co-founder of Advanced Inhalation Research (AIR), now part of the publicly-traded Alkermes, and Pulmatrix, a company established in 2002 dedicated to the development of a new therapy directed at lung infections, and Mend (Medicine in need) dedicated to the development of a new therapy directed at tuberculosis.

Prof. René KNUSEL – Swiss

Professor in political sociology and social action at the University of Lausanne. He is responsible of sociology courses dealing with social policies, social actions and social issues. One of his courses of this year is "Social exclusion and integration".

M. Jean-Paul PHILIPPOT – Belgium

General Administrator of the RTBF (Belgian Radio and Television Services for the French Community) since February 2002. He was hitherto a delegate director of "Interhospitalière Régionale des Infrastructures de Soins" (inter-region health and hospital centres).

Prof. Fernando Manuel RAMOA RIBEIRO – Portugal

Professor at the Technical University of Lisbon. He was vice chancellor of the same University between 1999 and 2002. President of the Foundation for Science and Technology of Lisbon since 2002.

M. Phillipe STREIFF – France

Phillipe Streiff began his pilot career in karting, then Formula 3 and finally Formula 1 (56 races). In 1989, he remained tetraplegic following an accident during qualification rounds of the Brazilian Grand Prix. He has organized the Masters of Bercy since 1993. He created CESA association. He was named technical adviser to the French Minister of Health and Social Protection in October 2002.

Prof. Alice G.B. TER MEULEN – Netherlands

Professor of Modern English Linguistics at the Faculty of Arts of the Rijksuniversiteit Groningen (RUG) and a Member of the research school Behavioural and Cognitive Neuroscience. Member of the Royal Netherlands Academy of Arts and Sciences (KNAW) and of the Governing Board of the NOW, The Netherlands Organisation for Scientific Research.

M. Javier VALENZUELA – Spain

Responsible of the international communication for the Presidency of the Spanish government of José Luis Rodríguez Zapatero since April 2004. Until then, he worked for the daily newspaper "El País" as a journalist and a columnist specialized in international issues, with the title of deputy manager.