

BULLETIN 11

DIRECTOR

Mara Brugés Polo

EDITOR IN CHIEF

Ximena Serrano Gil

STAFF WRITERS

Yino Castellanos Camacho
Maria Isabel Villegas
Giovanna Chethúan
Carlos Cuervo

TRANSLATION

Ricardo Arciniegas

DESIGN

NOTICyT Staff

**IF YOU NEED MORE
INFORMATION ABOUT
THESE NEWS YOU CAN
SEND AN E-MAIL TO**

noticyt.acpc@urosario.edu.co

**YOU CAN FREE PUBLISH
EVERY ARTICLE WITH THE
CREDIT OF NOTICYT**

Colombia said yes to more science, innovation and technology

With the discussion of topics as the invigoration of the institutionalization, the appropriate direction of the resources, the harmonic and systemic integration of the actors that participate in the production and use of science and technology and innovation, besides the sensitization of society toward these topics for appropriation. A scientific policy for Colombia has increased in its contents and researchers, in mark of the International Seminar on Politics of Science, Technology and Innovation.

Prototype created in Colombia

Computer Mouse guided with the eyes

The interaction man-machine for handicapped people shows with the *Mouse Vision* (MV), a devised system and implemented by investigators of the Cimbios Group of the School of Physics of the Industrial University of Santander (UIS) that according to its director David Miranda, allows moving the pointer or cursor on the computer screen with the movement of the eyes. But, how is it achieved?

Biodiesels: ups and downs for the planet

Before the environmental crisis taken place in the planet by the use of fossil fuels, and their gradual exhaustion, the world seemed to find the solution in the biodiesels production; however, today consent doesn't exist in the scientific community on the advantages and limitations that can present its production and massive use.

NOTICyT Cra. 6ª no. 14-13 Of. 515
Sede Universidad del Rosario, Bogotá, Colombia
Telefax. (57-1) 3411339 – 3414006 ext 246 – 324
www.noticyt.org

**Bogotá, Colombia
South America
April 30, 2008**

With the support of:



Colombia said yes to more science, innovation and technology

Among the fundamental topics, the role that the government should play in promotion and development of CyT activities was discussed. A vital paper, of promotion and coordination as Nicolás Eyzaguirre, President of the National Council of Innovation of Chile recognized, “especially in countries as inequitable as the Latin Americans.”

This role, however, should not be focused to finance the activities of CyT on the whole, like Guillermo Perry, former Colombian Secretary of Treasury explained. According to his appreciation, a politic of subsidies to the most consistent and pertinent projects is desirable, before insisting in the tributary incentives, because these have demonstrated to have little effectiveness for Latin America. In the same way, Perry recommended that the subsidies don't overcome 50% of the total investment, and that its approval, pursuit and evaluation remain in professional hands, including foreigners.

Now then, if it is not the government the one in charge of financing on the whole the programs of CyT who should make it? In the American case, explained by Kei Koizumi, director of the Association for the Advance of Science of the United States (AAAS), the federal structure of its country makes easier the efforts concentrating on the industry that finances two third parts of the total investment in technological development. “Donations, support of the Federal Government's 10%, and the States of the Union, support another percentage of the total investment”, the director pointed out.

In Colombia this possibility in generating more resources for CyT starting from product of bonuses like the oil company, or the privatizations of government enterprises, is contemplated in the draft law of Science and technology, which is expected to increase the budget of the 29th Law of 1990.

The company

“Only 1.3% of doctors hardly work in the Colombian managerial sector”, Judith Sutz, professor of the University of the Republic of Uruguay pointed out. This figure shows the traditional contempt in which the domestic managerial sector has perceived the topic of CyT, and, especially, innovation.

This situation many times has taken to insist in the invitation that has done in repeated cases Juan Francisco Miranda, director of Colciencias, to the Colombian managerial sector for them to demand innovation and technology, a model that has been clue for the development of countries like Korea, Australia or Finland.

However, accept this invitation supposes to change the mentality regarding the business, many times conceived in Latin America like “lucrative, and therefore, with low innovation”, as Nicolás Eyzaguirre pointed out.

There is another issue to be added in this situation; innovation is a process that requires time to produce good profitability, and those factors like the risk capital are good for its development, as few times is understood in the managerial circles and conservative politicians, the Chilean expert supplemented.

Now then, like Guillermo Perry explained, “the will of the market has little innovation, for that reason the government should participate in these developments, and not only be given by the managerial sector. This can be done by using instruments like the ones protecting the intellectual property and tributary incentives.”

For these reasons, it is needed to link the government, industries and academia, in a sufficiently well-known model in which the government coordinates, and facilitates processes, the industries contribute with some investments since they will see the product, and the academia develops knowledge. This should be done with clarity having in account that nothing is fixed forever and could be dynamize.

In conclusion, these analytic elements, arisen of successful experiences, and academic concepts, socialized in the Seminar, will nurture National Politics' of Development of the Investigation and the Innovation of Colciencias, as manager Juan Francisco Miranda indicated it: “An opportunity for Colombia to build and sow future”, he concluded.

Prototype created in Colombia

Computer Mouse guided with the eyes



Taking advantage of the principles of light reflection on different surfaces. When impacting an infrared beam of light of very low power develops on the ocular mucosa of the user of the *Mouse Vision*, this reflects a sign that changes intensity when the eye moves. This change of intensity in the sign you can measure thanks to two willing devices in front of each eye, mounted in the eyeglasses of some glasses that serve as a mechanic support to the system. This way first key information is obtained.

“The phase of coding the information of the movement of the eyes supposed to keep in mind several forms of making it, however, the cheapest and easiest way of implementing was this one, in which we take advantage of the relative change of the position of the cornea and of the crystalline lens when one looks at oneself in different addresses, and consequently the change of intensity in the light that is reflected”, professor Miranda supplemented.

Another question that arose on the possible damage that would suffer the eye when being impacted by the necessary light to reflect the sign whose change of intensity leaves measuring. “We find a study in primates that had been realized with infrared laser, the study reported damages but for the high-intensity of the laser. In our case we use two light emitting, infrareds of very low power, which guarantees that they won't cause damages neither to the retina neither the ocular mucosa”, Miranda pointed out.

However, it was not enough with this coded information of the change of light intensity. The changes, measured by a detection system with two tiny sensors or mounted photodiodes on the lenses of the glasses of the user of the *Mouse Vision should* be entered to the computer. This was made with a sound card that picks up the changes in the sign that the sensors send by means of pulses to incorporate for the PC audio channel.

This way, a user of the MV, only has to try its glasses equipped with the devices that emit the light (diodes) and those that measure the reflection (photodiodes) and to sit down in front of the computer, allowing that its eyes receive the light of low intensity whose reflection is measured, depending on its ocular movement. This way if it moves their eyes to the right, the cursor will make it and vice versa. Even when opening and closing the eyes smoothly a click will be made, Miranda explained.

Neural networks for movement

Now then, the signal has already entered to the PC, however how does the program identify that a change of light intensity of the eye means movement if the cursor to the right or left? How does it decide such a movement? By means of the design and operation of an artificial statistic neural network (RNA), a computational tool that simulates the way how the human brain operates.

It is more than that, the RNA is made up of a great number of highly cross-trigger prosecution elements (Neurons) working at the same time for the specific troubleshooting. “The RNA is a mathematical model that seeks to emulate the operation of the human brain, their application in economy and engineering arises at the end of the eighties with good results”, the professor of the National University of Colombia, Jesus Delgado explained.

This way, Miranda and his colleague Edwin Silva, “they trained” a statistical neuronal network for it to recognize parameters and instructions that will allow him to select and to decide the movement of the

cursor, by means of the identification of the specific changes of intensity of the light sign, become pulses, coming from the movement of the eyes of the user of the MV.

Finally, it was necessary that the decisions of the neuronal network arrive directly to the device that controls the *mouse* in the software of the computer. This was achieved thanks to the engineer's Oscar Miranda cooperation, who designed the program that allows that the parameters dictated by the network were executed by the cursor.

It is necessary to add that prototypes like the *Head Mouse* carried out in Spain allow the movement of the cursor directed by the head. "These efforts lead to improve the interaction with the PC in the case of handicapped people in their superior members, David Miranda commented. Enhanced versions are also expected from this development that could be used in virtual reality games, the investigator concluded.

Biodiesels: ups and downs for the planet

In Colombia a similar discussion has begun, because while the defenders of the biodiesels consider that its production and use is environmentally a responsible alternative, sustainable in the economic plane, and an option for the social development, their detractors say that the secondary damages are demonstrated to the ecology of the planet and the decrease of the alimentary security of entire countries.

At the moment the Colombian Institute for the Development of Science and Technology, COLCIENCIAS, impels a project that looks to complete a million hectares for sugar cane, and two million palm for biodiesel.

This way, the debate is served. In what all the experts coincide is in the necessity of carrying out more studies and investigations to specify the best way to produce biodiesels, assisting the energy, environmental and social approaches, because as Jens Mesa, president of Fedepalma expressed, "no cultivation is intrinsically good or bad, everything depends on the handling that is given."

**You may publish the NOTICyT articles in your environment without any cost,
But you must give credit to our Agency**

NOTICyT Cra. 6ª No. 14-13 Of. 515

Sede Universidad del Rosario, Bogotá, Colombia

Telefax. (57-1) 3411339 – 3414006 Ext 246 – 324 – 306

noticyt.acpc@urosario.edu.co

www.noticyt.org