



# High-speed networking: freeing epilepsy patients from seizure

90% of the world's 50 million epilepsy sufferers live in developing countries. Despite the success of modern drug therapy, a large minority of patients is resistant to anticonvulsant medication, leaving surgery as an effective alternative treatment.

Treating epilepsy with surgery is complex and skilled and many developing countries lack the expertise. Thanks to the power of two high-capacity data-communications networks – GÉANT and EUMEDCONNECT2 – the outlook for millions of epilepsy sufferers is being dramatically transformed and the costs of treatment substantially reduced.

### *Bridging the surgical treatment gap*

Exploiting the power of modern communications networks, medical specialists in the Hôpital Charles Nicolle in Tunis, Tunisia and in its namesake in Rouen, France are reducing geographical isolation and collaborating effectively on the diagnosis and surgical treatment of epilepsy patients. Established in 2006, the programme focuses on epilepsy patients for whom drug therapy has failed to achieve freedom from seizures. The collaboration relies on the power of regional Internet networks dedicated to research and education use: GÉANT, the pan-European network and its counterpart EUMEDCONNECT2, are bringing together researchers in seven southern and eastern Mediterranean countries.

To establish suitability for surgery, each of the patients in the neurological department of the Tunis hospital is the subject of a thorough assessment, including brain imaging and video electroencephalography (EEG) – producing huge, bandwidth-hungry files. These are transmitted over a path consisting of the Tunisian national network (run by the Centre de Calcul el Khawarizmi), EUMEDCONNECT2, GÉANT and RENATER (the French national network) to clinicians in the Rouen hospital. The two groups of doctors are able to discuss the findings in real time and arrive at surgical decisions together – exchanging best practice into the bargain.

An infrastructure with the capacity and reliability of these regional and national networks is essential to this international collaboration, ensuring the rapid and secure transfer of the video-EEG recordings and MRI scans. GÉANT, EUMEDCONNECT2 and their Tunisian and French counterparts are designed and



Neurological Department at the Hospital Charles Nicolle in Tunis, Tunisia

### *Epilepsy*

One of the oldest widely recognised medical conditions, epilepsy has been surrounded for centuries by fear, misunderstanding and discrimination; the condition can severely impact the quality of life for sufferers and their families, with psychological and social difficulties causing education and employment problems. Surgery offers a suitable alternative for people who are resistant to drug therapy.

The cornerstone of success for this kind of surgery is careful pre-operative assessment – requiring skills often lacking in developing countries. High-speed Internet networks for research and education – the regional backbones GÉANT and EUMEDCONNECT2 and their national counterparts in France and Tunisia – completely eliminate geographical distances, enabling medical experts in Tunisia and France to collaborate on assessments in real time, enhancing the range of skills of colleagues in Tunisia, improving the quality of epilepsy care and reducing its cost.



used for applications requiring huge volumes of data to be transmitted quickly, reliably and with total integrity of information.

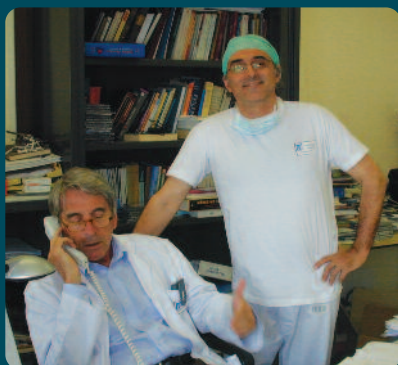
### ***A model for the future***

Published results for this pioneering collaboration between medical teams in different countries show a success rate close to 100%. Unremarkable in developed countries, where sophisticated epilepsy surgery has been routine for many years, such a success rate is rare in the Mediterranean rim. In Tunisia there are some 40,000 epilepsy sufferers, of whom 8000 have a drug-resistant form of the condition. This means a considerable and permanent health improvement, potentially for many thousands in the Tunisian population – and a major reduction in cost, because this is a permanent once-only treatment making lifelong drug therapy unnecessary.

“ We have a long-standing relationship with our sister hospital in Tunis and we have gradually improved the standard of epilepsy care with exchanges of personnel and equipment. Access to the GÉANT and EUMEDCONNECT2 networks has totally transformed the possibilities of collaboration. Being able to work with our colleagues in real time, examining scans and video-EEGs and advising on treatment options, has achieved overall results that were simply impossible before. ”

*Dominique Parain,  
Neurologist  
and  
François Proust,  
Neurosurgeon,*

*Department of  
Neurophysiology,  
Hôpital Charles Nicolle,  
Rouen, France.*



“ Working in real time with colleagues in Rouen to examine individual cases has offered new perspectives for our first group of epilepsy patients. After successful surgery they are all enjoying a life free from seizures. Actually, they have all begun a new life – all made possible by this technology. ”

*Amel Mrabet,  
Head of the Neurological Department,*

*Hôpital Charles Nicolle,  
Tunis, Tunisia*



The programme has proved so beneficial that planning is underway to set up collaborations with other Maghreb countries, benefiting an even wider population and increasing the savings in proportion. Although there are several active epilepsy medicine collaborations between developed and developing countries, this programme is the first in which Internet technology is making a dramatic difference.

It isn't only epilepsy sufferers who benefit. DANTE – responsible for building and maintaining GÉANT and EUMEDCONNECT2 – is behind a network of networks stretching around the globe and connecting millions of researchers, academics, scientists and doctors.

Many of these research and education networks are used for medical applications, reducing the costs of high-quality medical care, enabling medical skills transference and spreading sophisticated clinical practice to remote parts of the developing world lacking in skilled personnel and resources.

## **GÉANT – the dedicated high-bandwidth pan-European network**

- the third generation of the successful GÉANT project
- advanced interconnectivity between Europe's research networks through 50,000 kilometres of mostly optical fibre
- enables collaboration between nearly 40 million research and education users in over 8,000 institutions across Europe
- global connections extend the reach of GÉANT to North and Latin America, Asia, Mediterranean and Africa

### ***For more information:***

GÉANT: [www.geant.net](http://www.geant.net)

EUMEDCONNECT2: [www.eumedconnect2.net](http://www.eumedconnect2.net)

Hôpital Charles Nicolle (Tunis):

[www.italiatunisia.com/CharlesNicolle/index.html](http://www.italiatunisia.com/CharlesNicolle/index.html)

Hôpital Charles Nicolle (Rouen):

[www.chu-rouen.fr](http://www.chu-rouen.fr)

DANTE: [www.dante.net](http://www.dante.net)

EC: [http://ec.europa.eu/europeaid/index\\_en.htm](http://ec.europa.eu/europeaid/index_en.htm)

