



## DIRECT LINE TO THE DOCTOR

"Telemedicine combines mobility with high-performance innovative information and communication technology", is how Professor Georgios Sakas of the Fraunhofer Institute for Computer Graphics IGD in Darmstadt describes the benefits of T@lemed. "It gives us a practicable instrument with which we can provide a high standard of medical care in outlying regions at a manageable cost using a straightforward infrastructure. There will literally no longer be any such thing as a second-class patient anywhere in the world." Sakas heads the Brazilian TeleInVivo project at the IGD. The portable telemedical workstation consists of a 3D ultrasound scanner linked to a PC. "The doctor or trained medical staff scans a patient's ultrasound or X-ray data, then transforms them into three-dimensional volume data. The data set is sent by Internet, LAN, ISDN, modem, satellite or even GSM phone to the experts, who may be thousands of kilometers away. After this, the two physicians can even meet for a teleconsultation over the network if need be. Since the consultant has the full set of data on his own computer, he can generate new cross-sections and make an accurate diagnosis," explains Ilias Sachpazidis of the IGD. The consultants identify possible risk factors or deformities and ask patients to come for treatment if necessary. Not only expectant mothers, but all other patients benefit from the new technology. Many complaints can be examined by ultrasound scanning. The scientists expect up to 400 consultations per month at each station.

In Colombia, a group of researchers led by Stephan Kiefer of the health telematics team at the Fraunhofer Institute for Biomedical Engineering IBMT is in the process of connecting several outpatient care stations in malaria risk areas on the Pacific coast and in the Amazon region with special clinics in Cali and Bogotá. The IBMT teamed up with Greek partners to develop the TOPCARE telemedicine platform for this purpose. "Our platform caters to the medical needs of the population", declares Kiefer. "Our goal is above all to respond more quickly in future to malaria epidemics in tropical regions with few or sparse medical facilities". The TOPCARE telekiosk systems in the medical care stations are equipped with a microscope connected to a digital camera, a webcam and medical test instruments. The medical staff might for instance take a sample of patient's blood, place it under the microscope, then photograph the sample with the TOPCARE kiosk and send the pictures to the hospital along with a description of the case. Blood and urine analyses and other relevant vital parameters can also be registered at the TOPCARE kiosk and transferred to the hospital. The specialists immediately prepare a diagnosis and discuss the patient's further treatment with the medical staff.

## European patients enjoy TOPCARE benefits

... Patients are profiting from the new technology in Europe, too.

"We are currently running three pilot tests to find out how patients with acute and chronic illnesses can be better and more efficiently cared for in their own homes," reports health telematics expert Kiefer. TOPCARE is the name of an EU project in which the Fraunhofer experts from St. Ingbert near Saarbrücken have partnered with European research institutes and industrial medical engineering companies to develop a telematics platform for home care and telemedicine applications.

... The core unit is the TOPCARE box, which is either connected to the patient's telephone line or fitted with a mobile radio module. Different machines can be connected to the box depending on the type of therapy required, such as a home lung ventilator, exercise bike, blood clotting and blood sugar meter, drug dispenser or sphygmomanometer. The TOPCARE box transfers the data determined by the patients themselves to a TOPCARE telehealth server on the Internet, using the fixed telephone line or mobile radio, or alternatively faxes them to doctor's surgery. The technology for secure access to patient files has been developed by Kiefer's colleagues at the Fraunhofer Institute for Secure Information Technology SIT. The doctor has to log on to the server with a special card, and can read the measured values in the form of trend graphs and tables.

The IBMT scientists are currently testing TOPCARE with their European colleagues in pilot tests running in the Netherlands, the UK and Italy.

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