

## Argonaute 3D, Remote diagnostic and surgical strategy

The converging use of different technological innovations is opening the way to a new type of long distance communication.

Several people, geographically separated, but reunited in a common virtual space, can share and manipulate the same objects while remaining in front of their computers.

In collaboration with IRCAD of Strasbourg, France Telecom is currently participating in the development of this collaborative long distance tool, specifically in the health domain, with the Argonaute 3D project. An event that highlights the progress in both technical and medical fields.



### What ?

It is a tool that provides for long distance meetings in one common virtual space. Several people, situated in geographically distinct areas, can not only conduct a conversation in real time, but also share views of the same object and manipulate it one after the other, from the privacy of their own computer. The object is actually a 3D visual that appears on their screens and is shared by the different participants.

These participants are identified in the common meeting space by means of their virtual clones. This allows the participant to identify the clone of all participants without seeing his own. In the context of the Argonaute 3D project, France Telecom with the support of its centre for research and IRCAD of Strasbourg (Institute of research into cancer of the digestive system) puts this collaborative work tool at the disposition of the health service, proposing medical meetings of a new breed. Many medical professionals practicing in different towns or establishments can meet long distance to analyse a medical file, establish a diagnostic and plan a surgical intervention. Together they can observe and study a sick patient's organ, manipulate it, even simulate an operation.

The general practitioner can participate in this group as well as the patient himself. In medical terms, this kind of long distance meeting presents multiple opportunities: a more complete analysis of the patient's medical file, back up in taking a medical decision as well as saving time in the preparation of the surgery. In all, it gives a medical practitioner a new kind of support and expertise in terms of the comprehension of a pathology and its treatment, bringing a better and more complete treatment of the patient.



### How ?

Marking the timely convergence of different innovations in the domain of networks and virtual reality, the system is the result of several technologies merging. Its installation requires the implementation of a software developed specifically on a PC type terminal that is linked up to the network via high speed on DSL. The manipulation of the object observed, presented on the screen on a virtual table is managed by a 3D mouse which is linked up to the traditional mouse.

The visual representation of the different participants is a clone of their physical selves, modelled from photographs. The role of these clones is not to look as close as possible to the real person but to allow immediate identification by the other participants of the person speaking or executing a movement. Thanks to this original concept that offers a superior environment for communication without going so far as to reproduce a carbon copy of the real world, the users can focus on the collaborative task at hand. Another major advantage is its low consumption of network resources. A complementary option allows oral communication takes place in real time, with a spacial quality sound that promotes vocal identification and humanises the exchange.

Three technologies are needed to set up the system:

- the collaborative virtual environment Spin-3D platform developed by France Telecom R&D, integrating the functionalities handled by the 3D VSP software from IRCAD. The 3D model of the organ or the patient body is constructed from a series of images scanned in 2D.
- a software package guaranteeing the data exchange, another innovation developed by France Telecom R&D.
- and the use of a high speed connection on DSL.



## When ?

At the beginning of November 2002, an experimental project united a medical team from Paris, Strasbourg, Brest and Lannion, with the objective of establishing a definite diagnosis and surgical intervention strategy for a patient suffering from cancer. A long distance exchange was created in real time between some specialists as well as the patient's general practitioner. It was a veritable medical première which will lead the way to refining the implementation of the system and in all probability the full blown development of this kind of consultation.

Apart from the fact that the system can offer conditions of clinical observation accessible up to now only by a reduced number of medical practitioners, it creates an exceptional environment for exchange and knowledge sharing without the drawback of localisation.

Even if most of the technologies which are called on to make up the platform are already in application, the Argonaute 3D platform is still at the experimental stage. The performance of this collaborative long distance tool, its ease of use and its low consumption of the bandwidth on the network will encourage many different applications in various domains of activity. From the industrial world to teaching, commerce or computer games played on the network and more widely, in situations necessitating the intervention of several participants: online training, online work, collective creative development

In parallel, the evolution and the performance of computers sold to the general public, the increasing access to virtual reality technologies in the professional world as well as in private, the progressive accessibility of high speed connection are factors which will promote the development of this type of communication.