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**REPORT SUITABLE FOR PUBLICATION**

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# **1. THE OBJECTIVES OF THE PROJECT**

## **1.1. Background of the project**

Most companies spend a considerable amount of money to store technical documents without even being able to retrieve them and manage them locally. Another problem is that there is no means to communicate between different sites once a company has designed its proper database.

With regard to public databanks, companies today rely heavily on online services to formulate a query, but after the indexing reference has been selected, the document itself has to be ordered from an information provider or a document delivery service to be processed by the user. This method is time consuming and rather expensive, due to the delay of obtaining the required information.

## **1.2. The GEOTEL consortium**

GEOTEL was formed as a consortium of 5 European companies. The major aim of this three year project was to provide a system capable of forwarding facsimile documents to remote consultation stations in Europe. Although the consortium first examined the requirements in the area of oil and chemistry, the system will be implemented in other areas such as manufacturing industry and office environments.

## **2. THE WORK BEENG DONE**

### **2.1. The telecommunication part**

The GEOTEL consortium has built a system based on two servers: a database server and an image server. The indexing (database) server is accessed through the Packet Switched Data Network (PSDN) or the Public Telephone Switched Network (PSTN), both of which suit the small amount of informations being exchanged with the station. Once the indexing reference has been selected, its reference is automatically sent to the ISDN server so that to instantly recall the corresponding image.

### **2.2. The station**

The GEOTEL consortium has eventually developed a flexible system to be integrated in current office environments. The first phase was a PC DOS solution with the database and the images being stored on the same server and accessed via an ISDN link. The second step was running under the Windows 2 graphical environment; the database being stored on the station. The final Windows 3 release separates out the database and the image servers so that to provide the most convenient link during the querying procedure.

A UNIX version was developped so that to fully take advantage of its multitasking capability and enable the station to simultaneously connect to different retrieval services and recall the corresponding images as well.

### **2.3. The server**

The server is a PC DOS machine which ensures four simultaneous connections to be satisfied. Administration tools have been developped so that the device to be able to record the connections being established. The DOS and UNIX servers were developped simultaneously and processed with different compilers.

### **2.4. The international offer**

The GEOTEL consortium has succesfully installed stations in three diffrent countries - France, England and Germany - networked to the Paris server. The installation takes into account board agreements in the different countries as well as the heterogeneity of the national ISDN networks.

## **2.5. The GEOTEL Market studies**

The consortium has carried out a careful survey of the potential for facsimile documents in the instant delivery market - standardization bodies, national patent organisations as well as information providers - in order to fully evaluate the customers of a GEOTEL based system.

Considering the popularity of the newly emerging CD-ROMs and their close relationship with current online databases, a primary document instant delivery system can be considered as the most advanced media in terms of data update and information accuracy.

It is important to remember that online services provide only the reference of a document, whatever the sophistication of the searching tool; this means that the user remains dependent on the information providers once the selection has occurred. However, CD-ROMs are wholly suited to the consultation with a slow rate for updates; This is due to the fact that the information is only reprinted when the stored data has evolved.

## **2.6. The GEOTEL Office automation developments**

The GEOTEL consortium has developed tools which enable users to convert CAD/CAM and word processors to the standardized Group IV image format. In order to process different categories of software, the command is applied to the printer output format. With this tools, the GEOTEL user is provided with the ability to recall office as well as CAD/CAM documents from a distant server.

The choice of the Group IV image format has been deliberately imposed by network requirements, namely cost and effectiveness; the obtained compression ratio (1/20) being by far the most powerful tool for storage improvement and transmission performances.

## **2.7. The user interface**

The consortium has carefully evaluated the users requirements in term of database access, reference retrieval, documents recall and images display. A specific interface has been designed between GEOTEL and a selected market retrieval software in order to promote the system.

## **2.8. The GEOTEL 2 Mbit prototype**

The consortium has developed a 2 MBit prototype between two PCs in order to evaluate large file transfers in a GEOTEL based service. The experiment has been carried on together with the French manufacturer SCII who has provided the boards. This procedure shall be used for database updates as well as for large documents consultation.

## **3. RESULTS OBTAINED**

### **3.1. The telecommunication point of view**

The final achievement of the project is the ability to establish independent servers in Europe with consultation stations being connected, according to the requirements of users sets. The flexibility of the GEOTEL service matches the general aim of the RACE programme whose intent is to set up virtual private networks in Europe on shared telecoms infrastructures

### **3.2. The customer**

The GEOTEL system is wholly suited to organize groups of users or multi-sites companies so that they can share a technical documentation stored on a distant server. GEOTEL is a fac simile delivery system which can be interfaced with any current retrieval software: proprietary, SQL based, online service or language interpreters. GEOTEL is particularly suited to the consultation of technical documents either shared by restricted groups of users or distributed among several locations for one single company.

### **3.3. The user interface**

The windowing environment (UNIX or MS-Windows) provides a simultaneous display of several documents on the same screen, regardless of their origin database. The consultation procedure is particularly suited to technical information retrieval since both menus and lists of suitable terms are displayed on the screen together with the selected documents.

Particularly useful in supplying users with a sophisticated tool for image management, GEOTEL provides a whole set of attractive commands; browsing, rotating, zooming and printing are thus offered on the consultation station so that the Operator to carefully utilize the content of the file in which he is interested. Particular attention was paid to the screen management in order to continue the retrieval process without interfering with the image display.

The ergonomomy of the workstation is optimized inasmuch as the connections to the telecom network are fully automated within the retrieval commands. The GEOTEL Office Document Communication (ODC) model is therefore tightly integrated within the spectrum of standard office functions.

### **3.4. image format**

The pioneering advantage of the GEOTEL solution can be summarized as follows: availability of an image format, whatever the document source, and potential interface with documentary software which can manage the computer Files.

This homogeneous access given by the GEOTEL station to a distant twofold document management architecture is considered as a major achievement of the project.

A GEOTEL input station will therefore be equipped with the necessary converters to transform the computer file into its image format. The image being thus consulted from a "vanilla" station, without running its generating software.

GEOTEL was originally planned to transmit black and white images, but the application is certain to transfer any category of data: large documents like CAD/CAM files, geological sections or color images between different intervenees.

### **3.5. The GEOTEL tools**

Other than its ambition to provide a flexible service for primary document consultation, the GEOTEL consortium has developed several tools to equip the user with a set of commands capable of fully integrating the image delivery within more general office automation purposes.

#### PCL to GIV converter

The converter from PCL to the Group IV compressed format provides the user with a distant *access* to rasterized text files irrespective of their generating process. The conversion ensures the overall layout and fonts of the word processor to be saved. This tool enables the station to display a text without using its word processor, since its formatted form (image) only is transferred.

#### CAD/CAM to GIV converter

Similarly, CAD/CAM to the Group IV converters permit the user to recall images of computer generated documents regardless of their generating process.

#### E-Mail

The developed E-Mail facility will equip the GEOTEL interconnected users with a document exchange tool. Based on existing X 400 E-Mail services for the indexing part, it relies upon the ISDN link for document transmission. Any kind of image - handwriting, converted word processors, converted CAD/CAM as well as raster files - are thus likely to be communicated by this means between GEOTEL stations.

#### Hypertext

Owing to office requirements, the GEOTEL consortium has developed a prototype involving hypertext facilities. Highlighted areas are thus designed so that specific terms, fitted with selected fonts, generate hypertext links which will be saved during the PCL to Group IV conversion.

### **3.6. The commercial service**

Since GEOTEL may provide technical informations ruled by commercial requirements, statistical tools were developed on the server in order to fairly retribute the database management. During the pilot phase of the project, carried on with the French Standardization body (AFNOR), the fee charged for a GEOTEL ISDN consultation was based upon the current price of the paper copy.

### **3.7. LAN availability**

Based first on public links, the GEOTEL solution can be wholly integrated on a Local Area Network to enable users to access office documents in the same way. The ability to simultaneously handle both formatted and processable counterparts of a document is one of the main achievements of the GEOTEL project. This architecture can be adapted to any office or document manufacturing program for management purpose.

## **4. GEOTEL TODAY**

### **4.1. The GEOTEL offer**

Today GEOTEL is the first ISDN based transnational fac simile documents delivery system in Europe. Based upon a client/server architecture, it separates the reference database and the image server which provides the greatest flexibility to the user.

Since GEOTEL has directly contributed to the opening of ISDN links between different European countries, it is well placed to ensure the interconnection of heterogeneous ISDN networks.

### **4.2. Current applications**

Following its R&D phase, the GEOTEL system was selected by the French Lifts Manufacturers Federation to provide an instant consultation of safety rules and standards for the profession. The primary documents are stored on an ISDN server and accessed from both France and Belgium via ISDN as soon as their reference has been selected from the indexing database.

GEOTEL was selected among videotex and CD-ROM solutions since it was considered as the most convenient device to comply with the requirements of the users: frequent updates, integration of drawings, modification of both indexing and the document itself according to the new releases.

In the more general context of IBC, GEOTEL can be considered as an ambitious application to be implemented above current retrieval procedures but with the considerable added value of the primary document instant delivery.