THE ONTARIO TELEPRESENCE PROJECT

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ABSTRACT

The Ontario Telepresence Project is an inter-disciplinary research effort between academics and industry scientists studying sociological issues associated with the deployment of advanced computer and video supported cooperative work systems. The project's focus is on the integration and packaging of existing computer, video and telecommunications systems and on the development of methodologies for their successful deployment in arms-length user sites.

KEYWORDS: desk-top video, media space, inter-disciplinary research, user studies, CSCW.

INTRODUCTION

The Ontario Telepresence Project (OTP) is a three year, $5.7 million pre-competitive research project whose mandate is to design and field trial advanced media space systems in a variety of workplaces in order to gain insights into key sociological and engineering issues. The OTP is part of the *International Telepresence Project* which links Ontario researchers to counterparts in four European nations. The Project's major sponsor is the Province of Ontario through two of its Centres of Excellence -- the Information Technology Research Centre (ITRC) and the Telecommunications Research Institute of Ontario (TRIO).

Figure 1: *Various OTP prototypes are shown including the Active Desk and Hydra picture phone units.*

OPERATION

The OTP is a partnership of academic and industry researchers including faculty, students and professional staff from Engineering, Computer Science, Psychology and Sociology from the University of Toronto and Carleton University as well as staff located at Industry Partner sites. To gain first hand experience with the media spaces being prototyped, all aspects of work are conducted without regard for geographic location of the project participants. Experimental versions of a media space system are used to link collaborator's desk-tops and conference rooms.

Research Infrastructure

Most researchers associated with the project are connected to one-another via a CSCW environment which includes desktop video and computer conferencing. The underlying infrastructure for audio/video connections is a device and channel switching/control software called *IIIF*. IIIF maintains a virtual office model, including facilities for controlling personal accessibility. Point-to-point and multipoint A/V synchronous connections can be made by any user through a GUI running on their workstations. IIIF also controls devices such as CODECs (for off-site video connections), various baseband A/V switches, and VCRs. Currently, about 10 IIIF sites are operating world-wide including field trial sites, conference rooms, laboratories and industrial partner installations. IIIF servers will soon be able to inter-operate so that connections can be made person-to-person between site-separated individuals.

Management and Organizational Structure

Research is organized around three interlocking themes; Social Science and Field Studies, Applications and User Interface, and Engineering. Activities conducted within each theme include prototype builds, user experiments, and field studies. Researchers are often active in more than one theme.

Overall management is provided a Scientific Director, responsible for the scientific objectives of the project and a Managing Director, responsible for the project's external relations, finances and administration. OTP directly employs 14 people (full and part-time) but involves over 30 people in its various activities.

Industrial Partners

The OTP includes a small number of companies which share knowledge and technologies gained through the course of the research. These firms make an annual commitment of cash and other resources to support the research.

Collaboration between academic and industry participants on the project is predicated on the belief that technology

transfer between researchers happens best through an on-going process of bi-directional interchange and learning. As such, an important pre-condition to participation in the OTP is that all Industry Partners commit people in addition to cash and other in-kind support. It is through the active participation of individuals from partner firms that benefits are identified and extracted from the on-going work.

International Collaboration

The OTP is part of a larger research program called the "International Telepresence Project" which links Ontario with sites in the "Four Motors" regions of Europe: Baden-Würtemburg in Germany, Catalonya in Spain, Lombardia in Italy and the Rhône Alpes in France. European partners work in complementary areas of research -- tele-medicine and distance education. Participants exchange researchers, share software and hardware and also meet regularly to share experiences and insights.

ACTIVITIES AND OUTPUTS

The project's objective is not to produce new products or services. Rather, we explore the sociological effect CSCW systems have on the workplace. Thus, the project's sociologists lead the research agendas of the computer scientists and engineers. In house experiments and field trial sites selected by the social scientists provide the setting for the technologists work. Consequently, technical staff focus on system integration issues rather than on device or code creation. Thus, the systems deployed largely contain commercial components that are configured in novel ways to explore social issues.
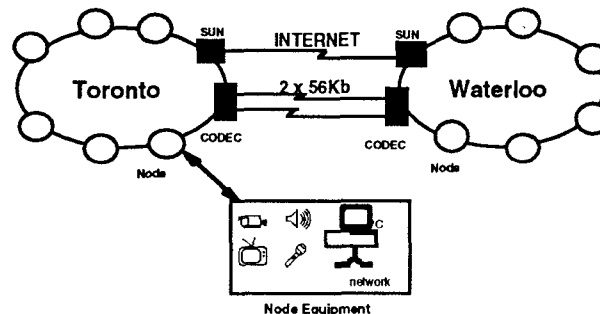

Figure 2: Computing and Telecommunications networks for the INDIGO user trial.

Field Trials

Driving all other activities is the design and deployment of prototype media spaces and the subsequent analysis of their social consequences. To this end, the project undertakes a number of laboratory experiments and field studies.

The first major field trial, code-named "Indigo", involved a small company with four sites in southern Ontario. Nine people from the Head office in Toronto and a site in Waterloo were outfitted with a media space system (see Figure 2). Each had desk-top video conferencing (multi-point), a shared file system, a shared workspace (using a commercial screen sharing product), and other customized features such as a virtual window to the outside of the building.

Prototypes

Numerous prototypes have been built and deployed for internal evaluation and field trial use. Below is a small sample of the systems built. Further information on these prototype (and the ones shown in Figure 1) are available in the various technical reports produced by the project.

Video Answering Machine . The video answering machine is a hardware/software system connected to the A/V network at the Ottawa site of OTP. Using a computer controlled VCR, incoming video CODEC calls are detected and responded to with a pre-recorded video greeting. After the greeting, the incoming messages from the caller is stored on a standard VHS tape which is indexed by the computer. The computer displays incoming messages (phone number, time, date, etc.) and controls the VCRs (storage medium) to enable search and play of selected messages.

Universal Mail Box. This prototype lets users send or receive voice mail messages from either a telephone hand-set or a PC. It consists of a voice automated attendant for the telephone, a custom X-client (with MAC, PC equivalents) for receiving, sending, or forwarding voice mail, and MIME capable e-mail software). A voice server selectively sends digitally stored voice-mail messages over the INTERNET or replays it over the public phone network as appropriate.

Video Mail. OTP sites have deployed an internal video mail system that lets users exchange short video messages. It consists of a custom MAC client and a server that stores messages on a standard VCR using the IIIF server for local routing. Inter-site messages are periodically retrieved from local storage and batch-shipped over CODECs to the far site. Users are informed of incoming video-mail messages by an automatically generated e-mail message.

Desk Area Network (DAN). The DAN is a system which enables the semi-automatic control of interconnections among A/V components in a room. Software, running on a local workstation, stores the status, location and purpose of A/V peripherals (such as VCRs and monitors) and can thus make intelligent routing decisions using a local A/V switch. For instance, if a videotape is inserted into a VCR and the "record" button is depressed, the office connections are automatically changed so that both videoconference sites are recorded onto the tape using a picture-in-picture unit. Similarly, if the play button is pressed, the room cameras are disabled while both sides of the meeting see the video tape on their monitors.

CONCLUSIONS

The Ontario Telepresence Project distinguishes itself from other CSCW efforts in its focus on integration of existing computer and telecommunications systems for arms-length field trials. By having a "user centred" approach, the project is able to gain important insights into user acceptance and adoption patterns which is both of scientific interest and of commercial value to its Industrial Partners.