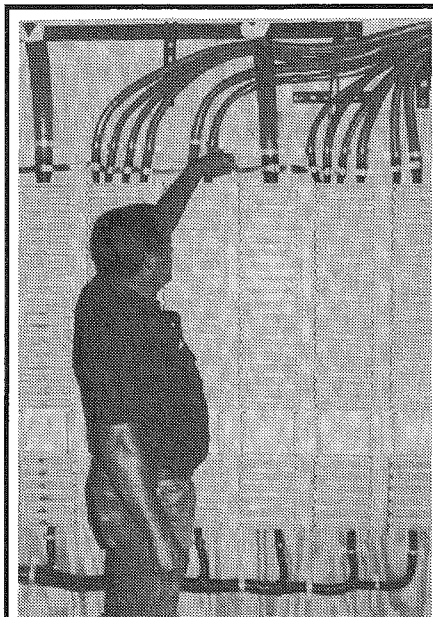


Telecom News

University Telecommunications
The University of Arizona

August 1989
Volume 1, Number 5



A telecommunications consultant inspects new wiring connections between offices and the campus cable system in the Modern Languages building.

TIPS Quality Review Reduces Inconvenience

You feel invaded. Strangers have occupied your workspace. They've attached metal tubing on the walls and pulled wire into it. They've opened the ceiling above your head while you've had to go on about your business. And they've replaced phone jacks in the walls. Is this work being done correctly now so that you won't have to put up with it again?

A telecommunications consulting firm has been constantly reviewing the quality of this and all other TIPS work. This quality review will ensure adherence to project specifications, will help remedy unexpected problems during TIPS work, and will minimize rework and the consequent inconvenience to those in offices.

The consulting firm, Telecommunications International Inc. (TII), was hired originally to assess present and future UA telecommunications needs and then to write up specifications for the project (TIPS) designed to meet those needs. This work makes TII a thoroughly informed reviewer of TIPS.

TII consultants are out on campus every day to observe the whole range of TIPS work. This work, performed by U S WEST and its half dozen subcontractors, includes burying conduit, pulling cable into conduit, splicing wires, drilling concrete, and installing new wiring and jacks in offices.

Observing this work, TII consultants take notes and photographs and then give these in a daily report to Dan Roman, Assistant Director for Planning in the University Telecommunications department.

"Neither U S WEST nor the University wants to redo work at the end of the project," says Roman. Because of this mutual desire to have work done

(Continued on page 3)

UA Pilots Evolving ISDN Technology

Talking on the phone and sending a computer file simultaneously over the same telephone line; accessing phone and computer services from a single jack; transferring data at high speeds over phone lines. These are some of the commonly advertised capabilities provided by ISDN. ISDN, or the Integrated Services Digital Network, is an evolving set of standards for a digital network carrying both voice and data traffic. These standards define interfaces for connecting to the network and services provided by the network.

As part of the TIPS project, the UA has just completed the implementation of a pilot project exploring the possibilities of using ISDN for data transfer over phone lines and the

simultaneous transfer of voice and data. U S WEST, the main contractor for TIPS, has been coordinating the pilot project with the assistance of AT&T, the manufacturer of the SESS digital switching system, and the University Telecommunications department. The Optical Sciences department and Pathology department in the College of Medicine were chosen for the pilot.

The ISDN Application

The Optical Sciences department is working on a joint project with the Pathology department in analyzing cancerous cells in tissue samples. Optical Sciences has developed an artificial intelligence system that is

(Continued on page 2)

In This Issue:

TIPS Quality Review	1
ISDN Pilot	1
Call Waiting with Modems	3
Customer Service Orders	3
News Briefs	3
TIPS Q & A	4
New Telecom Personnel	4
Subscription Form	4

ISDN Pilot, continued from page 1

capable of analyzing cell structures and patterns in tissue samples. This analysis provides an additional tool for pathologists to use in their diagnosis.

The whole process begins with Marc Sabb, a Research Assistant in the Pathology department, who scans tissue samples using a laser scanning microscope. These tissue images are converted into a digital format and saved on a microcomputer with a hard disk. Once a week, Sabb removes the hard disk and drives it across campus to the Optical Sciences Center. Sabb then transfers the data from Pathology's hard disk to an Optical Sciences department computer, where the artificial intelligence system resides. Sabb drives back to Pathology and reinstalls the hard disk. The process may take several hours of Sabb's time and also causes some department interruptions in Optical Sciences during the transfer.

Using ISDN, Sabb no longer has to remove the hard disk and carry it across campus; the tissue image files can be transferred at high speeds over digital phone lines. In order to explain how this process works, we first need to take a quick look at some ISDN concepts.

The B's and D's of ISDN

When you dial a phone number, signals are sent to a telephone switch that tell it where to place your call. These signals are transmitted in-band; that is, they use the same channel (transmission path) that carries your voice conversation. For example, if you're in the middle of a phone conversation and the person you're talking to starts to dial, you will hear the touch-tone signals in your ear. These signals do not make it to the telephone switch since the channel is being used for your voice conversation.

ISDN uses out-of-band signalling; signals are carried on a channel

separate from the one that carries voice. By using a separate channel for signalling, you could be talking on the phone at the same time you are dialing into a computer system.

The B-channel and D-channel are the main building blocks of ISDN transmission. The B-channel, also called the bearer channel, can carry data or voice at 64 kilobits per second (kbps). The D-channel is used to carry signalling information (e.g., on- or off-hook status, dialing information, and busy signals). This channel may transmit at 16 or 64 kbps depending on the ISDN level of service.

The ISDN level of service specifies the channels that are available and transmission speeds. For example, the level of service used in this pilot project, Basic Rate Interface, consists of two 64 kbps B-channels and a 16 kbps D-channel. (You will often hear Basic Rate Interface service referred to as "2B+D".) There are other ISDN channels, but we will restrict our discussion to the B- and D-channels.

The ISDN Solution

U S WEST installed an AT&T PC with an ISDN controller in the Pathology department and one in the Optical Sciences department. These PC's are connected to the computer systems used in the tissue analysis. An analog (normal) phone set is also connected to each PC. These PC's are connected by a one-pair wire to the 5ESS digital switching system in the downtown Tucson Central Office.

With the ISDN setup, Marc Sabb now transfers the tissue image file from the Pathology department computer system to the AT&T PC. Sabb then types a command on the AT&T PC which automatically dials the PC at the other end; this signalling information is sent over the D-channel through the 5ESS downtown. The image file is then sent over one of the B-channels at 64 kbps

to the AT&T PC in Optical Sciences. The information is automatically saved to a computer where it can be analyzed by the artificial intelligence system.

Sabb is able to complete the transfer without leaving his office, and at the same time the data is being transferred, he can pick up the phone connected to the AT&T PC and call Optical Sciences or any other destination.

The Future of ISDN at the UA

This ISDN pilot project has been useful in identifying problem areas that need to be resolved before ISDN is made available to the general UA campus. The UA will continue to be involved in ISDN pilot projects to find solutions to these problems and to further explore applications for ISDN at the University.

At cutover to the UA's new telecommunications system, the 5ESS switch will provide separate voice and signalling channels; however, it will only have a limited number of data channels. Successful ISDN pilot projects will be migrated to the UA's 5ESS switch in the future. Meanwhile, the University Telecommunications department will be watching the ISDN market closely because new standards are still evolving and external tariffs have yet to be set.

Telecommunications Services Directory

Customer Service Orders (Data/Telephone Lines)	1-5100
Network Control Center (24-Hour Data/Telephone Trouble Reports)	1-7999
Billing Inquiries	1-5100
Telex/Telegrams	1-3030
PC/Terminal Maintenance and Paging Services	1-5050
TIPS Hotline/Help	1-TIPS

Turning Off Call Waiting When Using a Modem

If you use a modem with a telephone that has call waiting, you no longer have to worry about being disconnected in the middle of your computer session. A feature called "controllable call waiting" allows you to shut off call waiting for a particular call.

Controllable call waiting is available in most Tucson calling areas. You can check on the availability of this feature in your calling area by contacting U S WEST Communications at 884-BELL (884-2355). Please note that controllable call waiting is not available on the University phone system.

To activate controllable call waiting on a touch-tone phone:

Dial *70 + the phone number of the computer you wish to call.

This will disable call waiting for that call (and only that call). Instructions for controllable call waiting can also be found in the beginning of the Tucson telephone directory.

TIPS, continued from page 1

right the first time, there is constant interaction between the University Telecommunications department and U S WEST.

Occasionally a problem will arise when "a practice may meet technical standards," says Roman, "but a specific application of that practice may require some slight modification."

TII recently observed such an application at Mohave dormitory. The installation of dorm room wire molding—metal tubing containing phone wiring—was being done to

specification, yet the placement of the molding did not allow window blinds to be removed for periodic cleaning.

TII consultants met at the dorm with a representative of the UA's Residence Life department, with Dan Roman of the University Telecommunications department, and with a U S WEST crew chief. An agreement was reached for an alternate routing of the molding that would meet dormitory needs and would still meet technical standards. With this problem resolved, U S WEST installers immediately resumed their work.

As offices are rewired for TIPS, the consultants verify that the thousands of new phone and data jacks are installed where specified in blueprints. Most mistakes are corrected by installers immediately so that phone users will be spared the additional inconvenience of corrections made later.

Also, in tunnels, manholes, and basements, the consultants scrutinize thousands of new copper wiring connections (see photo on page 1) in order to ensure uninterrupted phone and data communications in the future.

Customer Service Orders During TIPS

To order phone service (new, changes, disconnections) or data service (IDX connections) during the TIPS project, please use our normal ordering procedure by calling our Telecommunications Customer Services group at 621-5100.

Please note that U S WEST cannot answer service questions or process service orders. This is necessary to reduce confusion and help U S WEST complete installations according to their schedule.

We are keeping a record of all service orders received after the jack inventory. These jacks may not be wired at the same time that the installers are doing the majority of work in your building, but they will be wired before the final completion of TIPS. If you have an active jack that was missed during the inventory, please report it by calling our hotline/help number, 621-TIPS (621-8477), Monday-Friday, 9 a.m. to 4 p.m. Missed jacks may not be wired immediately, but they will be corrected before TIPS completion.

Thanks for your continued help and support in making TIPS a success!

News Briefs...

Telecommunications Briefing in September

On September 21 Bob Leach, University Telecommunications department director, will give a briefing that will include an update on the TIPS project and an overview of plans for cutover to the new telecommunications system provided by TIPS. All are invited, and questions are welcome. The briefing will be from 9-11 a.m. in the Senior Ballroom of the Student Union.

Optical Sciences Connects to UA Extended Ethernet

Computer users in the Optical Sciences building can now communicate with other users of more than 300 computers at the UA and tens of thousands of computers worldwide. The University Telecommunications department, through its subcontractors, recently completed the wiring that connects 16 computer systems in the Optical Sciences building to the UA extended ethernet. The UA

(continued on page 4)

News Briefs...

Optical Sciences, continued from page 3

extended ethernet is a network which links computer systems in 11 buildings on the University campus. This campus network is also connected to the National Internet, a large number of computer networks (e.g., ARPAnet, NSFNET, and MILnet) that communicate using TCP/IP.

TIPS Q & A

This column is featured each month in *Telecom News*. It provides answers to frequently asked questions about the TIPS project. If you have any questions or concerns about the

TIPS project, please call 621-TIPS (621-8477) between 9 a.m. and 4 p.m., Monday through Friday.

Q. Will ISDN data switching be available through the new 5ESS telephone switch at cutover?

A. ISDN data switching will not be generally available at the time of cutover to the new telephone switch. While the switch itself is capable of performing digital data switching, additional electronics are required to support ISDN data circuits. The new phone switch will initially have equipment to support a limited number of these circuits for ISDN pilot projects (such as the Optical

Sciences pilot discussed in this issue). As the ISDN technology/industry matures, increased campus access to ISDN services will occur.

New Telecom Personnel

Janus Lindholm- Janus has joined the Telecommunications Information Support group as an Office Automation Specialist. She is providing software and user support for electronic communications applications such as CoSy and Videotex. Formerly in CCIT Instructional Computing, Janus has six years experience in training, consulting, and documentation.

Telecom News

Telecom News is published monthly by the University Telecommunications department at the University of Arizona. Articles may be reprinted without permission as long as credit is given to the newsletter.

Inquiries and suggestions are welcome and should be addressed to *Telecom News*, University Telecommunications, Computer Center 73A, Rm. 131, or call 621-TIPS.

Publisher: Amelia Tynan
Telecommunications Services

Editors: Terry Robinson
George Shelton
Warren Van Nest

Subscription Form

Subscriptions to *Telecom News* are free. If you already receive the newsletter, we will retain your name on our mailing list unless you request cancellation. To subscribe or change subscription information, complete this form and return to: *Telecom News*, University Telecommunications, Computer Center 73A, Rm. 131.

- Add my name
 Cancel my subscription
 Change my address (include current address label)

Name: _____

Phone #: _____

Dept.: _____

Campus Address: _____

Telecom News

University of Arizona
University Telecommunications
Computer Center 73A, Rm. 131