

Technology

Roads—Bridges—Transit—

Iowa Transportation Center

Iowa State University

News

June 1995

Iowa legislature ends session

Iowa's '95-'96 transportation programs benefit from budget surplus.

The Seventy-sixth General Assembly ended the 1995 session on May 4, and local transportation agencies will experience some benefits from this year's transportation legislation.

According to Michael Coverdale, legislative liaison at the Iowa Department of Transportation, of particular importance is a key piece of the Iowa DOT's appropriation bill (Senate File 481). This piece moves the funding source for the Iowa Highway Patrol from the road use tax fund to the general fund.

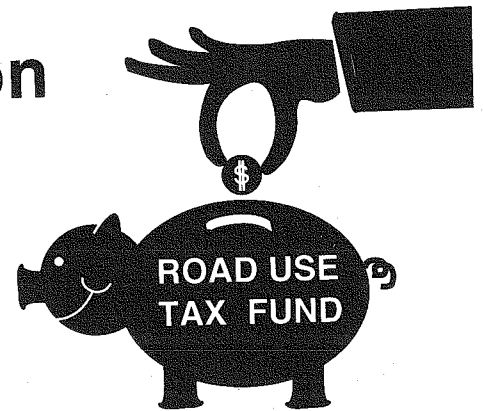
Effective July 1, this change will result in an immediate additional \$33 million in the road use tax fund from which city street funds and county farm-to-market and other secondary road funds are drawn.

To accomplish this change in funding, the bill reallocates disbursement of the so-called "fifth penny" of the use tax on gasoline, which for the last few years has gone to the general fund to be applied specifically to the state debt. Beginning this July, fifth penny monies will fund the Iowa Highway Patrol. Excess fifth penny monies (approximately \$5 million) will be split between the road use tax fund formula and improvements to the commercial/industrial network (the identified state road system).

"Eventually," says Coverdale, "over a period of four years, the entire fifth penny will go to road construction and maintenance."

One other change worth mentioning: One piece of the Iowa DOT's general techni-

cal bill (House File 460) allows the DOT to renew state highway corridor preservation options every three years. By prohibiting private development on state highway corridors, the state will save highway construction costs—a savings that ultimately can translate to more money for local projects. ■



Study focuses on special needs of rural transit

An Iowa State University study examines the issues and options in vehicle tracking technologies for mid-sized metropolitan and small rural bus agencies.

"We're a complete bus system," says Carol Lewiston, director of Boone County Transportation. "We provide rural and city service and fixed and demand-response routes. We serve the elderly, the handicapped, the general public, and special populations like children in daycare centers." With a fleet of 12 buses to cover all of Boone County, Lewiston routinely juggles maintenance emergencies and scheduling/routing decisions.

Lewiston is one of several managers of small to mid-sized transit agencies in Iowa who are watching with interest a research project led by Mary Kihl at

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Iowa State University. Together with her research team Kihl, professor of community and regional planning and associate director of the Design Research Institute in the College of Design, is investigating the value of automatic vehicle locator (AVL) tracking systems, dynamic (real-time) scheduling systems, and maintenance monitoring systems for small and mid-sized transit companies.

Automatic vehicle tracking

Basic AVL systems accurately pinpoint all available vehicles in a fleet and display vehicle locations on a map, greatly assisting dispatchers. More sophisticated AVL systems add other features:

- On-board warning lights notify drivers if they are early or late for key stops.
- Strategically placed message boards give passengers up-to-the-minute information on bus arrival times.
- On-board enunciation systems automatically announce major stops.
- On-board silent alarm systems assure both passengers and drivers of greater safety.

Ultimately, fullblown AVL systems in paratransit (demand-responsive) vehicles add on-board, real-time display maps that enable drivers to adjust their own routes and schedules.

Across the country many major city bus companies are experimenting with AVL tracking systems or are installing them in their fleets. Small and mid-sized agencies are increasingly aware of the benefits of AVL tracking systems and are debating whether such systems can be affordable. During the first two years of her study, Kihl and her team focused on

the possibilities for "low-cost" tracking systems for smaller transit operations in Iowa.

GPS-AVL

For most transit agencies, the AVL of choice is based on global positioning system (GPS) technology. Using portable receivers and a triangulation of locational readings from orbiting U.S. Department of Defense satellites, GPS technologies determine exact locations of receivers at regular intervals. GPS technologies offer flexible installation and up to three-meter accuracy in tracking. For bus operations, GPS offers the potential for pinpointing the location of all vehicles in the fleet at any time, usually on a map display system.

Interest in GPS tracking systems is increasing rapidly. Since Kihl's study began nearly three years ago, 21 cities have begun installing or procuring GPS systems for their buses. Denver now has a GPS tracking system installed and operational on most of its fleet; Milwaukee is not far behind. Minneapolis has a working bus tracking system in operation along the Interstate-394 corridor.

Putting together an affordable GPS-AVL system

Are GPS systems affordable for smaller operations without heavy federal subsidies? After experimenting with each component of a GPS tracking system to identify minimum costs for a basic system, Kihl says, "Yes—if you can resist some of the bells and whistles.

"The single most important step for acquiring an affordable AVL system is setting priorities. Officials need to weigh

the benefits against the costs of each feature of an AVL system. In other words, you have to determine what your primary objectives are so you don't put money into features you don't really need."

After setting priorities, transit officials should consider other issues:

- If you install a basic system, make sure it has an open, expandable architecture so features and/or units can be added when more funds are available. "As with other investments, selecting the lowest cost system today might mean sinking capital into what could be a high-maintenance white elephant tomorrow," Kihl cautions.
- Assess your in-house maintenance capabilities realistically. "Many small to mid-sized transit agencies, and especially rural companies, don't currently have the resources for maintaining and repairing sophisticated AVL equipment," Kihl says.

Steve Spade, general manager of the Des Moines Metropolitan Transit Authority and a member of the advisory committee to Kihl's study, is taking the approach Kihl suggests. Beginning in October 1995 with 10 buses and adding 10 more in December, the Authority plans to phase a basic AVL system into its fleet over the next year.

"We're starting with vehicle location and schedule adherence capabilities," Spade says. "We can add other features like automatic stop announcements later, if and when we've got the money.

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Director — Tom Maze; Assistant to the Director — Jan Graham; Associate Director of Outreach — Duane Smith; Editor — Marcia Brink; Safety Circuit Rider — Ed Bigelow; Program Coordinator — Sharon Prochnow; Library Coordinator — Stan Ring; Account Clerk — Diane Love; Secretary — Margaret Hammer

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The opinions, findings, or recommendations expressed here are those of the Iowa Transportation Center and do not necessarily reflect the views of the Federal Highway Administration or the Iowa Department of Transportation.

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"In the first phase we'll install the base station, communications equipment, and the programming and software. In subsequent phases as we equip more buses, the per-bus installation costs will be relatively low."

Rural transit's needs

The special challenges involved in applying AVL and computer scheduling systems to rural transit operations are the current focus of Kihl's team. For small, rural, demand-responsive transit systems, the primary operational concerns include:

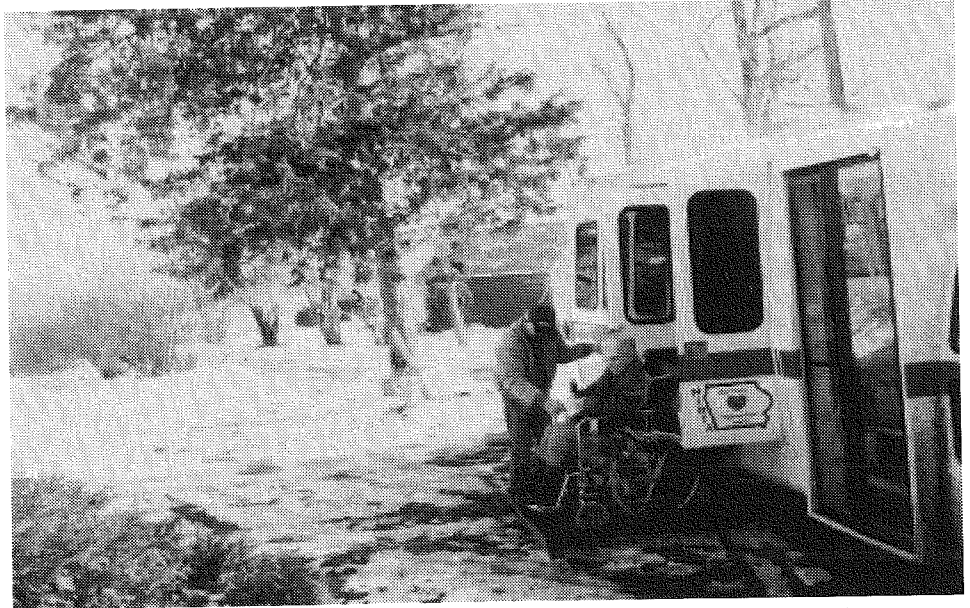
- reducing the time spent in trip scheduling
- reducing the length of time needed between a request for a ride and the actual pickup
- increasing the proportion of on-time pickups
- scheduling vehicle maintenance

Boone County Transportation stretches the limits of rural bus service. Lewiston says, "We provide Head Start and Foster Grandparent service and wheelchair-accessible buses for the public schools. We deliver children to dancing lessons, and elderly patients to area medical clinics. We coordinate tourism services with a commercial bus line and are working with that line to coordinate commuter service to Des Moines."

With all those services and more, Lewiston says, "The schedule needs often change from minute to minute. Coordinating so many types of transportation needs requires close local supervision to make the system work. We are close to outgrowing our manual scheduling system."

The current study is assessing the relative costs and benefits of installing AVL on such a rural, demand-responsive system. For such a system, three-meter accuracy in tracking vehicles' progress is less important than securing sufficiently accurate locational information to find a broken-down vehicle in a remote location.

Costs for installing an independent AVL system are almost prohibitive for a very small operation. There are definite



Rural transit companies have different scheduling issues from their urban counterparts. Preventing breakdowns in remote areas and monitoring trip time, idle time, and down time are important concerns.

economies of scale at work, since the same base station would be needed for tracking one vehicle or one hundred. The current study is exploring the potential for linking several small operations in different counties using a common AVL base station.

The study also explores the relative benefits and costs of employing another technology—dynamic (real-time) scheduling. Although this would not provide locational tracking of vehicles, it would reduce the time spent in building schedules and the extent of advanced time needed between requests and pickups. Sophisticated versions of dynamic scheduling programs also offer networking, which can assist in inserting return trips. This feature could be useful in more densely populated areas.

The study will also assess the relative costs and benefits of investing in a computer-operated system for monitoring vehicle maintenance. When not linked to a radio or an AVL system, a basic fleet monitoring system would not operate in real time. It could not supply real-time locational information nor assist with real-time scheduling and networking.

Yet, when downloaded at the end of the day, it would provide reliable updates on the condition of each vehicle in the fleet. This information would address a primary concern of rural transit operators by minimizing the potential for a breakdown in a remote area.

"Several vehicles in our fleet are close to worn out," says Lewiston. "The garage mechanic's daily check of basic systems may not be enough to avoid breakdowns." For Lewiston, sophisticated condition information about vehicles' mechanical systems to supplement routine maintenance could be beneficial. The ability to monitor trip time, idle time, and down time would also help.

The end product of the study will be an evaluative tool that will help small rural operators focus their questions and choose technologies that will come closest to responding to their needs, given funding limitations

For more information about the study, contact Mary Kihl, 515/294-0734. ■

Iowa DOT reorganization: spotlight on Planning and Programming

Previously named the Planning and Research Division, the Planning and Programming Division had two goals in mind when it reorganized:

- Move functions to the appropriate area within the division to sharpen the focus of each office.
- Respond to the multimodal requirements of the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA).

These goals emphasize the DOT's interaction with local planning organizations and place more emphasis on intermodalism.

The division examines state transportation facilities and systems, determines what short- and long-term changes and improvements will be needed in those systems, and, based on those needs, designs short- and long-range transportation plans for the state. The division is currently working on the state's transpor-

tation plan through the year 2020—Iowa in Motion.

Before reorganization, the DOT's transportation planning emphasized individual modal development. Responding to the multimodal requirements of ISTEA, the division created a Planning Coordination Team. The team will help incorporate an expanded modal perspective in the planning process, taking into account each mode of transportation for each suggested project. The team will coordinate efforts between the division and the Office of Local Systems (within the Project Development Division).

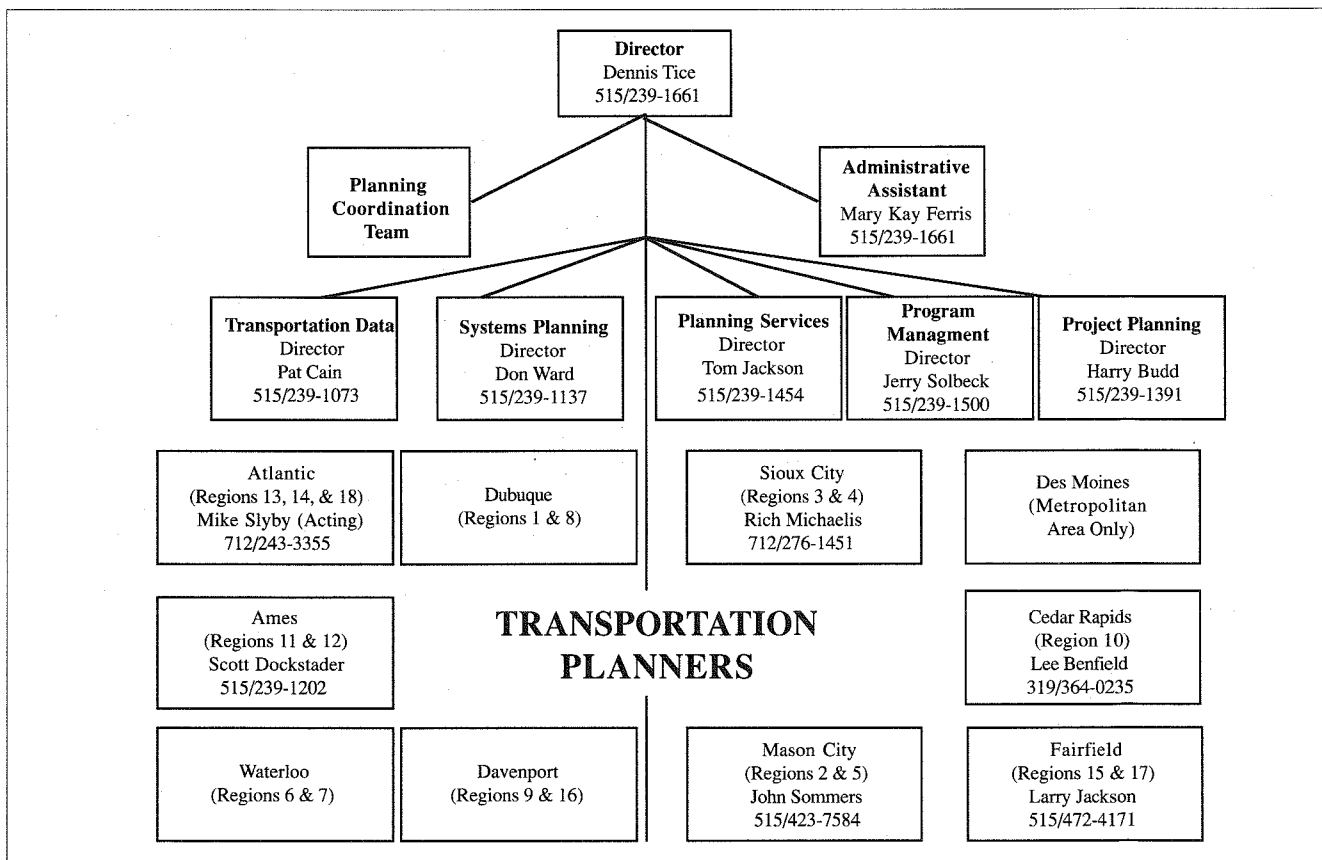
The Planning and Programming Division has expanded the responsibilities of the regional Transportation Planners to include working with all transportation modes, programs, and interested citizens or groups. The division added four new Transportation Planner positions, for a total of ten, reducing the geographic regions each planner works with and

allowing him or her to work more closely with interest groups in those regions. The four new positions have not yet been filled, but Tom Jackson, Director of Planning Services, says this is a top priority.

According to Jackson, the planners will play an integral coordinating role between local agencies and the state DOT. "The planners will be the main connection between counties and cities and this division," he says.

Local agencies develop their short- and long-term transportation plans for federal-aid highways through their regional planning affiliations (RPAs) and metropolitan planning organizations (MPOs), rather than on a county-to-county basis as in the past. The Transportation Planners will work closely with the state's 18 RPAs and eight MPOs to ensure that local plans are compatible with and interface with statewide plans.

If you have questions about the division, contact Tom Jackson, 515/239-1454. ■



Planning and Programming Division, Iowa Department of Transportation

Iowa's statewide pavement management system: an update

by Omar Smadi, Pavement Management Specialist at the Iowa Transportation Center and member of the Iowa PMS task force

Iowa's PMS project work plan was certified by the Federal Highway Administration (FHWA) in January 1995, and the project is now in its second phase: implementation of the work plan. Work is progressing well, and the first part of the implementation phase is scheduled to be completed by the end of this year. At that time the PMS task force will have completed four major tasks.

Following is a description of ongoing work:

Designing the database

One of the most important tasks in the implementation phase is to design a database for all the information necessary to operate the PMS. Database hardware, computer software, access, and support are being considered, as well as the mechanism for information exchange among local governmental agencies, the Iowa Department of Transportation, and the central managers of the statewide PMS. The database design should be flexible enough to allow the use of different location referencing access systems (mile post, longitude-latitude, x-y coordinates, etc.) and should be compatible with other databases at the Iowa DOT.

Establishing the inventory and history data

The Iowa PMS covers all non-NHS federal aid eligible highways in the state (approximately 23,000 miles). Cities, counties, and the Iowa DOT are responsible for this mileage. The goal of the inventory and history process is to collect all the inventory and history information available from all jurisdictions.

In December 1994, Iowa cities above 5,000 in population and all counties received inventory data for the federal aid eligible highways in their jurisdictions from the Iowa Transportation Center. These data were provided through the Iowa DOT's base records. Local governmental agencies were asked to review and update the data, section the pavement network into homogeneous pavement management sections, and provide history information (total and current surface thickness, and major rehabilitation actions).

Upon receiving the updated inventory and history data,

the ITC staff reviews the data and codes the information into a LOTUS 1-2-3 spreadsheet for eventual loading into the database. This process is nearly completed. We have received information from 90 counties and 60 cities, and we are in the process of contacting the remaining 25 agencies for their data.

Investigating data collection options

Using automated distress collection equipment has been a goal of the non-NHS task force and the Iowa DOT since the beginning of the project. Optimal and cost effective decisions regarding pavement maintenance, rehabilitation, and reconstruction depend on accurate and repeatable information;

with automated distress equipment, this can be assured. The task force has established a data collection subgroup to further investigate the available options in automated distress equipment and give recommendations to the task force.

So far, the subgroup has had four meetings and has narrowed the list of potential equipment to three. Results from the North Carolina test of automated equipment conducted by the FHWA in December 1994 were used in analyzing the alternatives available to the Iowa DOT. The subgroup has determined a maximum cost estimate for data collection

through a service agreement with a vendor, contract administration, and quality assurance and control.

To further narrow the search, the subgroup is in the process of scheduling a testing of the finalists' automated equipment. The test will probably take place in June and will consist of the actual testing, presentations by the vendors, and field demonstrations. Local governmental agencies are invited to attend the testing.

Evaluating and selecting pavement management software

This is the final task of the first part of the implementation phase. As a result of this task, the task force will recommend a pavement management software to be used for the operation of the statewide PMS. Pavement condition forecasting and resource allocation are the two major components that will be considered in the selection process. This task begins July 1, 1995.

For more information about the PMS task force or the upcoming tests of automated equipment, contact Omar Smadi, 515/294-8103. ■

This is the third in a series of articles updating local governmental agencies on the progress of Iowa's statewide pavement management system (PMS) for non-National Highway System (NHS) roads.

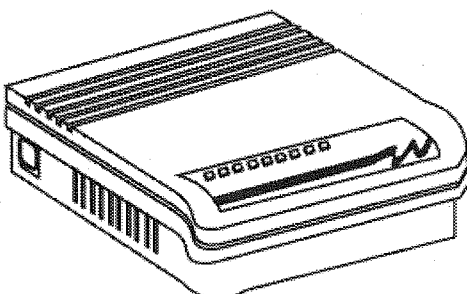
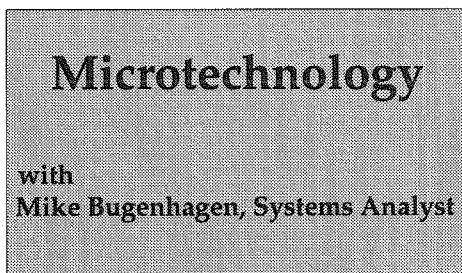
Modems: your computer's link with the world

If you haven't thought about buying a modem before, maybe now's the time to find out how this inexpensive device can expand your computer's usefulness and money-saving potential. Take a look at these examples:

- Modems give you access to electronic information services. The Iowa Transportation Center's Bulletin Board Service (ITCBBS) and the SHRP Information Clearinghouse, for example, offer you a world of transportation-related information through your computer.
- Many software companies let you update software simply by calling the company (via modem) and downloading the software upgrade. With a high-speed modem, downloading software may be quicker and less expensive than ordering disks from the company.
- A modem can be your key to Internet electronic mail (e-mail) through the ITCBBS (see the cover article in the February 1995 issue of *Technology News*).
- New Internet service providers, like the Iowa Cable Network (ICN), can connect you directly to the Internet via a modem, giving you nearly all the capabilities of that vast network without going through services like Compuserve or America OnLine.

Just what does a modem do?

According to Mike Bugenhagen, systems analyst at the Iowa Transportation Center, a modem is a device that allows computers at different locations to "communicate" via telephone lines. Modems do this by converting computers' digital signals (electronic pulses of 0s and 1s) to analog signals (continuous waves like sound waves), allowing computers to send signals over the analog telephone system. Using a modem, a "remote" computer can connect to (dial) a "host" computer to access information on the host or to download and transfer text, graphics, or executable (program) files from the host to the remote and vice versa.



A modem is connected to your computer and to a telephone line. To establish connections between your computer and an electronic service like the ITCBBS, you send commands to the modem via telecommunications software on your computer. The software tells the modem when and what number to dial and when to start translating analog to digital and vice versa. Generally, if you are calling an electronic service, your telecommunications software tells the modem to generate dial pulses or touchtone pulses, just as you do when you dial a number on a telephone.

After dialing, the modem goes into a wait state until it receives a carrier signal from the modem being dialed. Upon receiving the carrier signal (usually an audible tone), the calling modem establishes connections with the called modem by sending its own carrier signal. Once the two modems have negotiated the same data speed, they will automatically start to translate data from digital to analog and back to digital format, establishing a data link between the two computers.

Some electronic services, including the ITCBBS, allow you to transfer files between the service and your own computer. To shorten file transfer time, most modern high-speed modems compress (i.e., reduce the amount of empty space

in) files before transferring them, allowing the modems to send data faster than the base modem speed. A 14.4-baud modem (a baud refers to kilobytes per second) can actually reach speeds of 57.6 kbs, and a 28.8-baud modem can reach 115.2 kbs! Text files are the most compressible; that is, they are written "loosely" with lots of blank spaces (unless they are "zipped"—precompressed and archived). Executable files, graphics files, and zipped text files are extremely "tight," and modems cannot compress them.

Because modems are made by many manufacturers, the industry has developed a standard method for different kinds of modems to connect and communicate with each other without problems. The standard guarantees that modems manufactured by different companies will work together. The standard for a 14.4-baud modem is V.32, which is giving way to the new standard V.34 for 28.8-baud modems. The ITCBBS recently upgraded to 28.8 baud, but many other services haven't upgraded to 28.8 baud yet and won't for some time.

What features should I look for?

When selecting a modem consider several factors: compatibility, speed, cost, internal versus external modem, and faxing capabilities.

Compatibility. Choose a modem that's right for your computer. The modem will say either PC compatible or Mac compatible; most modems come in both models.

If your computer has a serial port, you can connect a modem to it. If you're not sure you have a serial port, check your manual. Some older computers have "slow" serial ports and may have trouble using today's high-speed modems (14.4 baud or faster). For more information on serial ports, see **Internal versus external modems** on the next page.

Speed. Modem speed indicates how quickly the modem processes or transfers bytes of information. The two most common speeds are 14.4 baud and 28.8 baud—the newest, quickest modem. Slower modems (1200, 2400, 4800, and

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9600 bytes per second) are still on the market but are becoming obsolete as new standards take hold. Replacing a slower modem can be cost effective because of the potential savings in long-distance telephone charges with a high-speed modem.

Cost. As a hardware expense, today's fast modems are relatively inexpensive.

14.4-baud modems (including fax-compatible modems) cost \$100 to \$150 and can download one megabyte (1 meg) of compressed files in about 20 minutes.

28.8-baud modems (including fax-compatible modems) cost \$200 to \$400 and can download 1 meg of compressed files in only 10 minutes, saving long-distance time on telephone lines and perhaps making up for the higher initial cost.

If you use your modem solely for online e-mail, choose the 14.4-baud modem. If you plan to transmit many large (especially graphics) files, the 28.8-baud modem may be the better choice.

Internal versus external modems.

External modems require a serial port (also called a "com" port) on your computer. If you don't have a spare serial port (one not being used by another device), you can either purchase and install a serial port card and use it to connect an external modem, or install an internal modem, which doesn't require a serial port.

Higher speed modems require high-speed serial ports. If you are using a 14.4- or 28.8-baud modem and would like it to be able to compress data, you'll need a high-speed serial port. Most new computers, like PCI bus computers, have high-speed serial ports that can handle the higher modem speeds.

High-speed serial ports have UART (universal asynchronous receive/transmit) chips that buffer data. The buffering function ensures that if either the modem or the computer lags behind its counterpart, no data are lost. Older serial ports have older UART chips without this buffering capacity and often suffer what is known as UART overrun or overflow. Overflow generally means that the

modem is sending more data to the UART in the serial port than the UART can give to the computer. If this happens, you may have unreadable screens and bad files at the receiving end.

One fix for UART overflow is to replace the UART chip, a procedure that is usually beyond the capability of even an avid computer user and should be left to a technical service. Another, easier alternative is simply to install a high-speed serial port card. Installation is easy; the only catch is that you must set the card up so it doesn't conflict with the serial ports already in your computer. To do so, you can either disable the serial port you're replacing or set up the high-speed serial port as the third or fourth port (third and fourth ports are not standard on most personal computers). Keep in mind that virtually all serial ports—even and odd—use interrupts (channels to request data exchange from the computer's central processing unit). Ports 1, 3, 5, and 7 use interrupt number 4. Ports 2, 4, and 6 use interrupt number 2. So you can't have a mouse on serial port 1 and a modem on serial port 3. The general rule: one device on an odd-numbered port, one on an even-numbered port.

Internal modems are attractive because they have their own UART chips, so they never experience UART overrun. Many new computers, especially laptops, are available with internal modems already installed. You can install an internal modem if your computer has an open card slot, or bay, for the modem card. If you install an internal modem, make sure no device like a mouse is on the corresponding odd- or even-numbered serial port. (Although installing a modem doesn't require a spare port, the internal modem will still have a serial port address—com 1, com 2, etc.)

If you haven't ventured inside your computer once or twice already, you might want a computer technician to install your high-speed serial port or internal modem. Some computer stores will install ports and internal modems at no cost if you've purchased the modem or serial port card from them. But always check first.

Fax-compatible modems. Before you buy a modem, consider if you're also in the market for a new or upgraded fax machine. A fax-compatible modem can, in addition to its modem capabilities, send and receive faxes. According to the May 1995 issue of *PC Computing*, fax-compatible modems have many advantages over regular fax machines and do not cost much more than regular modems (\$10 to \$25 more).

The new fax-compatible modems are nearly twice as fast as a regular fax machine. The quality of the fax printout is superior because the modem eliminates the need for scanning. When built into a laptop computer, fax-compatible modems are more portable than regular fax machines. And fax-compatible modems are much more efficient for multiple addressees. Perhaps most important, with fullblown fax software the faxes you receive via a fax-compatible modem can be converted from images to computer files, allowing you to print and/or edit them with your word processor.

Do I need anything else?

You need telecommunications software installed on your computer to use your modem. The type of software depends on what you want to do. Generally, if you want to call an electronic service like the ITCBBS, you need a general communications software program like Datastorm's Procomm Plus, Mustang Software's QModem, Delrina's Comm Suite, or DCA Inc.'s Cross Talk. Most of these programs take advantage of your modem's highest speed capability and enable users to view color screens. You can use the bare-bones MS Windows terminal program, but it doesn't offer speed and color enhancements or easy-to-use file transfer protocols (methods).

If you want to set up an on-line electronic service yourself, you need special bulletin board software.

To use a fax-compatible modem's faxing capabilities, you also need fax software. Most fax software lets you compose your fax document using your favorite word processing program; you can even include graphics. Then you print the

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Reader survey draws good response

Thanks again to everyone who responded to our December 1994 survey about *Technology News* and the Iowa Transportation Center lending library. With a revised format—and the lure of an ITC mug!—the survey drew nearly double the number of responses from the previous year.

Some highlights follow:

When asked for the “single most important transportation-related issue/challenge/problem you face right now,” by far the largest number of respondents name declining funds and resources. “Finding innovative approaches for stretching maintenance and construction money” is a typical response. For help dealing with tight budgets, watch for upcoming articles in this newsletter on public-private partnerships and on design elements that can save maintenance costs.

Several respondents also bemoan the difficulty staying current in a changing transportation field: “On a personal level,” one civil engineer says, “it’s hard keeping up with new information, technical advances, and regulations, and organizing this information for easy access and retrieval.” We’re working hard to keep you informed about the latest in transportation technology and regulations. As for easy access of information, we will publish an index of *Technology News* articles for ’94–’95 in July. For your copy call Marcia Brink, editor, 515/294-8103. (Thanks to the survey respondent who made this helpful suggestion.)

Most respondents find the newsletter useful and either read or skim most articles and columns. “Tips from the Field” continues to be the most-read column, with “Microtechnology,” the “Conference Calendar,” and “For More Information” (the library update) also having loyal readerships.

We gave respondents a long list of subjects from which to rate their top three choices for future articles. Among the general categories, “maintenance” is the highest number-one choice (nearly a third of the respondents); “computers” and “management” are second and third choices, respectively. “Management,” however, has the highest total number of 1st, 2nd, and 3rd choices combined. In specific categories, “geographic information systems” (in the general “computers” category) receives the most requests for future articles. (Look for a two-part article on implementation issues involved in geographic information systems beginning in the August *Technology News*.)

What would readers change about the newsletter? Following are our responses to some specific suggestions:

- “More pages and information” “More issues per year” “Double its content” “More frequent” “More articles in each publication” “More information of all kinds.” Beginning in October 1994 (right before the survey), we increased the newsletter by 50 percent, from eight to 12 pages. And we have a new commitment to publishing six issues per year—a commitment we have fulfilled for the ’94–’95 year with this very issue.

- “Place the complete article on adjoining pages.” A great suggestion, and since the December 1994 issue we’ve been doing just that, whenever possible. We hope readers appreciate the convenience.
- “Use recycled paper for publication.” *Technology News* has been printed on recycled paper for several years, but we only began publishing that information in the February 1995 newsletter—after reading this suggestion. Thanks for the reminder!
- “Very well put together, but maybe it’s time for an updated format or title page.” We agree. Keep your eyes open for *Technology News*’s new look, coming this fall.
- “The number of copies sent to our office—what an overload.” We responded to this complaint personally. Help us keep our mailing list up to date! If you get too many copies of the newsletter, or if the addressee or address is wrong, let us know. It’s most helpful if you copy the address page, mark the correction or deletion, and mail the page to the ITC’s return address.

Regarding the ITC’s lending library, nearly a third of the survey respondents didn’t know we had one! We followed up the survey with a special article about the library in the February 1995 newsletter and hope more of our readers are becoming familiar with its offerings. The good news is that over half the respondents who know about the library are using it and find it a valuable service.

Following is information regarding some specific suggestions for improving the library:

- “Publish a list of available materials.” For those of you who missed it, we printed an updated library catalog last fall and it’s available for the asking. Contact Stan Ring, librarian, 515/294-8103.
- “Make it available through search on the on-line bulletin board.” We’re working on an on-line catalog of holdings, but unfortunately it may be a while before we have this service. If and when we do, though, you’ll hear about it in *Technology News*.
- “It might be helpful to have an article on the library to tell us exactly where you are on Elwood Drive.” See page 7 of the February 1995 newsletter for general information about the library. Here are directions to the Iowa Transportation Center, where the library is housed: On Highway 30, take the Elwood Drive exit. Turn south on Elwood Drive. Pass two driveways on your right (west), one to the Gateway Holiday Inn, one to the National Farmers Organization headquarters. Turn in at the third driveway on your right—Southgate Square office park. Ours is the west building. (See the map on the next page.)

Stan Ring is in the library on Monday, Wednesday, and Friday mornings, but you can visit the library any time. ■

Editor’s note: Detailed survey results will be published soon. Call 515/294-8103 for your copy.

Coming in July: ITC delivers GPS workshop via satellite

Reserve your downlink site now for the ITC's two-session seminar on the Global Positioning System (GPS), coming to you live via satellite.

In conjunction with the Region VII office of the Federal Highway Administration, the ITC is sponsoring a workshop on GPS. The workshop will consist of two three-hour sessions broadcast live from Iowa State University in Ames on July 12 and 19. National leaders in the field of GPS will conduct each session.

The target audience is individuals responsible for the application of GPS-based systems for local government activities, including transportation. Law

enforcement, emergency services, airport services, and utility management will also benefit from the two-session course.

The purpose of the workshop is to provide managers and others who will be using GPS technologies with a foundation regarding how GPS came into being, its capabilities and limitations, and the current state of the art. Key technical phrases and capabilities associated with GPS will be explained in layman's terms, as will their appropriateness and relevance to specific applications.

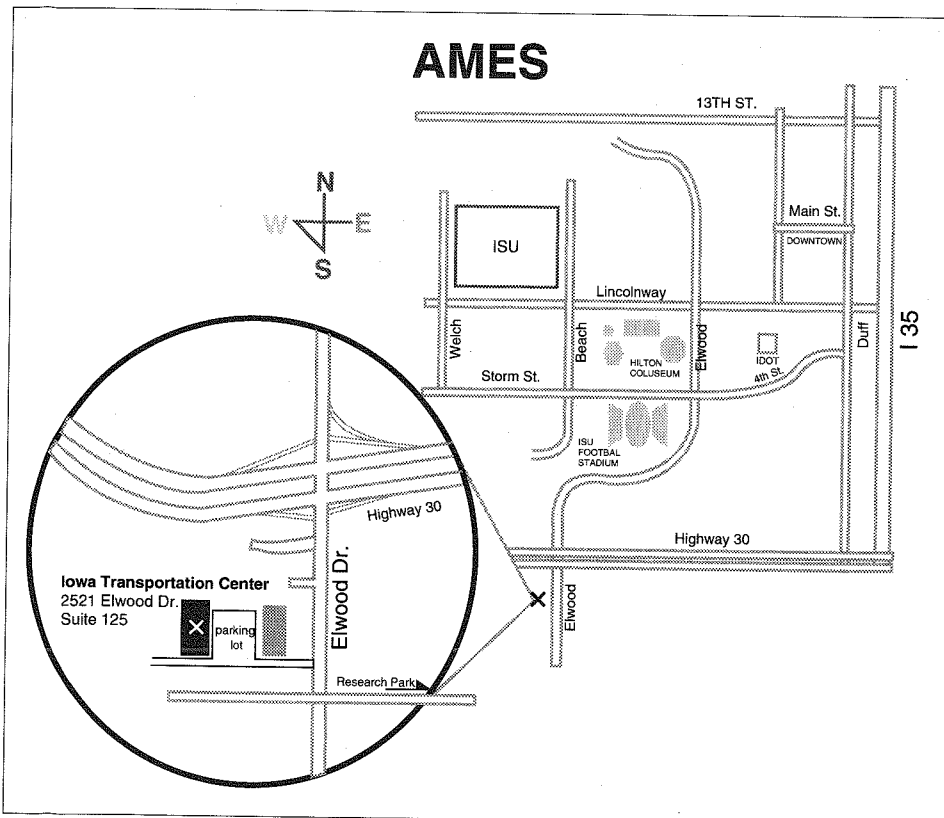
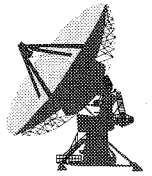
Viewing the seminar via satellite is easy and convenient. Satellite downlink sites are readily available at many educational and governmental locations like univer-

colleges, and city and county administration offices.

Simply reserve a downlink time at one of these locations for the session(s) you wish to view. During the sessions, you can ask questions by calling a toll-free number or by sending a fax.

The individual fee for each session is \$25; groups can pay a site registration fee of \$200 per session.

For further information about the workshop, including potential downlink sites, call Duane Smith, associate director for outreach, 515/294-8103. For a workshop brochure and/or registration information, call Sharon Prochnow, program coordinator, 515/294-8103. ■



Iowa's LTAP library is located in the Iowa Transportation Center, south of Highway 30 off Elwood Drive.

Modems *continued from page 7*

document to a special "printer," which is really the fax software. At that point, the software changes the print job into a fax.

Some general telecommunications packages offer faxing capability and generally function well, but they do not offer as many features as fullblown fax programs. Fullblown programs like Delrina's Winfax Pro offer fully enhanced faxing capabilities for documents you compose with word processing software, including capabilities like cover sheet options, fax broadcasting and scheduling, and both send and receive modes. Most fullblown packages also let you translate a graphic fax image received by your computer into text so you can edit it.

Go for it

Like any other new hardware purchase, modems require some time and patience to install or connect and to get comfortable with. But in return, they offer you the world.

For more information, contact Mike Bugenhagen, 515/294-8103.

Editor's note: The ITCBBS is supported by the Iowa Highway Research Board (HR-345). ■

ITC provides forum for sharing your ideas and expertise

Share your favorite design solutions

Later this year *Technology News* will publish an article describing road and bridge design elements that save maintenance costs and problems. For an example of such design elements, in the April issue we described the many maintenance considerations with guardrails. Some guardrail maintenance problems can be eliminated if the shoulder surface around the rails is paved. Better yet, bridges can be designed so that guardrails themselves are unnecessary. Both of these solutions can cost more money at construction, but save maintenance money—and headaches—later.

Nobody understands the importance of good design better than you, our readers, and we hope you'll share your best design suggestions that *save maintenance efforts and costs*. To submit a suggestion, call Duane Smith, associate director for outreach, or Marcia Brink, editor, 515/294-8103.

Thanks for your help! ■

Retired professionals on tap to help YOU!

The Iowa Transportation Center offers yet another resource to local transportation agencies—retired transportation engineers ready, willing, and eager to help with special projects or staffing needs.

"Our database of retired engineers represents years of valuable transportation-related experience and expertise that local agencies can take advantage of," says Duane Smith, ITC's associate director for outreach.

In December 1994, Smith started collecting the names of retired Iowa DOT engineers interested in part-time or temporary employment. So far, Smith's database of retired professionals contains approximately 20 names.

Participating retirees can help local agencies fill a variety of temporary or part-time employment needs: consultant selection, policy or procedure develop-

ment, project design, project review, training, or serving as interim county or city engineer.

The ITC acts as an intermediary between local agencies and participating retired engineers. An agency wanting help contacts Smith, who supplies the agency with a list of participating retirees along with their past work experience, areas of interest and expertise, and, in some cases, resumés.

The local agency is responsible for contacting appropriate retirees and arranging the terms of employment (compensation, etc.).

Smith wants to add the names of interested retired county and city engineers to his database.

To participate in this program, either as an employer or as a retired engineer, contact Smith, 515/294-8103. ■

Submit an article or an idea

Got an idea for an article for *Technology News*? Would you like to be a guest author? We appreciate suggestions from our readers for newsletter content. If you have a subject in mind or if you are willing to write an article, please give us a call: Marcia Brink, editor, 515/294-8103. ■

Earn \$100 for your "Tip"

Technology News is looking for a few good tips—and is willing to pay for them.

At the Iowa Transportation Center we know that the lowans who maintain the state's streets and highways have developed many innovative ways to do their jobs more efficiently, safely, and/or cost effectively. We are eager to publish these ideas and will pay \$100 to anyone whose tip is accepted for publication in *Technology News* as a "Tip from the Field."

A good tip should be about something easy to do or easy to construct in a shop. It should not focus on a

commercially available product nor endorse any specific product.

To submit a tip, write a brief description of your innovation. Describe how you use it and how it solves a problem or saves your department time, money, or accidents. Include brief instructions for building any special equipment. Photographs and diagrams are helpful and will be returned at your request.

Send your tip to Marcia Brink, editor, *Technology News*, Iowa Transportation Center, 2521 Elwood Drive, Suite 125, Ames, Iowa 50010-8263. For more information call her at 515/294-8103.

For more information

Following is a sampling of new or popular materials available from the Iowa Transportation Center library. To obtain materials or a catalog of library materials, contact Stan Ring, library coordinator, Monday, Wednesday, and Friday mornings, 515/294-9481. Or use the order form below.

Publications

Tips from the Field—Trucks and End Loaders The latest "Tips" booklet offers 21 of the Iowa Transportation Center's best tips gathered on trucks and end loaders. Free copies.
Request #P1079.

Ultra Thin PCC Overlays This Iowa Highway Research Board publication HR 559 reports on a project containing 65 different test sections with varying thicknesses of PCC overlay on an existing AC pavement. Varying degrees of spacing, fiber addition, and base preparation were used. Loan copy.
Request #P1085.

Flexible Pavement Manual This 127-page manual, provided by the American Coal Ash Association, provides detailed information on pavement bases using fly ash. It covers the design, materials, and construction aspects. Free copies available.
Request #P1086.

Bicycle Safety-Related Research Synthesis This publication summarizes bicycle safety research efforts since 1981 and offers references. Loan copy.
Request #P1088.

Alaska Highway Expeditionary Force—A Road Builder's Story This 1994 hard cover book by H. Milton Duesenberg reports on the construction of the 335-mile-long Alaska highway by Iowa contractors and on the entire 1,400 miles of construction in two years. Numerous photos are included. Loan copy.
Request #P1089.

Guidelines for Use of HMA Overlays to Rehabilitate PCC Pavements This NAPA publication presents a procedure for determining the thickness of an HMA overlay on deteriorated PCC pavements. Loan copy.
Request #P1091
(Note: The Asphalt Paving Association of Iowa has free copies available. Call 515/222-0015.)

Videotapes

Asphalt Overlays—The Four P's (15:30 min.) This Minnesota Local Road Research Board video explains the philosophy, purpose, and benefits of placing an asphalt overlay. It is not a training video but provides an overview of the process. Loan copy.
Request #V390.

Guardrails (9:15 min.) This video, prepared by the Minnesota DOT, discusses the design, testing, maintenance, and restoration of guardrails, providing an excellent overview of the process. Loan copy.
Request #V391.

Sandblasting Safety (19:00 min.) Another video by MnDOT, this one provides details on set-up, equipment needed, equipment operation, and safety considerations. Loan copy.
Request #V392.

Testing and Field Inspection of Roadway Delineation (35:45 min.) This U.S. DOT/FHWA video supplements P1045 (available free) and covers inspection points and maintenance. Loan copy.
Request #P393.

Correction

The April 1995 "For more information" column incorrectly stated that Parts I and II of the Iowa DOT's *Iowa in Motion* are available. At this time, only Part I is available.

Library order form

To obtain materials from the ITC library, return this form to the Iowa Transportation Center, Iowa State University, 2521 Elwood Drive, Suite 125, Ames, Iowa 50010-8263. (Please limit your request to four items. Thank you.)

	Book/Video Title	Index No.	No. of Copies
Name _____	_____	_____	_____
Address _____	_____	_____	_____
City/State/Zip _____	_____	_____	_____
Phone () _____	_____	_____	_____

Please send a complete catalog of all publications and audio-visual materials available from your office.

Conference calendar

Equipment Operations and Safety Workshops

June 7 Creston, Iowa
 June 13 Clear Lake, Iowa
 June 20 Ankeny, Iowa
 July 11 Iowa City, Iowa
 July 18 Waterloo, Iowa
 July 25 Storm Lake, Iowa
 Contact Sharon Prochnow, 515/294-8103

Motor Grader Operator (MoGO) Workshops

June 13 Cherokee, Iowa
 June 27 Cedar Rapids, Iowa
 July 11 New Hampton, Iowa
 July 18 Atlantic, Iowa
 August 1 Ames, Iowa
 Contact Sharon Prochnow, 515/294-8103.

Institute of Transportation Engineers (ITE) District IV Conference June 14-16—Kansas City, MO

This conference, designed for transportation engineers in District IV, combines an FHWA seminar on human factors and the aging road user with a session containing technical tours of projects constructed in the Kansas City area. Contact Duane Smith, 515/294-8103.

Sixth International Conference on Low Volume Roads June 25-29—University of Minnesota, Minneapolis This conference covers the latest in planning, construction, materials, and technology transfer for low-volume roads, as well as difficulties encountered in cold weather. Contact G.P. Jayaprakash, Transportation Research Board, 202/334-2956.

Global Positioning System (GPS) Technical Workshop July 12 and July 19—Downlink sites across Iowa and the rest of the country This Iowa Transportation Center workshop, presented live via satellite from Iowa State University, is for individuals responsible for the application of GPS-based systems for local

government activities, including transportation. The workshop discusses how the Global Positioning System works, necessary equipment, applications for state and local governments, and how private industry is using this technology. Registrants must contact downlink sites. For information, contact Duane Smith, 515/294-8103.

Midyear Iowa County Engineers Association (ICEA) Conference July 12-13—Ames

This conference covers legislative updates and information dealing with geographic information systems (GIS). This information includes the basics of GIS and integrating GIS into county transportation plans. Contact Jerry Hare, 712/328-5608.

Institute of Transportation Engineers (ITE) Annual Meeting August 5-8—Denver

This conference will discuss operations and design, planning, the transportation profession, transit, and the human factors of engineering. Contact Duane Smith, 515/294-8103.

National LTAP (Local Technical Assistance Program) Conference August 6-9—Kansas City, MO

This year's conference will consist of agenda tracks including transportation technology, education/communication, marketing, and program policy and management. It will include innovative, new products, services, and technologies for local agencies, new educational methods, program marketing, and training strategies. Contact Duane Smith, 515/294-8103.

American Public Works Association (APWA) Iowa Fall Conference August 9-11—Council Bluffs

This conference will cover various aspects of public works including traffic management systems, environmental impacts of public works, pavement management, snow operations, Omaha's GIS status, and technological updates. Contact Mike Wallner, 712/328-4634.

Iowa Traffic Control Safety Association (ITCSA) Fall Conference September 21-22—Des Moines

Date and location are tentative. This conference is designed to promote safe and efficient transportation on the streets and highways of Iowa. It is also a forum to address mutual concerns about achieving this goal through education, enforcement, and engineering, as well as emergency medical services. Contact Don Wall, 515/294-3811.

American Public Works Association (APWA) International Public Works Congress and Exposition September 23-28—Dallas

This conference gives public works professionals the opportunity to look into the industry's future and learn about the latest technological innovations and advances in the field. Contact Duane Smith, 515/294-8103.

Rural Public: Intercity Bus Transportation October 22-25—Des Moines

Designed for transportation providers, this conference will center around new technology, FTA regulations, and innovative approaches for use of intercity assistance funds. Contact Duane Smith, 515/294-8103.

ASCE Iowa Section Annual Meeting September 14-16—Ames

Contact Jim Cable, 515/294-2862.

APWA Snow Rodeo October 3-4—Des Moines

This "rodeo" provides snow plow operators a chance to sharpen their skills before snow-clearing season begins. It consists of a written test, a timed search for vehicle safety defects, and a driving simulation course with situations drivers may encounter while clearing streets. New features this year include a two-day schedule, a backhoe/loader proficiency exhibition, and a "share your expertise" segment. A tandem class also joins the single-axle class. Contact Bret Hodne, 515/222-3480.

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Iowa State University
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