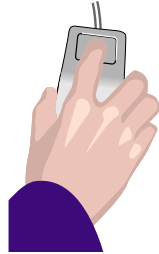


KUTC Newsletter

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A Local Technical Assistance Program (LTAP) of The University of Kansas Transportation Center
In cooperation with Kansas Department of Transportation and Federal Highway Administration

An issue dedicated to computers and technology in highway agencies



Computer-Based Sign Management

Three examples from Kansas

... by Lisa Harris

We talked with three county highway officials in Kansas who each have a computerized sign management system, or are implementing one. These counties vary in the number of signs they maintain, whether they use GPS to record sign locations, and whether they use GIS to map those locations. Each official has his own perspective on this topic:

Neosho County received 402 safety funds from the Kansas Department of Transportation (KDOT) for a sign management system using GPS. But they haven't been able to make full use of it yet. Frank Young, county engineer, says, "We're part-way into it, but we really haven't progressed on it. Something always comes up. One thing I've learned is that you just can't turn it over to someone. You've got to stay involved."

Neosho County's project was designed to be a joint venture with their county appraiser's office. The project uses ArcView, which the appraiser's office already uses. GPS location coordinates for signs, taken by the road and bridge department, were to be overlaid onto COBRA maps available from the internet.

The county hired an appraisal consultant from Arkansas to help with the project, but he "seems to have disappeared," says Young. Because of this, the project has fallen

into the road and bridge department's lap.

Young has had difficulty getting the GPS data tied-in with ArcView to create the sign overlays. "Counties really need to have a technical person on their payroll or hire someone to set it up," he said.

Despite this bump in the road, Young has been pleased their GPS system. "We are inventorying our signs with it, and it's been useful to our department for other things, too, like locating section corners and bridges. I think we'll keep using it more and more," he said.

Young noted that computerized sign management programs make more sense for local governments that are more urbanized than his county.

"After getting into this some," he said, "I can see that GPS sign management programs may have a lot more value in an area with a higher population density. We just don't have the need to have a sign location nailed down to within a meter... our manual system works well enough for the number of signs we track [about 3,000]. It's hard to justify shutting down for a week just to get people trained."

Riley County has been building its GIS system, which includes their sign management program, for the last 10 years. The county has 45 signs per mile; about 7,700 total. They use Cartegraph's SignView to manage

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sign data.

The county collected their initial sign data manually. “I don’t recommend using students or seasonal help for data collection, like we did,” said Rod Meredith, assistant director of public works. “They are not familiar with sign characteristics and they do not know their way around the county. It’s best to go with a county employee who really knows the job and the roads. You’ll save a lot of time. We had to go back and check all the data the students collected.”

The county uses a combination of manual forms and data entry to maintain information on signs.

“County employees fill out a (paper) change form and a technician enters that information into the electronic inventory. The technician is also our safety guy; he divides his work roughly 50/50 between safety and GIS/database work.”

Meredith said it takes the technician about four hours a week to update sign data.

Riley County does not use GPS to determine sign locations. Instead, they use a linear system, referencing the signs to where each road begins nearest the City of Manhattan.

“GPS just isn’t practical for us right now, because of problems with accuracy out here. It’s one thing to determine a location; it’s another to go back to it,” Meredith said. “We need more towers in our county, probably three or more, to get accurate data. And we need good receivers in our trucks, preferably truck-mounted.”

Riley County’s GIS system, however, is very well developed. “We use ArcView to view roads on an index map, electronically. ArcView reads the database for sign locations—we don’t have to digitize anything,” Meredith said.

Riley County has a GIS department with one full-time manager and

Sign Management at a Glance

Electronic systems help agencies with larger inventories manage their signs and other traffic control devices more aggressively and efficiently than with manual systems. Sign inventory data are stored in a computer database and can be quickly accessed in a variety of ways.

Staff responsible for signs can sort the inventory by kind (stop, yield, etc.), location (geographic coordinates and/or address), date purchased, installed, maintained, or replaced, material, or other sign characteristics.

This sorting capability allows staff to, for example:

- schedule maintenance/replacement activities based on any of several characteristics, like age of the signs,
- locate and schedule the replacement of signs made of materials that no longer meet MUTCD recommendations,
- generate replacement cost estimates and other electronic reports,
- generate a list of all traffic control devices at a particular intersection or problem location, and
- identify high vandalism locations and trends.

The ultimate purpose for using electronic sign management systems is to improve traffic control signage and thereby increase road user convenience, reduce crashes, and limit agency exposure to tort liability.

Excerpted from *Technology News*, Iowa LTAP.

two or three GIS interns from Kansas State University. They also have two committees related to GIS, one for department heads to look at the big picture, and a users group.

“Our county has 45 users of ArcView,” Meredith said. “We’re really adamant about training and getting value out of our GIS system.”

The GIS portion of the sign management system includes a plain index map of the county accessible from all supervisors’ desktops. The map has buttons at the side for assets like signs and bridges that can be displayed on the map. The system reads the data from Cartegraph and displays the data on the map. The data is also linked to the county’s aerial photographs, and those can be pulled up on the same screen.

Meredith, who designed the system, said: “We’re the only ones that have something like this that we know of.”

Riley County is currently tracking bridge, property locations and utilities in addition to signs. “Our next

step is to map our maintenance and construction projects for displaying cost information,” Meredith said.

Saline County, with over 3,100 signs, received 402 safety funds for GPS and computer equipment and training. They started with a commercial sign management software program, but then decided to write their own.

“Our sign management program is written in Microsoft Access,” said Jerry Fowler, county engineer. “We tried Cartegraph, but we had so many problems with them that we decided to transfer our old DBase files to Access and do it ourselves.”

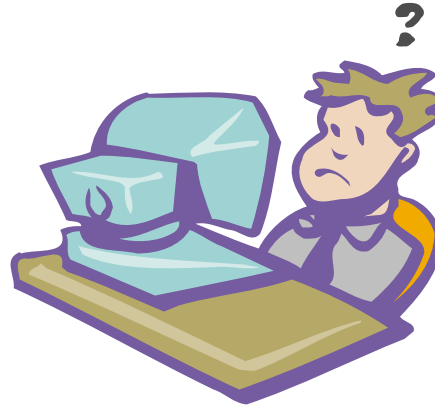
Fowler noted that Riley County has had better luck with Cartegraph. “I hear the product is more user-friendly now,” he said.

Saline County is currently recording GPS coordinates for all their signs. These will be entered into Access along with other information on sign characteristics.

“We will have the entire history
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To Back Up, or to Back Up...

There's no question about it. Do it!



... by Craig Damlo

Do you ever worry that your filing cabinet will get a cold and lose your payroll files?

Unlike your filing cabinet, your computer can get a virus and lose valuable files. Are you worried that gravity will pull your cabinet doors down so that files can't be retrieved? That is just what can happen to the heads of your hard drive. Now, before you throw out your computer and switch back to paper record-keeping, you should know that the odds of losing computer files are small, and you can shrink those odds even more by backing-up your files.

What exactly is a back-up? The classic definition is "a reserve or substitute." A more modern computer-related definition is "a copy of a program or file stored separately from the original." This definition should also say: "—and is updated regularly." Whether a file is backed up after every change, once a day, or once a month depends on the situation.

An ideal computer system would have just one central file server that contains all the data that needs to be backed up. This server would be connected to personal PCs that execute the software used to manipulate the files on the server. But most of us don't work that way—we each have a PC on our desk that stores software applications and data used by those applications. Therefore, there are three important questions to ask when deciding to start an effective backup system:

- ✓ What files need to be backed-up?
- ✓ What media should I back-up onto? and
- ✓ How often should I back-up?

All three questions have solutions that are difficult to put into general terms, but I will try to generalize for the most common system types.

What do you need to back up? Not the whole hard drive, not these days. This worked when hard drives were small, and backup media were larger than the hard drives. But today huge hard drives are affordable, which makes entire-disk imaging impractical. Besides, most of the drive is filled with program files that shouldn't be

to be backed up; odds are good that they take up more space than a single diskette, but not enough to justify a large tape system. Other options are a Zip disk system or a Compact Disk Recorder (CD-R) system. I prefer CD-Rs, because they are less vulnerable to being destroyed, and are relatively inexpensive.

CD-Rs are also helpful for keeping a backlog of backups. Instead of over-writing your back-up media each week, you really should keep a minimum of a month of backups, or more, if the data you are saving is especially important. Ask yourself, "How much can I really afford to lose?" By placing files on CD-Rs you won't be able to

You don't need to back up the whole hard drive.

backed up, not only because it is a waste of space, but also because it may infringe on copyright protections.

So take a look at your hard drive and decide what needs to be backed up. Good candidates are payroll files, databases and inventories, budget spread sheets, word processing documents and any other files you create using software. A great way to make back-up easier is to place these files in a central folder from the start. You can always sub-divide this central folder into specific applications.

Now that you have decided what files to backup, the next question—what media?—is easier to handle. Look at the size of your files that need

overwrite what is already written, and can sometimes keep two or three back-ups on a single CD-R. This capability comes in very handy when you need to make backups from multiple machines.

The final aspect of backing up doesn't involve your data files at all. Instead it involves your power system. As we saw in the summer of 2001 in California, power isn't a completely predictable commodity.

Modern computer power back-up systems are battery stack systems. These typically are only good for about three minutes of power to a computer and monitor. Three minutes may not seem like a great amount of

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Computerized sign management, *continued from page 2*

of the sign—the date it was installed, when we checked it, when it was repaired. We also just had new digital aerial photography taken of the county, with two-pixel photography. The photography will have the same coordinates as our GPS locates. So when we pull up information on a sign, we can also pull up a photograph,” Fowler said.

Saline County’s appraiser’s office prepares the maps for the road department, in ArcView. But the county is considering adding a new GIS department to perform this function.

“The appraiser’s office has the mapping equipment and training, but they are also stretched thin,” said Fowler. “They have plenty of their own work to do, and they receive mapping requests from many county departments. Projects can easily get bumped.”

A trip to Riley County helped convince county commissioners to consider adding the new department. “We took our commissioners over there for a tour. When they saw Riley County’s [GIS] system, they got on board real quick,” said Fowler. Funding for the new department, with two full-time and two part-time staff, will be up for approval in August with the 2003 budget.

Fowler said his department is starting to use GPS/GIS on their field laptops. He also noted that an advantage of GPS/GIS technology is enhanced emergency response time. “Response crews will be able to identify exactly where houses are on a road before they get there,” he said.

For more information on these Kansas sign management efforts, call: Frank Young, Neosho County, 620/244-3855; Rod Meredith, Riley County, 785/539-2981; Jerry Fowler, Saline County, 785/826-6527 ■

Asset Management Software: No Magic Black Box

... by Lisa Harris

With asset management such a hot issue in highway maintenance right now, we thought it would be a perfect time to run an article on asset management system software.

Problem is, there is no such software, per se. Some products provide help with several key components of the process, but nothing inventories all infrastructure assets, evaluates the data,

PONTIS is an American Association of State Highway and Transportation Officials (AASHTO) *Bridge Ware* product originally developed through a FHWA research project. It is used for state and local bridge management in many states, including Kansas. In our last issue we showed how PONTIS can be used to determine infrastructure value using GASB-34’s modified approach. Roadsoft was developed by the Michigan Local Technical Assistance Program

“There is no software that does it all, no magic black box. Asset management is a way of thinking, a way of doing business.” —Mike Fraher

provides life cycle analysis, assigns asset value, and determines priority among the various assets for funding.

“I don’t use the word ‘system’ when I talk about asset management. It just confuses people,” said Mike Fraher, Infrastructure Team Leader with the Federal Highway Administration’s (FHWA) Southern Resource Center. Fraher provides training in asset management principles and is a specialist in PONTIS, a bridge management system.

“There is no one system, no magic black box,” Fraher said. “Asset management is a way of thinking, a way of doing business. Software can’t think for you. But software can be a useful tool in that process.”

Fraher believes that sign, pavement, and bridge management software programs are the best tools for asset management at the moment. A few examples of management system software are PONTIS for bridges, Roadsoft and RSMS for pavements, SIMS for signs, and Cartegraph for multiple assets.

(www.michiganltap.org) and RSMS and SIMS were developed by the New Hampshire Technology Transfer Center (www.t2.unh.edu). Cartegraph is one of a handful of private vendors that offer high-end infrastructure inventory tools (www.Cartegraph.com). Cartegraph offers condition rating capability with some of their modules.

How do you choose which tool (software program) to use? Fraher said: “The aim of asset management is to balance needs with wants—and have some accountability for the resources you’ve been given. The process starts with goal setting, and you work backwards from there,” he said. “After you determine your goals (i.e., desired condition levels for your various assets), you need to ask: “What data and analysis tools will I need to determine and track those conditions and what kind of expertise am I going to need to operate and maintain the tools?” The answers will vary depending on the number and

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Data Integration Helps You See the Whole Picture

... by Lisa Harris ...

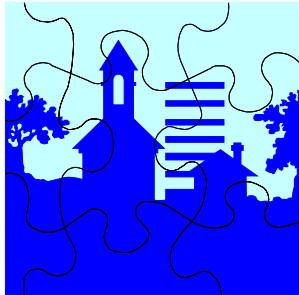
Successful asset management requires readily accessible and comparable data. Such data enables decision-makers to develop infrastructure performance objectives, identify investment strategies, and conduct value assessments for different types of assets.

Comparability is hard to come by, though. In most highway agencies infrastructure data resides in separate databases; pavement data is in the pavement database and bridge data is in the bridge database, etc. The data is "stove-piped;" that is, one type of data sits in its own "pipe" and can't be evaluated alongside other data. When this situation exists, decision-makers have difficulty identifying the most appropriate infrastructure investment strategies. And it can create situations where the right hand does not know what the left hand is doing.

FHWA's Mike Freher gives this example: "There's no one in the bridge department who knows the congestion management guys are adding four more lanes to the road approaching the bridge."

A process called *data integration* can improve accessibility and comparability either by storing all of the data in a single data "warehouse" or by linking databases through a computer network.

Linking data is challenging, however, as most current systems have a restricted capability for data exchange. Because of these difficulties, data integration strategies have been implemented by only a few transportation



agencies, and these applications have been limited in scope.

Much more information and guidance is needed to address the technical and other organizational challenges involved in data

integration. To respond to this need, FHWA's Office of Asset Management has published a *Data Integration Primer* and a *Glossary of Data Integration Terms*. FHWA is also developing a collection of case studies on State highway agency data integration experiences. To obtain copies, contact FHWA's Office of Asset Management at (202) 366-9242.

FHWA recently joined with the American Association of State Highway and Transportation Officials (AASHTO) to hold a Data Integration Forum and Peer Exchange on December 12-13, 2001, in Chicago, Illinois. The forum provided participants with an overview of the state-of-the-practice in data integration, as well as the opportunity to share their experiences in this area.

More than 90 transportation professionals from across the country attended, including two local agencies. Seven State highway/transportation agencies—Florida, Maine, Michigan, Mississippi, Ohio, Tennessee and Virginia—presented their ongoing data integration efforts.

Key presentation and discussion areas included integration requirements, legacy database systems, data collection, software and hardware options including GIS and commercial-off-the shelf products, data standards, location reference systems and institutional impediments.

The forum provided participants with an overview of the state-of-the-practice in data integration, as well as the opportunity to share their experiences in this area.

A forum proceedings will be available in Summer 2002 that will describe the key data integration issues highlighted at the forum and those to be addressed in future research and technical activities by the FHWA.

A working group for Asset Management Data Integration has also been formed to steer the activities in this area.

For more information about the FHWA Asset Management Data Integration Program including technical publications, forum proceedings, working group and other activities, contact Roemer Alfelro at (202) 366-9242 or visit their website at www.fhwa.dot.gov/infrastructure/asstmgnt/diindex.htm.

Source

"Data Integration: Key to Practice of Asset Management," *FOCUS*, USDOT/FHWA. September 2001. ■

Computer back-up,

continued from page 3

time, but this is usually enough time to stop a loss of data during a brown out, and also enough time to save your data and shut the machine down during a black out. Many power back-up systems also come with options that allow you to hook the system to your computer and it will automatically shut your windows machine down if you are not around to shut it down yourself.

Back-up technology is prevalent and inexpensive, and the reason for backing-up files is clear. So there's no question about it... be sure to do it!

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Unraveling the Mystery of GPS Receivers

... by Roger Chappell, Technology Integration Engineer, Washington State Technology Transfer Center

Does one size fit all? What is the difference between the \$99 GPS unit in the sporting goods store and one a surveyor uses? There seems to be a lot of confusion today about GPS units. And rightly so, with prices ranging from \$99 to over \$40,000.

In this article I hope to help demystify this technology. The military, surveyors, and other select groups have been using this technology for a long time, but it has only been in the past several years that the common person could afford to use it. It reminds me of the explosion in popularity of desktop PCs in the last 20 years. What was shrouded in mystery is now a part of our lives and in many of our homes. Except now, in the case of GPS, there are more players in the game than Apple and Big Blue.

Will the next 20 years find geospatial coordinates as common as e-mail is today? Probably not, but hopefully GPS will be as easy to use.

Four types of receiver units

Before I can begin to address what type of unit is best for you, let's take a look at some of the different types of units available. I generally divide them into four types of systems:

- navigation grade receivers
- mapping grade receivers
- survey grade receivers
- specialty/military grade receivers.

Navigation grade receivers. As the name implies these units are used for navigation purposes. These units are GPS only and not typically Differential Global Positioning System (DGPS) capable. I will discuss things that affect positional accuracy later, but in general, any unit that does not use DGPS can only pinpoint a location within a 10-meter circle now that SA (Selective Availability) has been turned off. Costs per unit vary depending on how many features are included. Navigation grade units are usually under \$1,000, with most of them under \$300. Some units include things like maps, data points, or line feature storage, and even satellite e-mail messaging. Most agencies use mapping or survey grade receivers to gather their spatial data, but furnish inexpensive navigation grade receivers to the workers who use the data.

For example, to create a storm water management system model in three-dimensional space you need very accurate spatial coordinates. Elevations are important or your model may not drain properly. On the other hand, a unit that can put you in less than a 10 meter circle should be close enough for maintenance personnel to locate and unplug a culvert.

Mapping grade receivers. These units should be DGPS capable and should be able to achieve sub-meter (smaller than a one-meter circle) accuracy. These systems range from \$1,000 to as high as \$30,000, depending on the features, software, and peripherals included with the package. Most of these units come with a computer system and software that allow the user to input various types of data. Most of them are designed to gather data in a

format that readily interfaces with a GIS (Geographic Information System)—that is: points, lines and polygons. Points are things like signs, intersections, and culverts. Lines are roads, sidewalks, and guardrails. Polygons are wetlands, soils and county boundaries. Some systems include laser range finders, digital cameras, inertial guidance systems, voice command, and every type of test probe and meter imaginable.

Survey grade receivers. These are DGPS capable and should achieve centimeter accuracy or better. These units range from \$5,000 to \$40,000 per unit. Achievement of sub-centimeter accuracy requires skill and training and is best left to the GPS guru types for now. For example, there are RTK (Real Time Kinematic) systems that require a base station to be set up over a survey marker of known coordinates. Radio links must be maintained and the data must be corrected and verified.

Specialty and military grade receivers.

This is a general catch-all category. The price and accuracy of these units can vary dramatically. I throw this category to mention specialty receivers used for aerial photography, underwater positioning, and the like.

Then there are Military P(Y) Code Receivers that use encrypted P code from the GPS satellites and are only available to the military and some federal agencies. Receivers that aren't military receivers are called C/A (Civilian Access or Course Acquisition) code receivers. The P-code receivers remove the effects of SA (Selective Availability) but may not compensate for ionospheric, atmospheric and other conditions (see box on next page). Even without the effects of SA, these receivers are only accurate to between three and nine meters (without differential correction).

Currently SA is turned off, but the Department of Defense has the ability

What is Selective Availability (SA)?

The greatly simplified version is: The Department of Defense controls the GPS satellite system. Each satellite has a very accurate atomic clock that broadcasts the current time, and your receiver also has a clock built into it. By comparing the time from the GPS satellites (when the signal left space) to when the signal got to your clock in your receiver, and knowing that the signal travels at a constant velocity, the speed of light, it is simple math for the computer in your receiver to figure out how far away that satellite is from you. It takes the signal from three or more satellites to triangulate a position in space (three satellites for an XY position, four or more to add a Z value for 3-D images).

Here's where the mystery comes in. There are invisible forces acting on these signals that change their velocity (ionospheric and atmospheric) or time (clock errors or human intervention). If you had an atomic clock in the vacuum of space with no interference, in theory the measurements could be perfect.

Even though the satellites are way up there (12,600 miles), you pretty much need line of sight between them and your receiver. Unlike radio waves that you can pick up accurately inside a building, interference as minor as leaves on a tree can stop the signal from reaching you. I've had people demonstrate that their equipment can pick up satellites within buildings. What they are seeing is known as a "multipath," or a signal reflecting off or through something. This means the signal had to take a longer distance to get to the receiver, which in turn means it took longer to get from the satellite to the receiver. This distorts the positional readings. We need to remember this system was created and is operated by the Department of Defense for military purposes. Besides wanting to know where in the world things are, it is used for military targeting, and it is not a good idea for everyone in the world to have that pinpoint targeting ability, so they play with the time element a bit by controlling the time output from the satellites. This also makes it a lot harder for someone on the ground to target a satellite, especially if it is moving and dodging in a virtual 100-meter circle.

We also need to remember that we didn't have to install and maintain the system or pay rental on all these signals from space. We can use them for free, provided we have the right equipment. The Department of Defense allows us free access to a tool that is currently accurate within a 10-meter circle (95 percent of the time) and most of the time the circle is much smaller than 10 meters. That is good enough for most hikers, boaters, hunters, and general-purpose navigation applications.

to turn it on or off as needed. That is why even navigation receivers are currently accurate to about 10 meters. It still won't correct all possible inaccuracies and if you want sub-meter, you'll still need DGPS.

More about DGPS

How does the D (Differential) in DGPS help you? In a nutshell, DGPS

is achieved by using two receivers. The first is the one you bought for your fieldwork. The second receiver may be a base station, DGPS vendor, or even a unit that you set up yourself. Whatever the case, the second GPS receiver is placed over a point with a known coordinate value (such as a survey marker). Now that the receiver is at a known value, you can compare

the signals it receives against the coordinates where it is. The difference between the receiver and the point projected by the GPS signal is your correction factor.

From a very simplified view, if the signal coming into the GPS receiver determines its location is five feet to the west and 10 feet to the north of where my coordinates say the receiver should be, I need to subtract that distance from any measurements made in the field during that time period. Then it is just a matter of comparing the positions you receive in the field with the corrected ones from the base station and doing a little math. Most receivers that use DGPS come with software that does the all math for you.

Remember, this method works only if the receiver in the field is looking at the same satellites as the base station during the same time periods. Some vendors use a network of base stations and adjust over long distances (baselines), then broadcast their network corrections through a satellite.

Two ways to correct

There are two main ways that differential correction is accomplished:

Post processing. In this scenario, the base station stores raw GPS position fixes, and software is used to compare the raw positions to the coordinate value of the receiver. This data is then placed in a log file or database and distributed. If you are using someone else's base station, keep in mind that there are various formats and position fix rates that are collected. So you will have to determine if their data will meet your needs. Look for "meta data"—the data about the site, base station and data that you are planning to use. Then you will need to get the files you need to do the differential correction. Some base station information can be accessed directly over the Internet; for other information you may have to contact the base station operator. Once you have the

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KDOT Korner

What is “511” and What Does it Mean for Our Transportation System?

... by Ira J. Allen

Traveler information is going high tech, nationwide. In July 2000, the FCC (Federal Communications Commission) designated 511 the national traveler information telephone number to “enhance safety, ease congestion, reduce pollution and fuel consumption, and advance efficiency—all without the traditional dependence on simply building or enlarging roads.” Officials hope 511 eventually will be used nationwide—similar to 411 and 911—replacing the 300 or so 10-digit phone numbers that now provide traveler information in various regions.

This ruling was requested by the United States Department of Transportation (U.S. DOT). The aim is for each state to set up an ATIS (Advanced Traveler Information System), coordinating the efforts of various local transportation and communications organizations. This means that eventually, any caller anywhere in the country will be able to get local information about transportation, traffic, and road conditions.

When should 511 be implemented?

The FCC ruling leaves nearly all implementation issues and schedules to state and local agencies and telecommunications carriers. In 2005, the FCC will review progress in implementing 511. So far, 511 has only been implemented in a few states; Kansas is not among them. 511 pre-

sents both an opportunity and a challenge—an opportunity because of the boon it could be to travelers, transportation and emergency-response agencies, and states in general, and a challenge because the coordination between separate agencies required to implement 511 promises to be an enormous task.

What services will 511 provide?

The basic content provided by every 511 system should be the same, says the 511 Deployment Coalition, a group whose members are drawn from an alphabet soup of transportation organizations, including the American Association of State Highway and Transportation Officials (AASHTO), the American Public Transportation Association (APTA), and the Intelligent Transportation Society of America (ITS America).

Access to and use of the 511 code must be coordinated to ensure that a certain core traffic “information set” is conveyed wherever ATIS is accessed. Each 511 system needs to provide, at the least, information about two modes: highway travel and public transportation information. Highway information generally focuses on data available for well-traveled roadways in a 511 service area. Public transportation information should cover information associated with transit services (bus, rail, etc.) in a 511 service area.

Obviously, keeping this sort of information current requires the cooperation of a number of different entities.

Why is 511 important?

The goal of the 511 Deployment Coalition is “the timely establishment of a national 511 traveler information service that is sustainable and provides value to users.” The intent is to implement 511 nationally using a bottom-up approach. Each state is expected to coordinate the efforts of individual agencies within the state, and each state will eventually be expected to coordinate services with their neighboring states. To this end, U.S. DOT has made \$100,000 in grant money available for each of the 50 states, to be used as starter money for their individual services. Ideally, these services will be integrated between states to achieve nationwide coverage and consistency. States are also expected to coordinate efforts on the local level, between various transit agencies, governmental agencies, and telecommunications companies. This is a task that promises to be a logistical struggle, but some states have already successfully implemented 511 numbers and services, proving that it can be done relatively quickly.

Where Is Kansas In 511?

Problems related to consolidating information between numerous agencies will need to be solved before Kansas can begin implementing 511 service. The Kansas Department of Transportation (KDOT) is spearheading this effort. To this end, the Kansas Department of Transportation (KDOT) has hired Barbara Blue, as

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A 511 Case Study: Utah's Voice-Activated System

Salt Lake City's 511 system helped residents and visitors manage the traffic crunch during the recent Winter Olympics.

Utah's 511 system provides travelers with information about traffic incidents and weather conditions on highways and roads, and also includes information on public transit schedules and fares. During the Olympics it even had daily schedules for and directions to all Olympic events (from anywhere in the state).

Calls to the hot line are free. The system translates a caller's request into a data request and returns the data in speech.

Carol Zimmerman, a coalition member responsible for 511 marketing and outreach, said voice-enabled technology is the "preferred method" because it's more user-friendly.

"The voice-enabled technology has been in development for over the last 10 or more years," said Zimmerman, vice president of the transportation systems group at Battelle, a nonprofit research and



Utah's 511 system is easy on the ears. Pieces of sound were linked to create speech that has a natural inflection rather than a synthesized tone.

development organization. "So some of the earlier implementations were primitive and not very reliable. But the technology has been improving so you have broad-based consumer applications like 511."

Representatives from Kentucky and Minnesota, two early 511 adopters, said their states plan to voice-

How Does it Work?

Utah's voice application platform draws data from existing traffic information web page content, converts it to Extensible Markup Language (XML), then to audio.

The Mountain View, Calif.-based Tellme Networks used a product called VoiceXML to integrate the state's existing Web infrastructure and its CommuterLink system (www.utah.commuterlink.com), which provides traffic, weather and accident information via radio, television and the Internet.

In audio production pieces of sound were linked to create speech that has a natural inflection rather than a synthesized tone. The company also performed usability tests.

Tellme Networks took less than three months to develop Utah's system.

activate their touch-tone systems.

Accessibility, especially for users with physical disabilities such as blindness, is another major benefit of voice-enabled technology, said Greg O'Connell, head of public-sector operations for Mountain View, Calif.-based Tellme Networks Inc., which developed Utah's system.

When state officials were researching Utah's traveler information services, they found 12 different

Asset mgmt. software, from page 4

density of the assets and the local government's budget.

Asset management trainer (and county road maintenance engineer) Ali Roohanihrad offered this advice for choosing software in a recent issue of *pc-trans* magazine:

- Choose software powerful enough to meet your agency's present and future needs, but not so complex as to produce data and analyses your agency does not require for decision-making.
- Upgrade availability and cost (and vendor support) are just as important as the initial cost of the software.
- Make sure off-site training is readily available and conveniently located.
- Consult employees who will use the system for advice about what to purchase. This will ensure you meet their needs, and have their support.

The concept of asset management is a work in progress. AASHTO is currently working on a project to better define asset management and the principles needed for implementation. Fraher said "there will be training coming out of that effort."

Kansas LTAP will provide more information on this topic in this newsletter, as it becomes available. ■

hot lines offering various types of travel information across the state.

"It opened up our eyes to how difficult it is for our customers," said Martin Knopp, head of intelligent transportation systems for the Utah Department of Transportation.

Source

"A Call for Help" by Dibya Sarkar, *FCW.com*, February 11, 2002. ■

A Leg Up

Revised Handbook Addresses the Needs of Older Pedestrians as Well as Drivers

... by Ira J. Allen

Last year the Federal Highway Administration (FHWA) published an updated version of a 1998 highway design guide addressing needs of older drivers. The impetus behind this update (and behind the initial publication) is the fact that the proportion of the population over the age of 65 is growing significantly, and this fact presents certain safety issues.

Drivers and pedestrians can be expected to have some problems in traffic environments given changes in their perceptual, cognitive and psychomotor abilities as they age. As the Handbook states, "These changes present many challenges to transportation engineers, who must ensure system safety while increasing operational efficiency."

Scope of the Handbook

The Handbook provides transportation engineers (and others involved in highway and street management) ideas for coping with the problems presented by some older road users. It is intended to supplement existing guidelines concerning highway engineering, such as the Green Book and the MUTCD (*Manual of Uniform Traffic Control Devices*), but does not replace them and is not legislative or regulatory in nature. Rather, it provides a summary of research on several of the problems associated with older drivers and pedestrians and a list of possible solutions for each problem. The solutions vary in degree of technical detail;



The most significant revision to the *Highway Design Handbook For Older Drivers And Pedestrians* is the addition of pedestrians. The new version also covers a wider range of issues relating to older drivers/pedestrians, and has added more information on how to implement recommendations. Up-to-the-minute research has also been incorporated.

This free handbook is a must-have for roadway planning. It should soon be available on the web at <http://safety.fhwa.dot.gov/programs/olderdriver.htm>, and can currently be acquired in hard copy by contacting the FHWA Reports Center at (301) 577-0818. Ask for report # FHWA-RD-01-103.

I will not list them here—several hundred (very well-indexed) pages have already been devoted to that in the Handbook.

In addition to the Handbook itself, FHWA has published *Guidelines and Recommendations to Accommodate Older Drivers and Pedestrians* (FHWA-RD-1-051). This publication pares away much of the rationale provided in the Handbook, giving the reader a brief sketch of each problem area and concise descriptions of recommendations.

Top Five Problem Areas

FHWA identified five problem roadway areas at which older drivers and/or pedestrians are most likely to have difficulties:

- intersections,
- highway interchanges,
- roadway curvature and passing,
- construction/work zones, and
- highway-rail grade crossings.

Rather than going into detailed explanations of each of these sections,

I will cover only one—intersections—to give some idea of whether this handbook could be valuable to you. The Handbook covers the other four areas in much the same way.

Intersections

For drivers 80 years old and older, approximately 50 percent of fatal crashes occur at intersections. For drivers 65 and older, this figure is 37 percent. Compare these numbers to 23 percent for drivers up to 50 years old, and you'll see why the Handbook states: "The single greatest concern in accommodating older road users, both drivers and pedestrians, is the ability of these persons to negotiate intersections safely." Older drivers find driving situations involving complex speed-distance judgments under time constraints more difficult than younger drivers. And this is the typical scenario for driving through an intersection.

Research shows that older age groups have considerably more difficulty making right and left turns at

Our Aging Drivers

	United States	Kansas
Percentage of drivers age 60 or more	16.4	20.7
Percentage of drivers age 70 or more	9.9	11.4

intersections and responding to traffic signals. Older drivers also have difficulty with the following activities:

- reading street signs in town,
- driving across an intersection,
- finding the beginning of a left-turn lane at an intersection,
- making a left turn at an intersection, following pavement markings, and responding to traffic signals.

Between 12 and 27 percent of older drivers surveyed experienced difficulty in each of the areas listed above. The Handbook goes on to report and analyze the driving behavior of older drivers in greater detail.

Older pedestrians

Issues affecting older pedestrians are addressed throughout the Handbook. The Intersection section, for example, summarizes research on the types of traffic situations that put older pedestrians most at risk and discusses age-related diminished capabilities for walking and reading signs and signals. This section also provides several pages documenting research on older pedestrian safety at roundabouts.

Timely information

The 65 and older age group, which numbered 33.5 million in the U.S. in 1995, will grow to more than 36 million by 2005, and can be expected to exceed 50 million by 2020. With these numbers, this age group will account for roughly one-fifth of the driving-age population in this country. Traffic volumes are growing ever larger, congestion is worsening, and demands on drivers are growing, yet it remains true that a person's overall quality of life is closely linked to independence. And for many Americans, the automobile is

essential to independence. What this means is that more and more American drivers will be on the roads with less capability of dealing with demanding driving situations.

This is particularly true of Kansas, where older drivers already number more than a fifth of the total driving population. In Kansas, 20.7 percent of drivers were 60 or older in the year 2000; 11.4 percent were 70 years old or older.

If those numbers seem high, it's because they are. Nationwide, only 16.4 percent of drivers are aged 60 or over. 9.9 percent of American drivers are 70 years old or older. It is in this context that the Handbook is so vital for Kansas.

Recent research has been incorporated, format and content changes have been made, guidance on implementing recommendations has been added, and the range of applications covered by the Handbook has expanded beyond the original 1998 document. Anyone interested in highway planning, or even in the effects of the normal aging process on driving ability, would do well to acquire this book.

Sources

www.fhwa.dot.gov/ohim/hs00/dl22.htm;

Guidelines and Recommendations to Accommodate Older Drivers and Pedestrians, USDOT/Federal Highway Administration, October 2001.

Highway Design Handbook for Older Drivers and Pedestrians, USDOT/Federal Highway Administration, October 2001. ■

511, continued from page 8

ATIS Coordinator, to oversee 511 implementation efforts.

Bruce Baldwin, ITS/Safety Engineer at the Federal Highway Administration's (FHWA) Kansas Division office, says that Kansas is shooting for implementation by the end of 2002, and that "institutional difficulties, not hardware are holding us back."

As Barbara Blue explains, "There are many complexities to the implementation of 511, such as data sources that support information provided in the system, telephony issues, and cooperation from private sector players such as telecommunications companies."

Institutional coordination and planning for 511 has only just begun in Kansas, and the focus for now has been on highway information.

"We are in the elementary stages of research and development," Blue says. "The initial launch of the Kansas 511 program will focus on road-specific weather and road conditions. There may be other program components in the future, but we're concentrating on these right now."

KDOT and other transportation entities, then, are interested in implementing 511, and have made a commitment to do so. "The timing of the implementation depends on many factors, and no firm timetable has been determined," Blue said. "We think we know what we'd like to do—the question is when and how..." she added.

If you would like to participate in Kansas' 511 system, call Barbara Blue at (785) 291-3818.

Sources

www.its.dot.gov/511/511Rcnsd%20Comm%20TNR.doc;

511: America's Traveler Information Number: Implementation Guidelines for Launching 511 Services, 511 Deployment Coalition, November, 2001. ■

Policies and Education Help Prevent E-Mail Woes

... by Dale Bowen and Bryan Gold

Cities and counties should develop computer policies that clearly identify appropriate e-mail use. Equally important, local governments need to educate their elected officials and employees about those policies to ensure e-mail systems are not abused.

Clearwater, Fl., has experienced widely publicized incidents of e-mail abuse. In 1999 their acting information technology director resigned following allegations that he used a private e-mail account to send sexually provocative statements to a city employee.

Early in 2000, the supervisor of their solid waste department was accused of racial discrimination



No messages are considered private. And employees must realize that, even when a message is “deleted” it can still be re-created.

because he e-mailed a questionable joke to a co-worker. The incidents touched off internal investigations and led to a series of revisions of the city’s e-mail policy.

Even so, in October 2000, Clearwater’s planning and development administrator was forced to resign after using the city’s computer system to send e-mails containing improper jokes and conversations about his private storage business. As a result, the *St. Petersburg Times* requested that the planning administrator and the assistant manager (a recipient of the off-color jokes) release e-mail records from the previous year.

You’re putting yourself and your agency at risk if:

- you send or receive messages from work about a private commercial venture (even your weekend firewood-cutting business);
- you send or receive personal e-mail or internet information you don’t want others to read (personal correspondence, retirement information, bank statements, etc.);
- you send or receive sexually explicit or offensive material (including jokes) from work—whether from your work or personal e-mail address.

Before giving the records to the media, Clearwater officials allowed the staff in question to remove personal e-mail messages. The newspaper sued, arguing that state law classifies all e-mails sent and received on city computers and read by city employees as public records.

Clearwater’s struggle with its computer policy is not unique. A recent sur-

vey conducted by PTI and the International City/County Management Association indicates that 61 percent of the responding jurisdictions have or plan to create an e-mail use policy to regulate employee’s use of e-mail.

Local government e-mail use policies should address:

Message content. E-mail messages should contain information related only to government business. Messages that contain sexually explicit materials, obscene and discriminatory language or solicitation for commercial ventures or religious causes should be prohibited. Employees should not use their government e-mail address in connection with

private on-line portals, chat rooms, listserves, bulletin boards, or to receive personal material, such as, but not limited to, information on stocks and bank records. If an e-mail system is used for sending personal messages, the employee waives the right to privacy.

Public records. Employees must realize that, even when a message is “deleted” it can still be re-created. Therefore no messages are considered private. E-mail should not be used to transmit confidential information without advice from the city or county counsel.

After crafting clear rules for e-mail use, local governments should educate all officials and employees about the rules. In San Diego, for example, employees are informed that electronic records are subject to the mandatory disclosure requirements of the California Public Records Act.

“E-mail is subject to all the same laws, policies, and practices that apply to other means of communication, such as the telephone and paper documents,” says Dinah Neff, deputy city manager and CIO for San Diego.

Some local governments have created training programs about e-mail use or include this information in orientations for new employees. San Diego provides information about e-mail use to new employees as part

E-Mail and Public Records in Kansas

Is e-mail subject to public records law in Kansas? The Attorney General says yes. In her Opinion 2002-1, Carla Stovall answered an inquiry from the City of Hays Attorney about e-mail from city commissioners being considered public documents.

Stovall said: [I]t is our opinion that the Kansas Open Records Act applies to computer records as well as paper records. A record created by use of electronic mail may be subject to the KORA if the electronic record in question meets the definition of 'public record' found in K.S.A. 45-217. Whether e-mail communications between or involving individual city commissioners are 'public records' will depend upon whether such e-mail communications are 'made, maintained, or kept by or [are] in the possession of a public agency,' and whether any exceptions to the definition apply. The statutory definition of the term 'public agency' includes political and taxing subdivisions and their officers or employees. However, the definition of a 'public record' excludes records that are 'made, maintained or kept by an individual who is a member of . . . the governing body of any political or taxing subdivision.' Thus, if a specific e-mail communication is not made, maintained or kept by the city, but rather is exclusively made, maintained or kept only by the individual city commission members, it is not a 'public record' as defined by K.S.A. 45-217."

This opinion applies to government employees as well. Stovall said "It is very important for ... city employees and officials, using e-mail services, to be cognizant of the other laws that may apply or be implicated by such actions."

So in short, if you send personal e-mail, be sure to send it from your home computer—and use a personal e-mail address, not your work address. Otherwise your message and any replies could be considered public record.

of their initial orientation.

"We describe our e-mail policy, the rationale behind it, and the employee's role in the city's record retention policy. We also diagram how e-mail travels in the city's computer system—all the nodes it goes through, and how when you delete something it might still be on any one of the servers we use," said Diane Norman, San Diego's IT Program Manager.

"Our basic points are: keep personal e-mail out of the work place, don't put the network at risk, and don't put the city at risk." Norman said.

San Diego uses a video to illustrate e-mail use and misuse that can be checked out and viewed at any time. They use the public sector edition of a commercial video entitled "E-Mail Essentials," distributed by Quality Media Resources (*QMR.com*; 800-800-5229). The video is pricey—\$425—

but well worth it, says Norman. The video features actors in scenarios that show employees using e-mail inappropriately in a work situation, and discusses why it's inappropriate and possible consequences. As a result of their training efforts, San Diego has seen only minimal misuse of the e-mail system and the internet, said Neff.

Source

www.americancityandcounty.com. Reprinted (and updated) with permission from *Transportation Technology Update*, Spring 2001, Mississippi Center for Technology Transfer. ■

Dale Bowen is director of on-line services for Washington D.C.-based Public Technology, Inc. (PTI). Bryan Gold is PTI's director of communications.

GPS, continued from page 7

base station files in hand, it is simply a matter of figuring out the software that came with your receiver or that you bought to compare the two files.

If you are new to GPS, it is a good practice to visit "survey monuments" as often as you can when collecting data in the field. A survey monument is a point with known coordinate values. I like to verify my data against known points whenever possible. If I see that my receiver accurately finds known locations, it builds confidence, that by using the same procedures I can locate other points with similar results.

Real time. Real time differential correction is not to be confused with survey grade Real-Time Kinematic (RTK) systems. Using real-time differential correction is basically the same concept as post processing, but your receiver is in constant contact with a base station through radio or satellite links, making the differential corrections on the fly, in real time. Some equipment even allows you to do both real time and post processing differential correction on the same data. There are free broadcast corrections available in many locations, and there are companies that sell these services as well.

I hope this gives you a starting point for answering the question "Which type of unit is best for me?" Any of the above systems will tell you where in the world you are, and some will even tell you what's there when you get there. The cost of the equipment will vary a great deal depending on the accuracy of the equipment and the features included. But as with any technology, GPS units are getting smaller, faster, less expensive and easier to use every day.

Reprinted and adapted with permission from the Washington State Technology Transfer Center. ■

CD Reviews

Editor's note: We're receiving more and more training material on CD-ROM these days, and fewer videos, so we are featuring a few new CDs this issue:

Intelligent Transportation Systems Awareness, Version 2.0

USDOT/FHWA, 1999.

This CD-ROM aims, as its title suggests, to develop awareness about intelligent transportation systems, defined as a collection of technologies applied to transportation in the name of efficiency.

The CD is divided into four modules: What are Intelligent Transportation Systems?; Success Stories; Strategic Considerations; and Planning and Intelligent Transportation Systems Implementation.

Each module has a clickable interface that takes the user to various topics, where a soothing voice explains what that section is all about. This

feature may grow tiresome. This qualm aside, the CD nicely interweaves the spoken voice (which will take some users back to their college days) with important points and quick facts printed on the screen. Each section can be easily replayed, and the information presented is detailed and specific, but not overly so. Well produced from start to finish, the CD sleeve has easy-to-follow instructions for both installing and uninstalling the program. Content-wise, it's a winner, and it won't take up much space on the hard drive.

—by *Ira Allen*

Pedestrian/Bicycle Safety Resource Set, Version 1.0

USDOT/FHWA, 2000.

FHWA has made a good start on addressing the issue of pedestrian and bicyclist safety with regard to motor vehicles with this CD-ROM. It is

packaged well and is self-installing, and aims to educate the user about problems and possible solutions for pedestrian and bicyclist safety. Once inside the program, the user is guided through the initial stages accompanied by a moderator. After the first couple of screens, all further information is in PDF format. (You can download Adobe Acrobat if you don't have it. You'll need it to read the PDFs.)

The videos within the early sections of the program are somewhat fuzzy and jerky. And you have to return to the introduction sequence every time you want to switch between looking at pedestrian and bicyclist safety. Aside from those relatively minor problems, the CD-ROM is of definite value. It's full of relevant, fairly-easily accessed information, and should be a valuable tool for designers of roads and bike/pedestrian facilities.

—by *Ira Allen* ■

Calendar

... 2002 ...

April 24
Using Gut-Level Emotion to Make Safety Training Stick (Click, Listen and Learn)

April 24-26
KCHA/APWA Kansas Chapter Joint Meeting in Salina
Contact Norm Bowers at 913/782-2640 or Brenda Herrman at 785/628-7350

*May 1
What's New with the MUTCD?
in Chanute

*May 8
What's New with the MUTCD?
in Hutchinson

APWA Round Table Discussions
5/16—Garden City
6/20—Manhattan
7/18—Great Bend
8/29—Wichita
10/24—Lawrence
11/21—Fort Scott
Call Brenda Herrman at 785/628-7350

May 21-22
Kansas Transportation Safety Conference in Topeka
Call KU Continuing Education toll free at 877/404-5823

May 21
Conflict Solving for the New Supervisor (Click, Listen and Learn)

*June 25-27
NHI Course: Urban Drainage Design in Topeka

July 17
Implementing GASB-34 (Click, Listen and Learn)

*October 8-10
Culvert Design (NHI Course), in Topeka

*September/October
LTAP Motorgrader Operator Training
5 locations in KS

*October
LTAP Snow and Ice Control Training
5 locations in KS

October 15
MINK2 (FHWA County Engineer's Meeting) in St. Joseph, MO
Call Gary Rosewicz at 785/562-5349

October 29
Use of Chemicals and Abrasives for Winter Road Maintenance (Click, Listen and Learn)

For information on calendar items indicated with a * or to suggest a topic for a future LTAP workshop, contact:

Rose Lichtenberg
LTAP Training Coordinator
Kansas University Transportation Center
1530 W. 15th Street, Room 2011
Lawrence, KS 66045-7609
785/864-2594

or visit our Web site at www.kutc.ku.edu

To register for the APWA/LTAP "Click Listen and Learn" workshops, call Ashley Gann at (816) 472-6100 ext. 3511. Cost is \$125 per site.

Free Resources

Check off your selections, fill in the bottom portion, and return this form to:

KUTC Materials Request, 1530 W. 15th St., Room 2011, Lawrence, Kansas 66045
or fax to 785/864-3199

CDs

One CD per lending request. Two week lending period.

- Intelligent Transportation System Awareness**
by USDOT/FHWA, 1999.
- Pedestrian/Bicycle Safety Resource Set**
by USDOT/FHWA, 2000.

Publications

You are free to keep these unless otherwise noted.

- Access Management: Sensible Solutions for Tomorrow's Traffic**
(tri-fold brochure) An at-a-glance guide to limiting access to heavily-traveled roads, how the process works, and when to consider its use. Published by USDOT/FHWA, 1998.
- Corridor Management: Balancing Land Use and Transportation**
(tri-fold brochure) A very simple presentation of corridor management—a planning tool whereby governments work together to improve safety and efficiency of major traffic corridors. Includes contacts within each of the KDOT districts. Published by KDOT.
- Where Will My Driveway Go?**
(tri-fold brochure) A brief guide to both access management and corridor management, with information about how to apply for a permit from KDOT to build a driveway on highway right of way. Published by KDOT.

Equipment

Available free—for loan to local highway agencies. Call us at (785) 864-5658 to arrange time period needed for loan. There could be a waiting list for these items.

- Jamar Technologies, Inc. (DB-400) Turning Movement Counter Board**
A basic model for recording turning movements at intersections. The board is is lightweight and comes with its own case.
- Jamar Technologies, Inc. (TDC-8) Turning Movement Counter Board**
Can be used to do turning movement counts, classification counts, gap studies, stop-delay studies, speed studies, and travel time studies. The board is is lightweight and comes with its own case.

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The Kansas Local Technical Assistance Program (LTAP) is an educational, research and service program of the Kansas University Transportation Center (KUTC), located in the University of Kansas School of Engineering. Its purpose is to provide information to local and county highway agencies and transportation personnel by translating into understandable terms the latest technologies in the areas of roads, highways and bridges.

The *KUTC Newsletter* is one of the KUTC's educational activities. Published quarterly, the newsletter is free to counties, cities, towns, tribal governments, road districts and others with transportation responsibilities. Editorial decisions are made by the KUTC. Engineering practices and procedures set forth in this newsletter shall be implemented by or under the supervision of a licensed professional engineer in accordance with Kansas state statutes dealing with the technical professions.

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