PARTNERS FOR ITS Y2K
AWARENESS TO ACTION

STEPS FOR ACTION

Getting Intelligent Transportation Systems Ready for the Year 2000

Do not procrastinate. The time to identify potential Y2K problems is now. It's important to test your system and find where you stand. If you have not yet tested your system, you need to get moving. Although most big, centralized transportation management systems have been developed since we learned about the Y2K issue and already have four-digit dates, the only way to know for sure is to test.

Tips for success:

- *Increase awareness and educate. Raise awareness among the general public and develop specific examples of the potential failures in various aspects of transportation operations, to focus attention on the issue.*
- *Publicize and celebrate success stories on ITS Y2K remedies.*
- *Each transportation agency or organization responsible for testing its own system should share information on identification and resolution of problems.*

Foreword

With the year 2000 rapidly approaching, we are becoming more and more familiar with what is known as "Y2K," shorthand for the year 2000 problem. The problem has its origins in computer systems that store only the last two numbers of years in dates (such as "98" for 1998; the "19" is assumed). This requires less disk storage space, but poses a major problem as we head into the year 2000. Computer systems could interpret "00" as 1900, rather than 2000. This could cause computers to crash, generate bad data, or otherwise malfunction. Transportation systems that depend on computers or vehicles using embedded computer chips could shut down.

Preventing those problems involves a simple technical fix, but determining what needs to be fixed—and how—requires an extensive computer evaluation and testing process. The problem is really more of a project management issue than a technical issue.

Y2K is a pervasive problem, affecting all areas of our lives. President Clinton, Vice President Gore, and Transportation Secretary Slater have made solving the Y2K challenge a top priority.

To ensure that our Nation's transportation systems will continue to provide safe travel on and beyond January 1, 2000, we are also working with our partners in the transportation community. For example, we recently held an Intelligent Transportation Systems (ITS) Y2K Summit meeting of our partners; this brochure is based on the discussions at the Summit.

The purpose of this brochure is to serve as an organizing tool that will help you map out your Y2K problem-solving activities between now and January 1, 2000. During that period, the U.S. Department of Transportation will communicate the importance of Y2K at every appropriate opportunity. We will facilitate a national Y2K dialog and provide whatever assistance we can to ensure the safe, orderly operation of our transportation system.

We will routinely provide information to our public- and private-sector partners to share examples of good practice and to encourage their adoption. We will assist in regional Y2K seminars and provide our ITS Y2K partners with materials that can be used in presentations at local, regional, State, and national conferences. We urge our State and local partners to use their regularly allocated Federal highway and transit funds to repair their Y2K problems.

As you read through the Steps for Action, consider the following questions:

- *Have you considered how your intelligent transportation system integrates with other systems? Have those other systems been checked? Have you considered the relationships between your system's data, user data, imported data, software application data, the operating system upon which all these applications and databases are running, and how they are affected by the year 2000 problem? Can you identify potential problems with these complex interrelationships?*
- *Fixing the Y2K problem on one individual computer could take an hour. Who pays for that hour? Multiply that by however many computers you have.*
- *Have you applied a higher standard to ensure that ITS public safety systems, including emergency management and incident management systems, will work?*
- *Have you made contingency plans? What if you've done everything possible, but your system fails because of failures in interrelated systems, such as telecommunications or energy systems?*
- *Will you be ready on January 1, 2000?*

Mortimer L. Downey
Deputy Secretary
U.S. Department of Transportation

The ITS Y2K Summit, held July 27, 1998, brought more than 150 transportation professionals together to develop a plan for addressing and solving the Y2K problem. The Summit was designed to obtain input from a cross-section of transportation decisionmakers, information technology experts, and line operators. An opening plenary session set the stage and provided a charge to the Summit participants; facilitated breakout sessions allowed the participants to produce a comprehensive set of "Steps for Action" by the end of the day. This is the final version of the Steps for Action document prepared by the Summit participants.

The Partners for ITS Y2K have teamed with the U.S. Department of Transportation to ensure that the Y2K compliance problem is a focus of attention throughout 1998 and 1999 and that the transportation community provides leadership to implement the Y2K Steps for Action described in this brochure.

ITS Y2K Partners

AAA Foundation for Traffic Safety
American Association of Motor Vehicle Administrators
American Association of State Highway and Transportation Officials
American Association of Port Authorities
American Public Transit Association
American Public Works Association
American Society of Civil Engineers
Community Transportation Association of America
ITS America
Inland Rivers, Ports and Terminals, Inc.
Institute of Transportation Engineers
Intermodal Association of North America
International Association of Chiefs of Police
International Bridge, Tunnel and Turnpike Association
National Association of County Engineers
National Association of Regional Councils
National Conference of State Legislatures
National Electrical Manufacturers Association
National Governors' Association
National Private Truck Council
Public Technology, Inc.
Transportation Research Board

This Steps for Action brochure was developed by participants at the ITS Year 2000 Summit hosted by the U.S. Department of Transportation on July 27, 1998, in Arlington, Virginia. The document is not intended to provide a comprehensive inventory of Y2K issues, but represents a compilation of views regarding Y2K experiences across a broad range of public- and private-sector groups. It is intended as a resource for educational and information purposes only; it is not intended as legal advice.

Putting It All Together

The Summit participants provided a wide range of suggestions and ideas concerning the Y2K challenge with regard to intelligent transportation systems (ITS). Inevitably, much of the discussion related to the institutional issues that face transportation organizations and industry, particularly in light of the interdependent nature of today's information systems and the integration of these systems into organizational decision making. The participants identified several characteristics of a successful Y2K compliance initiative:

- ***Involvement of executives and elected officials.*** *In general, where top executives have supported the compliance initiative, Y2K efforts have been successful. It is thus important to garner top leadership support for such efforts. One of the key motivations for the transportation industry to make ITS technologies Y2K compliant is the critical link between information technology–controlled system performance and safety. This has been an important justification for executives supporting Y2K compliance efforts.*
- ***Mission-critical assessment.*** *It is important to understand which mission-critical functions will most likely be affected by the Y2K challenge. This means that not only is top-down organizational participation necessary, but so too is bottom-up involvement by those using the systems on a day-to-day basis. These individuals often have a better sense of the important interdependencies inherent in corporate information systems. In many cases there is a high level of awareness of the Y2K challenge among key decisionmakers, but the awareness does not go very deep in the organization.*
- ***The best laid plans....*** *The most appropriate approach to Y2K assessment of ITS technologies, such as freeway management systems, is to inventory information system assets, assess the level of vulnerability, test alternative scenarios to gauge response, adopt strategies to deal with any Y2K problems, and develop a contingency plan in the event that these strategies do not work. The contingency element of this problem-solving approach is one that is often overlooked, but that could potentially be most important in averting serious disruption.*
- ***An organizational strategy.*** *Meeting the ITS Y2K challenge requires an organization-wide strategy for dealing with a myriad of problems that cross organizational and jurisdictional boundaries. The good news is that there is often an institutional structure that can be used to foster awareness and provide coordination of ITS Y2K efforts. The bad news is that this same institutional structure can pose serious barriers to success. The most effective approach to organizational ITS Y2K efforts is to find a "champion" who can lead the effort and who has the respect of organizational leaders. Incentives should be provided to encourage such champions and to bolster public/customer confidence that a serious plan of action is being followed and remedies are being made. The strategy also needs to leverage resources as much as possible to incorporate Y2K compliance efforts within resource allocation decisions.*
- ***Important role of the Federal government.*** *The transportation industry is large and diverse. The Federal government has an important role to play in making sure the industry is aware of the Y2K challenges and in providing forums, such as the Summit, for the exchange of information.*

A key question posed at the Summit was, "How do you know you are there?" How is success defined (at least before the turn of the century)? What role do vendors have in ensuring compliance? Defining success can be one of the most challenging parts of ensuring that intelligent transportation systems are Y2K compliant.

The Summit participants strongly recommended that a structure be established to allow information to be exchanged among those involved with ensuring that intelligent transportation systems (such as traffic control systems, transit management systems, and freight and port management systems) are Y2K compliant. This swapping of information about successes and failures with integrated systems could help others avoid common pitfalls.

Steps for Action

The following are the seven Steps for Action developed by the Summit participants, along with key factors to be considered.

Determine who the key transportation players are in preparing for ITS Y2K. Different groups (industry associations, professional organizations, elected officials, appointed officials, senior operational managers, support functions) have unique roles and responsibilities in managing the Y2K remediation process.

- *Federal agencies have a major role–providing leadership, supporting legislation to limit liability, and serving as a focal point for information sharing and dissemination.*
- *Elected officials also have a key role: they must remain informed, demand accountability, and allocate appropriate resources to solving the Y2K problem. They must also encourage coordination with other levels of government.*
- *ITS "domain experts" must contribute expertise in narrowly specialized areas, share insights, maintain lines of communication, and provide "reality checks."*
- *Transportation industry and professional associations can play a key role by providing information, coordinating across functional areas, and sharing solutions. One strategy might be to create a speakers bureau with appropriately tailored materials for addressing different groups on the Y2K problem. One recommendation of the Summit was to encourage efforts to reach out to municipalities.*
- *Transportation industry vendors and contractors have an obligation to share databases of compliance tests and risk assessments and to make information available to customers.*

> ***"[The Y2K] problem tends to grow as you get into it."***
>
> *Katherine Hofstedt, Minnesota DOT*

Encourage elected/appointed officials, who are accountable to the public, to probe for details. They need to ask about the management of Y2K remediation programs for transportation services.

- *The role of elected and appointed officials is to lead and motivate their organizations to address Y2K problems.*
- *ITS "domain experts" must inform officials about critical issues.*
- *Officials must be aware of the dimensions of the Y2K problem within their organization: What is the problem, and how big is it? Have we prepared an inventory of systems that might be affected? What might fail? Do we have a plan? What is the status? Do we have the authority to make necessary changes? Have the needed resources been allocated to solve the problem? What are some of our interdependencies with others—who depends on us, and whom do we depend on? How can we leverage resources?*
- *Elected officials should also consider that the public will be asking the same kind of questions of them—namely, what have you done to take responsibility and address any Y2K problems in transportation systems in your jurisdiction?*

Seek out the experiences of others, who can provide "lessons learned" about effective strategies and coordination efforts for ITS Y2K. Identify best practices. Following are several examples cited during the Summit:

- *Get started now. The deadline for resolving the Y2K problem cannot be extended.*
- *Set priorities: Mission-critical systems should have first call on resources.*
- *Public-sector agencies should develop and implement an outreach plan to inform their constituents of steps they are taking to address the Y2K problem. Confidence is established by sharing information.*
- *Share information. Create a central clearinghouse—an authoritative source on ITS Y2K issues—or direct people to existing resources.*
- *Take advantage of opportunities for peer review and support. Work with other agencies in your area or with members of technical and professional organizations.*
- *Get legal staff involved as early as possible. Contractual issues and liability questions must be resolved quickly and with the assistance of legal staff.*
- *Top management support is critical. Keep leadership aware, and make a forceful case without being an alarmist.*
- *Assign a top-flight manager and provide the resources and authority necessary to get the job done.*
- *Technical support is key. Be willing to pay for the talent and expertise needed to accomplish necessary tasks, whether contract support or in-house staff.*
- *Have a test plan and follow it. Many estimates of ITS Y2K repairs indicate that testing will take up half of the overall project timeline.*
- *Provide information on ITS Y2K compliance, through databases and customer advisories (if all else fails, resort to Y2K "recall notices").*
- *Take advantage of the "crisis atmosphere" to leverage awareness and promote deeper understanding of information technology and systems (including embedded systems). This kind of visibility for ITS may not occur again in the near future.*

> ***"The electrical manufacturers industry will take a lead role in providing information."***
>
> *William Russell,*
> *Traffic Signal Industry Representative*

Sharing experiences can also reveal pitfalls that must be avoided, as well as some of the barriers to effective management of ITS Y2K repairs.

- *Be persistent when reaching out for information or cooperation.*
- *Try not to be overwhelmed by the magnitude of the problem—cut it into manageable bits.*
- *Maintain a "big picture" perspective—don't focus so narrowly on one aspect that you lose sight of other critical issues.*
- *Timing is a major potential problem; decision-making cycles may not be in sync for different levels of government or types of organization.*
- *Maintain awareness of potential problems with international partners (some countries may not be acting quickly enough).*
- *Recognize that compliance means different things to different people. Be certain that everyone is operating with the same set of definitions.*
- *Understand that compliance does not equal contingency planning—you still need to ask "what-if" questions and account for internal and external failures. (If no one understands how the plan is to be implemented, or what to do if something goes wrong, all of the planning in the world may fail to deliver the goods.)*

Organizations involved in ITS Y2K remediation efforts should seek out information and assistance in defining the problem and working toward effective action.

- *Federal technology transfer programs should address Y2K issues.*
- *All agencies and organizations should integrate the Y2K message in training courses, raise the issue at conferences, and identify Y2K compliance as an issue on documents such as purchase orders and invoices.*
- *To the extent possible, agencies should take advantage of traditional service providers (e.g., accountants). Many of these vendors have developed extensive Y2K capabilities.*
- *Take advantage of traditional channels for communication (newsletters, association publications, bulletin boards, and Web sites).*
- *Consider hiring outside experts. It may not be cost-effective to develop in-house Y2K capabilities for ITS.*
- *Contact your venders and request the Y2K compliance status of their products.*
- *Develop or provide links to self-assessment tests for "simple" systems such as personal computers.*
- *Agencies involved in ITS could provide resources for a speakers bureau on Y2K remediation.*
- *Network with your peers. Maybe someone else has encountered the same or similar problems with their intelligent transportation systems.*

"The problem is not one of technology, but one of project management."

John Koskinen,
President's Council on Y2K Conversion

Develop a wide range of Y2K scenarios and carefully consider the consequences if ITS technologies do not function properly. The need for contingency planning must be fully understood. Contingency planning should include the following:

- *Fixes not finished. What if you run out of time on some first- or second-priority systems?*
- *Fixes that fail. What if your testing reveals that some of the fixes you relied upon were unsuccessful?*
- *External failures. What do you do when someone else (a vendor, partner, or utility) has failed to fix its systems?*
- *Training. The best contingency plan will fail if no one knows how to implement it. Do you have everyone in your agency trained on how to effect the changes? On how to respond to contingencies?*

"The delivery of local transportation services is most important."

Donald Evans, Montgomery County, MD

The following table highlights the threats, benefits, concerns, and actions for the four major groups of people and organizations affected by the ITS Y2K issue.

	Affected Groups			
	Public Sector	**Private Sector**	**Associations**	**General Public**
Threats/Risks	♦ *Public safety* ♦ *Liability* ♦ *Fiscal impact*	♦ *Liability* ♦ *Losses*	♦ *Problems for membership*	♦ *Public safety* ♦ *Security*
Benefits/Rewards	♦ *Opportunity to address other information technology issues*	♦ *Profits from Y2K business* ♦ *Better products*	♦ *Visibility* ♦ *Service to members*	♦ *Understand limits of technology*
Concerns	♦ *Do we have a plan?* ♦ *Who pays?*	♦ *Are we compliant?* ♦ *Have we told our customers?*	♦ *How can we be of service?* ♦ *Can we publicize "best practice"?*	♦ *Who is in charge?* ♦ *What is being done?*
Actions	♦ *Develop plan* ♦ *Act now*	♦ *Test devices* ♦ *Establish database*	♦ *Inform members* ♦ *Reward success*	♦ *Understand problem* ♦ *Don't panic*

"ITS America has committed itself to serving in a leadership role and as a central repository for Y2K issues and information."

John Collins, ITS America

Coordination with others is vitally important in ensuring that intelligent transportation systems continue to function safely and effectively beyond 2000. In each region, there are many different organizations that play a role in supporting the safety and productivity of the transportation system: emergency services, public utilities, shippers and carriers, port operators, law enforcement, and others. Each of these agencies should be integrated into the ITS Y2K solution.

- *Communicate with business partners.*
- *Meet with emergency management agencies; consider designating a regional agency to lead contingency planning efforts.*

The following information, while not an outcome of the Steps to Action Summit, complements the Summit conclusions and recommendations. It is intended to assist transportation managers prepare for and solve ITS Y2K problems.

Managers of traffic control systems and other intelligent transportation systems, including transit and port management systems, should develop a plan for addressing and correcting any ITS Y2K problems. The plan should also preclude problems in new procurements by requiring that new information technology systems be Y2K compliant. Procurement contracts should include clauses requiring that all hardware and software will accurately process dates and date-related data before, during, and after the year 2000. This should include accurately entering, storing, manipulating, comparing, calculating, updating, recording, displaying, outputting, and transferring such dates and data.

Assessments as to whether a system is Y2K compliant may include a simulation, in which you set the system's clock ahead and evaluate the effect on the system. Before making any changes, however, be sure to back up the system.

The assessment should be tailored to meet the needs of your system. Check with your information technology staff for specific advice. The information below is intended as an example of a Y2K assessment for a LAN–based application:

1. *Set the system clock on the PC/server to 12:01 a.m., 01/01/2000.*

   Does the server allow this time to be correctly set?

   Reboot the server.

   Does the server keep the correct Y2K date and time after reboot?

2. *Set the system clock on the server to 11:59 p.m., 12/31/1999.*

   Allow the server's clock to roll over to the year 2000.

   Check to make sure the server's clock rolls over to the year 2000 correctly.

   Reboot the server.

   Does the server keep the correct Y2K date and time after reboot?

3. *Repeat Steps 1 and 2 on the PC/client (to determine if the PC is stand–alone Y2K compliant).*

4. *Log in with the PC/client to make sure the PC/client works with the Y2K date and time on the server.*

   Check the date and time on the PC/client. Is it the correct Y2K date and time?

5. *Time-dependent backup software.*

   Test if the backups will kick off after Y2K.

   Test any electronic recordkeeping system software that uses hierarchical storage management.

Recommendations

All operators—traffic control systems, transit and port management systems, and others—should be proactive and establish a plan to address the Y2K problem, now. The plan should include the following:

1. *Do not assume that there is not a problem.*
2. *Do not assume that if there is a problem someone else will provide a simple solution.*
3. *Prepare an inventory of all system elements (controllers, CMS/VMS displays, firmware, software, etc.) and request a Y2K compliance statement from developers/suppliers.*
4. *Consider conducting a simulation of the Y2K date on your system.*

Develop and implement a contingency plan, anticipating what can go wrong and what to do about it. There is always the potential for a failure to be caused by some set of interactions, which you either did not think to test or could not really test. Having a backup is wise. You need to anticipate which system or component failures could occur and then make sure that the backup plan is safe and workable. Under normal conditions, systems do occasionally fail. With Y2K planning, you need to anticipate what to do if many systems fail simultaneously.

Further information concerning ITS Y2K information is available on the U.S. Department of Transportation's Web site: www.y2ktransport.dot.gov.

Resources

The following World Wide Web sites provide information about Y2K solutions. In addition, newspapers, magazines, and television stations are increasing their Y2K coverage.

www.Y2K.gov
President's Council on Year 2000 Conversion. Links to other Federal Y2K operations and other resources.

www.fhwa.dot.gov/y2k
Federal Highway Administration and the Year 2000 Computer Problem

www.nawgits.com/y2kforum
National Associations Working Group for ITS. Partnership with U.S. Department of Transportation with interest in understanding the concepts, practices, and applications of intelligent transportation systems (ITS).

www.itsa.org
Intelligent Transportation Society of America

pti.nw.dc.us/membership/Y2K
Public Technology, Inc.'s Year 2000 site, providing information for local officials and their staffs.

www.itaa.org/year2000.htm
Information Technology Association of America

www.itpolicy.gsa.gov/mks/yr2000/cioy2k.htm
Recommended Year 2000 Contract Language (Final FAR Rule)

This listing of Web sites does not imply an endorsement of the information contained at the Web site or of the organizations posting information at those sites.

U.S. Department of Transportation

Publication No. FHWA-SA-99-001