

GAO

## Testimony

Before the Subcommittee on Transportation and  
Infrastructure, Committee on Environment and Public  
Works, U.S. Senate

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# Transportation Infrastructure

## States' Implementation of Transportation Management Systems

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Mr. Chairman and Members of the Subcommittee:

We appreciate the opportunity to provide this statement for the record on the states' implementation of transportation management systems. These six systems—for managing highway pavement, bridges, highway safety, traffic congestion, public transportation facilities and equipment, and intermodal transportation facilities and systems—were mandated by the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA). The National Highway System Designation Act of 1995 (NHS Act) made the six systems optional, except the congestion management system in certain areas.<sup>1</sup> These management systems are tools that provide information to assist state and local decisionmakers in selecting cost-effective policies, programs, and projects to protect and improve the nation's transportation infrastructure. In January 1997, we reported on the status of the states' development and implementation of the systems, how the states expect to use the systems, and the factors that have facilitated or hindered the development and implementation of the systems.<sup>2</sup> In summary, we found the following:

- As of September 1996, about half the states were moving forward with all six transportation management systems, even though they were no longer mandatory. The remaining states were developing or implementing at least three of the systems. All states were implementing a pavement management system, and nearly all states were implementing bridge, safety, and congestion management systems. Congestion management systems were being developed for all 128 transportation management areas, where they are still mandatory.<sup>3</sup> About 30 states were implementing public transportation and intermodal management systems. The six transportation management systems take a variety of forms, including computerized inventories of assets, software programs, and systematic procedures for collecting and analyzing information.
- The states were developing the systems for use by decisionmakers in the planning process and to help transportation officials conduct daily operations. Some states have realized that to obtain the most uses from the systems, the systems need to be integrated so that, for example, users

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<sup>1</sup>The NHS Act made statewide congestion management systems optional but still required the systems in transportation management areas (urbanized areas with populations greater than 200,000 or other areas so designated at the request of the governor and the metropolitan planning organization or affected local officials).

<sup>2</sup>Transportation Infrastructure: States' Implementation of Transportation Management Systems (GAO/RCED-97-32, Jan. 13, 1997).

<sup>3</sup>All states and Puerto Rico have at least one transportation management area, except Idaho, Maine, Montana, North Dakota, South Dakota, Vermont, West Virginia, and Wyoming.

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can combine information from several management systems to analyze the overall transportation needs in a geographic area. Nationwide, over half the states plan to integrate the systems.

- Although pavement and bridge management systems have been around for several decades, the other mandated systems were new to many states. Three of the seven states that we reviewed as case studies<sup>4</sup> indicated that the 1991 legislative mandate provided a catalyst or “jump start” to developing and implementing the new systems and resulted in the systems receiving high-level support and top priority status. Although implementing the systems is now optional, several states are continuing their efforts because they view the systems as beneficial to the decision-making process in that they provide more accurate, timely information than was previously available. On the other hand, the removal of the federal mandate lessened support for developing certain systems. In addition, some states reported that the U.S. Department of Transportation’s (DOT) failure to issue a clear and timely rule on management systems following the 1991 mandate had caused difficulties in implementing public transportation, congestion, and intermodal management systems. Several states indicated that the Federal Highway Administration (FHWA) was helpful in providing initial workshops and training to states to develop the systems. Officials in all seven states that we reviewed, however, stated that they continue to need federal assistance in solving technical problems with software and/or learning from other states’ experiences in implementing and integrating the systems.

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## All States Are Implementing Some Systems but Customizing Them to Meet Their Own Needs

As of September 1996, 24 states reported that they were moving forward with all six systems, even though they were no longer mandatory. (See app. I.) The remaining states reported they were developing or implementing at least three of the transportation management systems originally mandated by ISTEA. Nearly all states reported that they were developing and implementing management systems for pavement, bridge, highway safety, and traffic congestion. Pavement and bridge management systems may be easier for the states to develop and implement than other management systems because many states had established inventories or a form of management system for these assets before ISTEA.

Nearly all states were developing and implementing congestion management systems, which continue to be required in transportation management areas. Congestion management systems were being

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<sup>4</sup>The seven states we selected were Maryland, Michigan, Montana, New York, North Carolina, Oregon, and Texas. We selected these states to provide geographic balance and a variety of experiences in implementing the management systems.

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developed by state or local agencies for all transportation management areas. Moreover, several states that did not have transportation management areas were developing these systems.

About two-thirds of the states reported that they were developing and implementing the public transportation management system and the intermodal management system. According to transportation officials, fewer states may be proceeding with these two systems because (1) the systems are newer and the states are less familiar with them and (2) the states generally lack jurisdiction over the assets covered in these systems. (See apps. II through VII for more information on each management system.)

Once the NHS Act made the management systems optional, officials in the seven states we reviewed told us that they reassessed their needs and decided whether to (1) proceed with the systems as originally planned, (2) reduce the scope of the systems, and/or (3) discontinue certain systems. Among our case-study states, Michigan was the only one that decided to implement the six management systems with no change in scope to the plans they had developed on the basis of DOT's interim rule.<sup>5</sup> Transportation officials in that state viewed the management systems as an opportunity to improve decision-making and as a way to address other departmental objectives.

The other six case-study states scaled back the extent to which they were developing certain systems, especially pavement and congestion management systems. For example, ISTEA required the states to incorporate all federal-aid highways, which included some roads under local jurisdiction, in their pavement management systems. After the NHS Act made the systems optional, five of the states we reviewed—Maryland, Montana, New York, Oregon, and Texas—decided to include only state-maintained roads and roads on the National Highway System in their pavement management system, at least initially. In addition, three states we reviewed—Maryland, North Carolina, and Texas—decided to discontinue certain management systems—the intermodal and/or the public transportation management systems—once they were no longer mandatory. In each case, state transportation officials determined that the state's needs were being met sufficiently by existing programs and/or activities. Finally, five states we reviewed—Montana, New York, Maryland, Oregon, and Texas—used the flexibility they gained from the passage of

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<sup>5</sup>ISTEA required DOT to issue regulations on the management systems by December 18, 1992. FHWA and the Federal Transit Administration jointly issued an interim final rule in December 1993 and a final rule in December 1996.

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the NHS Act to extend the time frames for implementing some systems beyond those established in initial work plans. Officials in these states found ISTEA's and DOT's initial time frames unrealistic and replaced them with more accurate estimates for completing the initial work on the management systems.

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## Systems Used for Planning and Daily Decision-Making

Many state decisionmakers intend to use information from the management systems in developing statewide and regional transportation plans. The American Association of State Highway and Transportation Officials (AASHTO) surveyed its membership in May 1996 and found that all 37 states that responded intended to integrate the systems within their planning processes. With respect to our seven case-study states, each was using or intended to use the management systems in its planning process as well as using information from the systems in making decisions involving day-to-day activities. For example, state and county maintenance engineers may use information on pavement condition from the pavement management system to determine maintenance needs and priorities.

While some states planned to use the management systems as stand-alone tools to assist decisionmakers in their respective departments, other states also planned to use the systems in an integrated/coordinated manner. At least 26 states planned to integrate parts of their managements systems, according to AASHTO's May 1996 survey. Coordination and integration of the systems helps to eliminate duplication by identifying common features and data elements and enhances the usefulness of the systems by enabling decisionmakers to compare trade-offs at a program level or among transportation modes. Integrating the management systems, however, raises numerous issues—such as establishing common data definitions and common geographical referencing systems. To handle these issues, three states we reviewed have established special committees and dedicated resources beyond those that are needed to develop and implement the individual systems.

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## Several Factors Have Influenced Implementation of Management Systems

Several states we reviewed responded to the ISTEA mandate by providing high-level support and top priority to quickly develop and implement the six management systems. For instance, in New York we were told that the mandate provided a “jump start” to the overall development and implementation of the systems. The state provided additional resources and technical support for enhancing five existing systems and for developing a new one required by the mandate. Although the systems are

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now optional, many states have continued to develop and implement them because of the potential benefits associated with the systems. For example, several case-study states commented that the systems reduce redundancy and provide more complete, accurate information in a single location. In addition, states view the management systems as a way to improve the planning process by providing objective, timely information to decisionmakers.

In several case-study states, the removal in 1995 of the ISTEA mandate lessened support for the development and implementation of transportation management systems and resulted in some systems being dropped. In addition, some states reported that DOT's failure to issue a clear and timely rule following the enactment of ISTEA on developing and implementing the management systems caused difficulties, particularly in terms of the congestion, public transportation, and/or intermodal management systems. These difficulties resulted in one state delaying development of some systems. Another state, which found the concept of an intermodal management system not clearly spelled out in either ISTEA or the interim rule, decided not to implement the system. While a number of states acknowledged receiving assistance from FHWA, several case-study states indicated that they had received little or no assistance from the Federal Transit Administration (FTA) on implementing a public transportation management system. FTA officials told us that they had, in fact, provided assistance, which included issuing guidance on the system and providing related software.

Most states would like additional federal assistance in implementing the management systems. AASHTO found that a majority of the states responding to its May 1996 survey would like both FHWA and FTA to provide more technical assistance by sponsoring conferences and training courses, acting as an information clearinghouse, establishing task forces, and funding research. In addition, our case-study states indicated that they need additional technical assistance from FHWA that focuses on areas such as developing software for the systems, explaining geographic information systems technology,<sup>6</sup> establishing performance measures for systems, and integrating the management systems. Finally, states told us that DOT should establish an information clearinghouse that would provide the results of the research pertaining to the management systems and examples of best practices for various states' efforts to implement and integrate systems.

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<sup>6</sup>Geographic information systems are the computer hardware and software that allow for the assembly, storage, manipulation, and display of geographically referenced data (i.e., data that are associated with specific places on earth, such as the location of a bridge).

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In conclusion, the NHS Act, which generally made the management systems optional, resulted in reduced federal involvement with the systems and an increase in the states' role. The states are continuing to develop and implement most systems, but they are now doing so according to their own needs and time frames rather than by following federal requirements. As the states proceed, however, they are facing technical problems that they would like further federal help in addressing. While the management systems are no longer mandatory, we believe there continues to be a role for FHWA and FTA to play in helping the states address the problems they face in developing, implementing, and integrating the systems that will best meet their needs.

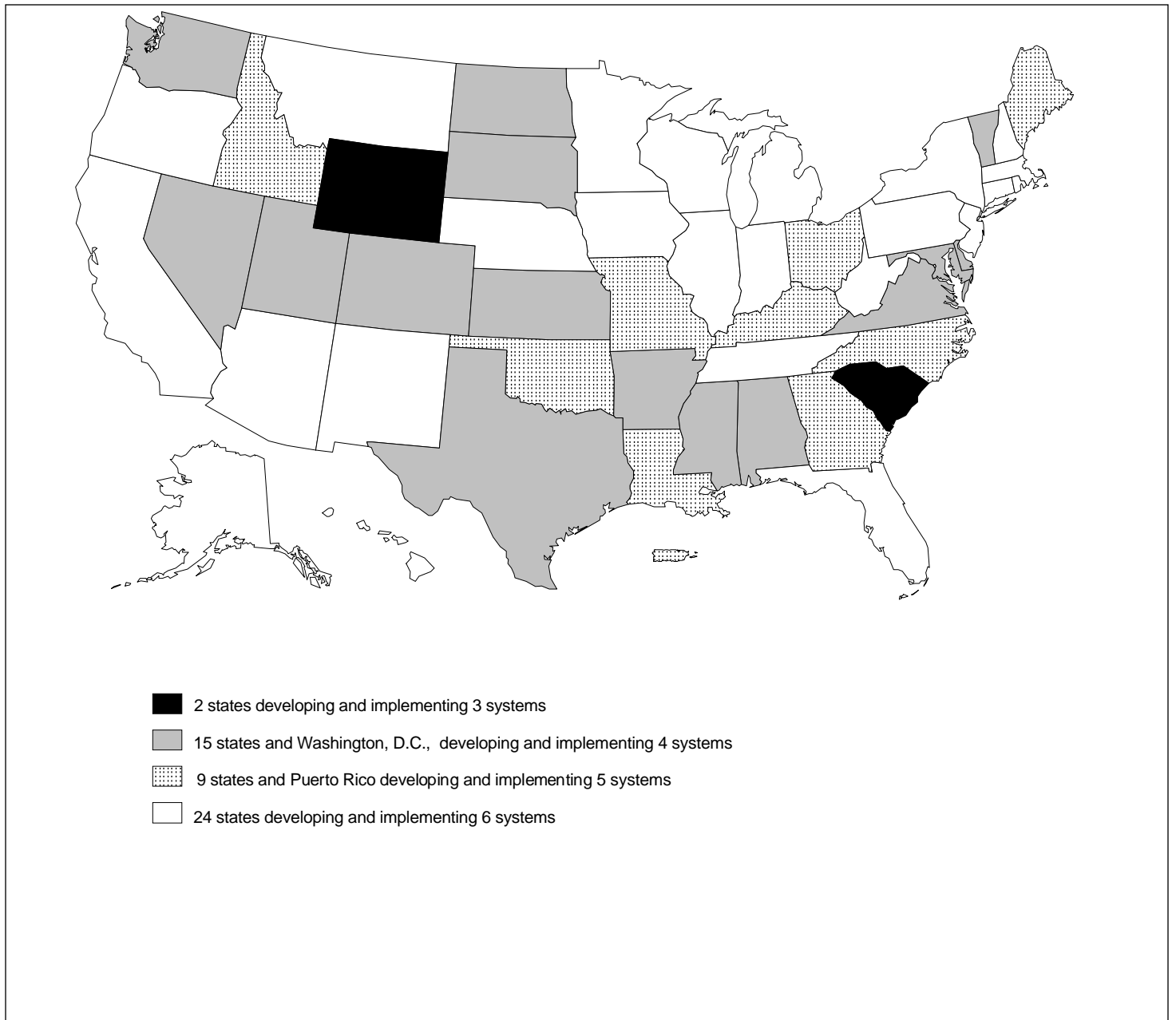
Our report recommended that DOT work with the states to more fully determine the types of technical assistance needed. In addition, we recommended that DOT establish an information clearinghouse on (1) training, conferences, and workshops being offered, regionally and nationally; (2) the status of the states' experience with implementing and integrating the six management systems; (3) the available software applications and technology; (4) the systems' performance measures; (5) examples of "best practices" of the states that are effectively implementing and integrating the systems; and (6) other issues identified by the states. DOT has not commented on our recommendations. The department is required by law to respond to our recommendations within 60 days of report issuance, which will not occur until mid-March.



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# Number of Management Systems Being Developed and Implemented by Each State



# The States Implementing Pavement Management Systems (as Reported by the States)



**F** = System covers all federal-aid highways.

Notes: There is little or no uniformity among the states in the way they measure, collect, and report pavement condition. The states have been developing their pavement management systems independently, and no two are the same.

We do not have information on the systems' coverage for New Jersey, Puerto Rico, Rhode Island, and Washington, D.C.

Sources: Status reports submitted by the states to FHWA during 1996; American Association of State Highway and Transportation Officials' (AASHTO) survey, May 1996; GAO interviews with state officials in 1996.

# The States Implementing Bridge Management Systems (as Reported by the States)



F = System covers all bridges on and off federal-aid highways.

Notes: Pontis is an off-the-shelf software package for bridge management systems. AASHTO's version (3.0) of the software has been available since July 1995, and version 3.1 was issued in July 1996.

We do not have information on the coverage of the system for Nevada, Puerto Rico, Rhode Island, and Vermont.

Sources: Status reports submitted by states to FHWA during 1996; The Status of the Nation's Highway Bridges: Highway Bridge Replacement and Rehabilitation Program and National Bridge Inventory, FHWA, June 1995; AASHTO's survey, May 1996; GAO's interviews with state officials.

# The States Implementing Safety Management Systems (as Reported by the States)

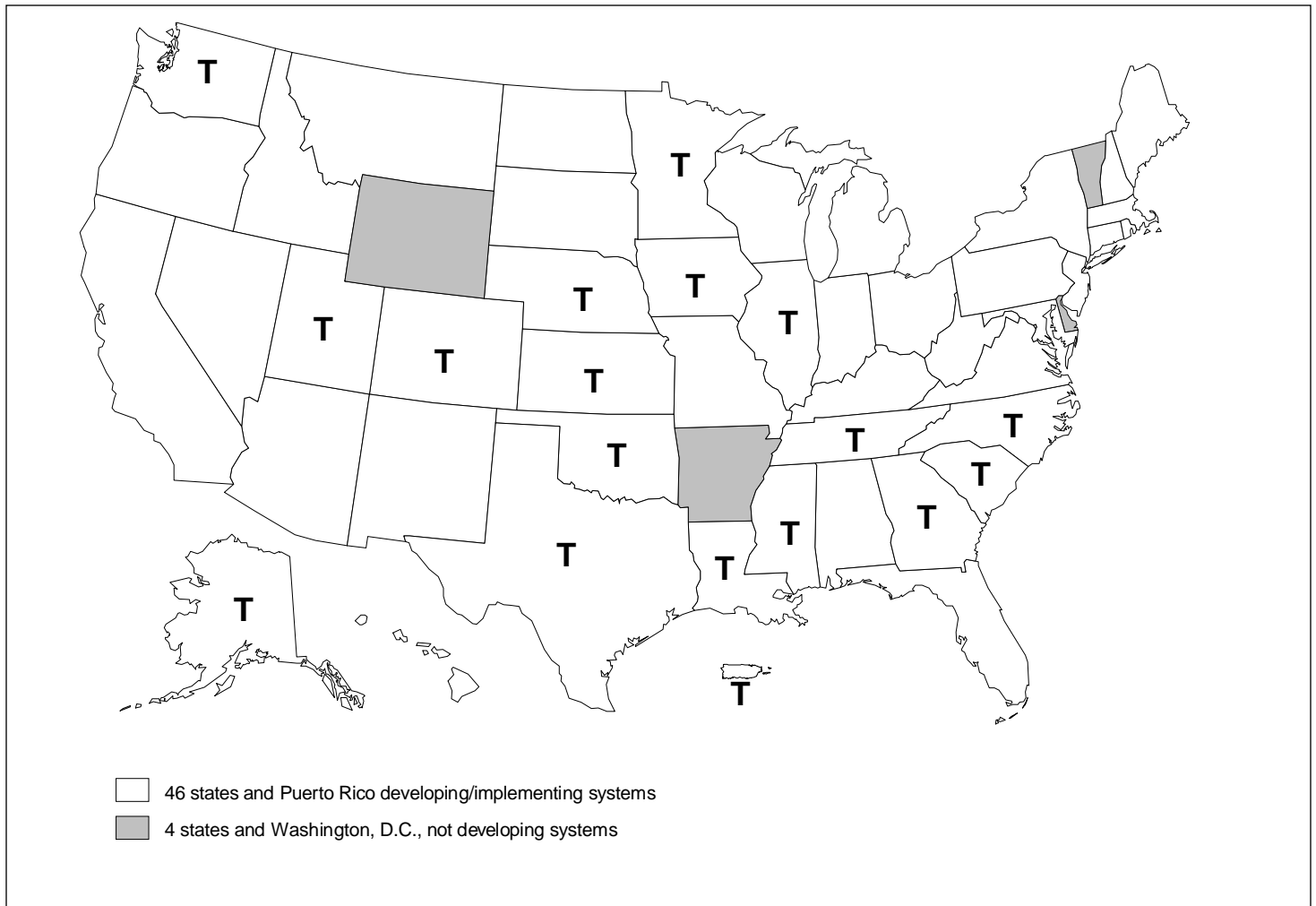


Notes: South Carolina planned to begin implementing the system in fiscal year 1997, and Ohio had components of a safety management in place according to a February 1996 study.

The composition of a safety management system takes many forms—from an administrative structure composed of a coordinating or executive committee and subcommittees with members representing many agencies to a large database that merges safety information from a number of sources.

Sources: Status reports submitted to FHWA during 1996; AASHTO's survey, May 1996; GAO's interviews with state officials.

# The States Implementing Congestion Management Systems (as Reported by the States)

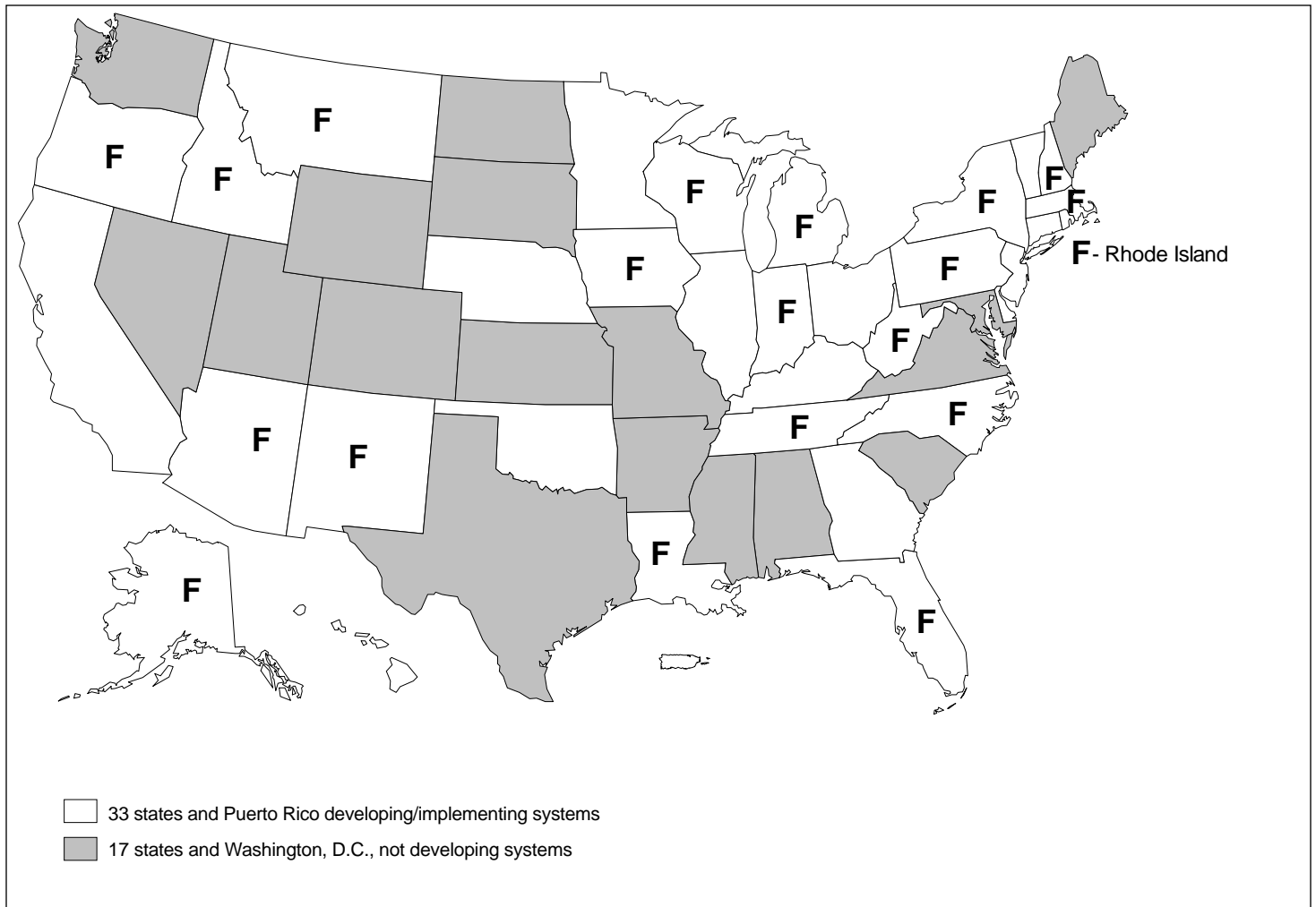


T= System covers only transportation management areas.

Note: We do not have information on the coverage of the systems in Kentucky, Nevada, Ohio, and Rhode Island.

Sources: Status reports submitted by states to FHWA during 1996; AASHTO's survey, May 1996; GAO's interviews with state officials.

# The States Implementing Public Transportation Management Systems (as Reported by the States)



F = System covers federally funded or FTA-funded transit operators.

Note: Of those states implementing the system, seven (Connecticut, Iowa, New Jersey, New York, North Carolina, Rhode Island, and Tennessee) already have operational systems in place.

We do not have information on the coverage of the systems in Connecticut, Delaware, Georgia, Kentucky, Minnesota, New Jersey, Ohio, Oklahoma, Puerto Rico, and Vermont.

Sources: Status reports submitted by states to FHWA during 1996; AASHTO's survey, May 1996; GAO's interviews with state officials.

# The States Implementing Intermodal Management Systems (as Reported by the States)



**S** = Statewide coverage of management system.

Note: We do not have information on the coverage of the systems in Kentucky, Minnesota, New Jersey, Ohio, Rhode Island, and Washington, D.C..

Sources: Status reports submitted by states to FHWA during 1996; AASHTO's survey, May 1996; GAO's interviews with state officials.



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