Communicating With the Public Using ATIS During Disasters

A Guide for Practitioners

April 2007

U.S. Department of Transportation
Research and Innovative Technology Administration
Federal Highway Administration

QUALITY ASSURANCE STATEMENT

The U.S. Department of Transportation ("the Department") provides high-quality information to serve Government, industry, and the public in a manner that promotes public understanding. Standards and policies are used to ensure and maximize the quality, objectivity, utility, and integrity of its information. The Department periodically reviews quality issues and adjusts its programs and processes to ensure continuous quality improvements.

U.S. Department
of Transportation
Federal Highway Administration

400 Seventh St., S.W.
Washington, D.C. 20590

In Reply Refer To: HOTM-1

This toolkit document is the result of a study on "Communicating with the Public Using ATIS during Disasters" conducted by Battelle for the Federal Highway Administration in collaboration with the Research and Innovative Technology Administration's ITS Joint Program Office. The purpose of the study is to examine what information needs to be communicated to evacuees and other travelers under disaster conditions, and how the advanced traveler information system (ATIS) assets of a State's Department of Transportation (DOT) or other transportation agency can be effectively used to deliver such information. ATIS assets have become increasingly plentiful in this Nation, including the 511 traveler information telephone number which is within reach of 100 million Americans.

The toolkit aids in the assessment of who, what, when, where, why and how the traveler information assets need to operate to deliver critical and useful information during major no-notice events or disasters. Assessing regional and metropolitan coordination has become even more critical due to the aftermath of various types of disasters that have occurred in the United States in the past several years ranging from major hurricanes, floods, earthquakes, wildfires, and the post-9/11 threat of terrorism.

The wide array of media available to travelers makes this toolkit and its suggested methodology valuable for those regions facing natural and man-made events. Effective communication to the public who are planning their trips or who are already enroute is essential for protecting lives and for mitigating the impacts of the disaster. Additional benefits of traveler information strategy development will benefit responders working to verify the nature of a problem, to identify the appropriate response, and to deliver the correct equipment and personnel resources to and from the scene quickly and safely.

Sincerely,

Jeffrey F. Paniati
Associate Administrator for Operations
Federal Highway Administration

Shelley J. Row
Director, ITS Joint Program Office
Research and Innovative Technology Administration

MOVING THE
AMERICAN
ECONOMY

Technical Report Documentation

1. Report No. FHWA-HOP-07-068	2. Government Accession No.	3. Recipient's Catalog No.
4. Title and Subtitle Communicating With the Public Using ATIS During Disasters: A Guide for Practitioners		5. Report Date April, 2007
		6. Performing Organization Code
7. Author(s) Carol Zimmerman, Patricia Bolton, Mala Raman (Battelle); Todd Kell, Stacy Unholz, Chris Bausher (PBS&J)		8. Performing Organization Report No.
9. Performing Organization Name and Address Battelle 901 D Street, SW Suite 900 Washington, DC 20024		10. Work Unit No. (TRAIS)
		11. Contract or Grant No. DTFH61-01-C-00182
12. Sponsoring Agency Name and Address Federal Highway Administration Office of Operations 1200 New Jersey Avenue SE Washington, DC 20590		13. Type of Report and Period Covered
		14. Sponsoring Agency Code HOTO-1

15. Supplementary Notes

FHWA Task Manager: James Pol

16. Abstract

Advanced Traveler Information Systems, ATIS, can play an important role in communicating essential information to the public during disasters. Variable message signs, 511 telephone systems, highway advisory radio, and websites are some of the dissemination devices of systems that collect, process, and disseminate information about travel conditions to the public for day-to-day transportation operations, and these same systems need to be effectively used during disaster situations. This document provides advice on use of ATIS during disasters and is intended not only for state and local transportation agencies but for their partners in public safety and emergency management agencies. It offers practical guidance to managers of transportation management centers and emergency operations and to public information officers who may be called on to staff joint information centers during disasters.

The document discusses what we know about human behavior in disaster situations based on findings from several decades of research. That perspective can help in maximizing the effectiveness of traveler information communications. The current use of traveler information in managing normal incidents and planned special events is examined as a starting point for gauging the processes and technologies that are in place today. Five case studies of actual disasters in Georgia, California, Nevada, Utah, and Washington State show the role that traveler information has played in current practice and provide lessons for others. A concept of operations is presented that characterizes the flow of information among the people, organizations, and technologies comprising traveler information dissemination during disasters.

To maximize the benefit of ATIS as a tool for communicating with the public during disasters, a local strategy should be developed. A toolkit for organizing and conducting a strategy workshop is provided in this document as a starting point. A workshop that encompasses all the key stakeholders can acquaint them with currently available ATIS assets, potential future enhancements, and each agency's role in ensuring that ATIS is an important tool for helping the public when disaster strikes.

17. Key Word Traveler information, intelligent transportation systems, ATIS, ITS, disaster behavior, information dissemination, emergency transportation operations, emergency response	18. Distribution Statement No restrictions

19. Security Classif. (of this report) Unclassified	20. Security Classif. (of this page) Unclassified	21. No. of Pages 36	22. Price

Form DOT F 1700.7 (8-72) Reproduction of completed page authorized

Table of Contents

List of Acronyms

ATIS	Advanced Traveler Information Systems
CAD	Computer Assisted Dispatch
Caltrans	California Department of Transportation
CMS	Changeable Message Sign
DEM	Department of Emergency Management
DHS	Department of Homeland Security
DMS	Dynamic Message Sign
DOT	Department of Transportation
DPS	Department of Public Safety
EAS	Emergency Alert System
EMA	Emergency Management Agency
EOC	Emergency Operations Center
FAA	Federal Aviation Administration
FBI	Federal Bureau of Investigations
FCC	Federal Communications Commission
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
GDOT	Georgia Department of Transportation
HAR	Highway Advisory Radio
ICS	Incident Command System
ITS	Intelligent Transportation System
JIC	Joint Information Center
MCDOT	Maricopa County Department of Transportation
MPO	Metropolitan Planning Organization
NHP	Nevada Highway Patrol
NIMS	National Incident Management System
PDA	Personal Digital Assistant
PIO	Public Information Officers
SOP	Standard Operating Procedures
TMC	Traffic Management Center
TMT	Traffic Management Team
TOC	Traffic Operations Center
UCS	Unified Command Structure
UDOT	Utah Department of Transportation
VMS	Variable Message Sign

EXECUTIVE SUMMARY

Advanced Traveler Information Systems, ATIS, can play an important role in communicating essential information to the public during disasters. Variable message signs, 511 telephone systems, highway advisory radio, and websites are some of the dissemination devices of systems that collect, process, and disseminate information about travel conditions to the public for day-to-day transportation operations, and these same systems need to be effectively used during disaster situations. This document provides advice on use of ATIS during disasters and is intended not only for state and local transportation agencies but for their partners in public safety and emergency management agencies. It offers practical guidance to managers of transportation management centers and emergency operations centers and to public information officers who may be called on to staff joint information centers during disasters.

The document discusses what we know about human behavior in disaster situations based on findings from several decades of research. That perspective can help in maximizing the effectiveness of traveler information communications. The current use of traveler information in managing normal incidents and planned special events is examined as a starting point for gauging the processes and technologies that are in place today. Five case studies of actual disasters in Georgia, California, Nevada, Utah, and Washington State show the role that traveler information has played in current practice and provide lessons for others. A concept of operations is presented that characterizes the flow of information among the people, organizations, and technologies comprising traveler information dissemination during disasters.

To maximize the benefit of ATIS as a tool for communicating with the public during disasters, a local strategy should be developed. A toolkit for organizing and conducting a strategy workshop is provided in this document as a starting point. A workshop that encompasses all the key stakeholders can acquaint them with currently available ATIS assets, potential future enhancements, and each agency's role in ensuring that ATIS is an important tool for helping the public when disaster strikes.

The authors would like to acknowledge the many transportation, public safety, and emergency management personnel around the country who generously provided their time to the research upon which this document is based. The study would not have been possible without their help.

1.0 Introduction

Hurricanes, wildfires, flash floods, toxic chemical releases, terrorist acts, earthquakes—these are some of the natural and technological events that can spell disaster for individuals and communities across the United States. To many Americans, our world may seem like a more dangerous place than in the past. Real and potential terrorists acts and horrific storms such as Katrina and Rita have heightened our concern about natural and manmade disasters and how we deal with them. We are ever more aware of the impact of disasters and the need for plans to deal with them, and government agencies at all levels have focused greater attention and resources on emergency planning and response than any time in the past.

This document focuses on the intersection of two key elements in emergency planning and response: the transportation system and communication with the public. When disaster strikes, individuals at risk need to be informed and protected. If evacuation is in order, how and where should people be transported? Others not directly threatened need to be kept out of harm's way and travel only where it is safe and does not interfere with the emergency responders.

Transportation agencies throughout the country are increasingly equipped to help the public during disasters due to the deployment of technologies known as advanced traveler information systems, or ATIS. They include technologies such as variable message signs (VMS) along roadways, automated telephone systems such as 511, websites, e-mail alerts, and highway advisory radio (HAR). Intended primarily as information tools to assist travelers during "normal" travel, they can be quickly adapted to disaster conditions and be an integral part of an overall approach for communicating emergency information to the public.

The rest of this document examines the role of ATIS in communicating with the public during disaster situations. The document is based on research that included a review of literature, telephone interviews with traffic operations managers, case study interviews at five disaster sites, and a workshop with transportation and emergency managers. It begins with discussion of the challenges and issues in section two, followed by the state of the practice in section three. Section four presents a concept of operations, and section five provides a toolkit for use by public sector agencies to develop a strategy for using ATIS in disasters. Section six is a brief conclusion.

This document provides practical guidance to public sector managers who plan for and manage the response to disasters. It is targeted to officials in transportation management centers, who already have or will have ATIS assets that can be used for emergencies; to officials in responder agencies, including police, fire, rescue, and emergency management, who need to be aware how ATIS can assist in managing a disaster; and to public information officials from all agencies who coordinate dissemination of information to the public during disasters. Moreover, private sector organizations involved in traveler information and emergency response may also find the document valuable for their interests.

The reader should be aware that, for the purposes of this study, a disaster is defined as an emergency the nature and scale of which outstrips the ability of public agencies to respond as they would to a "normal" incident. The study also focuses on the case studies on disasters that occurred without notice. That is, unlike hurricanes or other natural disasters that are anticipated, the no-notice disasters provide responders with no prior warning of the time, place, or nature of the event.

2.0 Challenges and Issues

Under disaster conditions, providing information to the traveling public is urgently needed to maintain the safety of travelers in the disaster area or to divert travelers headed toward the impact area so that they can continue toward their destination, although by a less than direct route. When an area is threatened and evacuation is called for, information needs to be disseminated that prompts people to travel out of the area as soon as possible and along safe routes. Ineffective communications can increase the potential for harm to the public.

While public agencies involved in emergency response rightly view their mission as protection of the public, a common assumption is that people will take the appropriate action when the authorities provide information and recommendations about the emergency. Actual experience with dangerous conditions has shown that an appreciable portion of the target audience does not engage in the recommended action. Some part of the intended audience may not have received it, delayed their response to the recommendation, or chosen to make an alternative response to the recommended one. On the other hand, there may be people who were not part of the intended audience who make the recommended response even though it is not relevant to where they are in relation to the danger. The failure on the part of the public to heed disaster information can result in death and injury.

Behavioral Research Basis for Disaster Information Dissemination

The dangers to the public posed by ineffective communications during disasters has prompted researchers to examine the human response to actual or potential dangers so that methods of communication and the messages conveyed can be adjusted to achieve a higher level of the recommended response to disaster conditions. These research findings provide an important foundation for public sector strategies for communicating with the public during disasters. Pertinent findings include the following:

- People prefer to try to continue their routine and familiar activities as long as possible if they are at home. Many people will interpret an emergency warning as not being pertinent to them or the area where they are, or perceive that the situation being described does not necessitate a response such as evacuation or rerouting around the area to be avoided. Thus, people may stay where they are when evacuation is prudent, often citing their previous experience with a warning that indicated it was not necessary to evacuate or that they did not want to get caught in the slow moving evacuation traffic.

- Normal social behavior is to take actions to protect one's immediate family or other relatives. When information is disseminated that indicates an emergency condition or the need to evacuate, people will begin to move about the area in an effort to get their relatives together. They are unlikely to evacuate until this is accomplished. This can both delay the departure of many people and create some degree of traffic



congestion. However well crafted a message to evacuate is, it is not likely to minimize this behavior. Emergency responders and emergency managers need to recognize that this will occur and make plans to accommodate it.

- Audiences are not homogeneous. Research on the use of information typically finds that different segments of the overall audience receive, process, and act on information differently. Variables that have been found to affect responses to information about hazards or warning messages include education level, economic status, ethnicity, and previous experience. This makes the task of providing meaningful and persuasive messages to all audiences challenging.

- Panic is not the normal public response. Research on emergency response has found evidence that many law enforcement personnel and elected officials, among others, hold the misperception than people confronted with information about a threatening or dangerous situation will panic and begin to engage in behavior that threatens their safety and that of others. News accounts may reinforce this perception by their choice of words and situations depicted out of context. The danger is that authorities who continue to hold to this belief may withhold critical information that could help people avoid injury or death. Transportation authorities need to understand that it will be easier to predict and facilitate people's withdrawal from a dangerous situation when they have been told the characteristics of the threat and what their risks and options are, than if all they know is that there is some danger.

  Considerable research on social behavior in evacuations and disasters substantiates the ability of people to use information in the face of threat. People are frightened in these situations, but being frightened does not preclude rational behavior and, in fact, may be an important motivator for prompting people to take appropriate protective action. In response to their own reading of the situation or official warnings, people will make decisions that are rational in terms of what they think they know about the situation, even though in retrospect their information may be proved to have been inaccurate.

- Information seeking is the norm. Studies of evacuation behavior find that the most typical action people take upon receiving a message that recommends evacuation is to seek to confirm the first information they hear. Many continue to check multiple sources of information for the purpose of making sense out the situation, so they can engage in protective action. They will use whatever information they perceive to be most credible. This is true for both people who evacuate and those who don't. Accurate, timely, consistent, and specific information from officials on where the danger is and what the options are for moving away from it, such as routes and staging or shelter destinations will be shared with others and acted on. Timely provision of consistent information about what the authorities think is the safest course of action will help to avoid confusion and maintain calm among evacuees. A related finding is that the more unfamiliar and more imminent the threat is perceived to be, the more likely people are to evacuate and to do so fairly quickly. Thus, the public may begin to evacuate on their own in advance of any warning or recommendation by public safety and transportation officials. The implication of this finding is that officials need to be prepared to facilitate this action once they realize it is occurring.

- The behavior of response organizations themselves has been studied to figure out how to make them more effective. The biggest error that emergency response personnel tend to make is to believe that disasters are just big emergencies and that their normal practices for incident response will be effective. However, disasters create communication demands that are an order of magnitude above that ap-

propriate to routine emergencies. Agencies must acknowledge this and develop appropriate protocols, including how to handle communications to the public. Also, most leaders of emergency response agencies acknowledge that the greatest value of engaging in a multi-agency planning process is not the creation of the document called the emergency plan, but the development of relationships and trust among agency personnel that facilitates collaboration when disaster strikes.

Behavioral research such as the findings cited here has bearing on the use of ATIS, the subject of this document. ATIS, like other methods for disseminating disaster-related information, should be grounded in an understanding of how people receive and act on information about disaster travel conditions so that ATIS-disseminated information can be most effective.

Assumptions and Constraints Affecting Use of ATIS During Disasters

Underlying this document are a few assumptions that bear mentioning at the outset. The extent to which those assumptions are not valid represent potential constraints on the efficacy of ATIS assets during disasters.

An assumption throughout this document is that transportation agencies have or are planning to have various ATIS assets that can be used to convey messages in near real-time about the condition of the transportation system and whether or not it has been affected by the disaster agent. While ATIS is generally widespread, there are gaps in availability.

An assumption is also made that communications assets in general are available by which information can be transferred that ends up as an ATIS-based message. Both of these assumptions need to be examined by agencies in the context of a specific region or specific disaster scenario. Several agencies, because of their particular response role or the location of their operations with respect to the overall disaster area, will have information that could be of value to evacuees or other travelers. Each of these agencies can be viewed as part of a supply chain of information for travelers, and a gap in the supply chain may result in important information not being transmitted. For example, an individual wildfire fighter might be unable to maintain contact with the incident command, because his communication mode is dependent on a line of sight pathway or being within a certain radio range. A county law enforcement agency may not be able to directly communicate with a city law enforcement agency or with the emergency operations center in an adjacent county because of a lack of interoperability among agency communication systems. Information about rapidly changing conditions that would be critical to travelers in a particular area may be lost or delayed due to such gaps in pathways for the communication of information from the field to the transportation agency for dissemination via the ATIS.

Another assumption is that public agencies have pre-planned protocols for communicating with each other and sharing information during emergencies. The lack of such protocols negatively impact incident response under normal conditions. By definition, disasters involve many more agencies and jurisdictions than is the case for a routine emergency; and protocols for an expanded set of agencies to be included in notifications and status updates need to be designed in advance of a disaster, along with the decision criteria for when to invoke the disaster communication protocol. Some areas may have experienced major damage to the roadway that is part of a critical transportation route, but the response agencies may not think to notify agencies beyond the impact area. Even in situations of widespread damage, the lack of information from a specific jurisdiction is likely to be interpreted as the lack of any problem there, rather than the lack of communication coming from there. For example, during the Loma Prieta earthquake in California in 1989, damage to communication systems resulted in a delay of information about damage in and around Santa Cruz that in turn resulted in a delay in response to the damage and information about damage to the major highway into Santa Cruz. There was no protocol for systematically checking with each jurisdiction, since under normal circumstances if a jurisdiction had a problem, it would have been reported. Thus, if a traveler is accustomed to receiving current information on roadway conditions through ATIS and the message is not current, the traveler is likely to assume there is no problem with that route despite the disaster.

3.0 Current Practice

Disasters are not new phenomena, but they are now being examined with a more critical eye to learn from them and make improvements to future operations. In the transportation community techniques for managing incidents and planned special events are a normal part of business that can be brought into play during emergency situations. However, disasters are not just big emergencies, as they involve a scale and duration that transcends normal operations both for the transportation community and emergency responders. Drawing on past experience, this section describes current practices in traffic incident management and special event management and provides case study examples of disaster situations that have involved transportation agencies.

Traveler Information for Normal Incidents and Planned Special Events

For traveler safety and convenience, many DOTs view providing information to the traveling public as a key part of their mission. The rise and continued improvement of ATIS has enabled DOTs to communicate with the public in new and innovative ways during incidents. Table 3-1 presents the types of ATIS used during incidents by jurisdictions interviewed for this study. Managing a planned special event has many of the characteristics of an incident from the standpoint of impact on transportation except that it is known in advance and, consequently, use of assets such as ATIS can be planned ahead of time.

Table 3-1. Types of ATIS Used During Incidents by Selected Jurisdictions

Jurisdiction	ATIS Technologies Used
Colorado DOT	VMS, HAR, website, 511
Florida DOT, District 5	VMS, 511, website, wireless devices, radio and television media
Maricopa County DOT	Partners with Arizona DOT on use of VMS, 511, and website
Nebraska DOT	VMS, 511, website, radio and television media
Oregon DOT	511, extensive website, radio and television media including cable TV, HAR, VMS, developing application to send information to wireless devices
Texas DOT	HAR, VMS, website, wireless devices, radio and television media, e-mail alerts
Wisconsin DOT	Extensive HAR, VMS, radio and television media, website, telephone ATIS Service (800-ROADWIS)


DOTs work closely with state police, sheriff departments, and highway patrol during an incident and, to a lesser extent, during delivery of information to travelers. In some jurisdictions, local law enforcement and the DOT jointly fund and operate traveler information services, such as 511 telephone systems. Law enforcement, often the first responder on the scene of an incident, is the source of much information about new incidents which is often obtained by the DOT through monitoring police communications. With most DOTs who were interviewed reporting the use of Unified Incident Command during an incident, interdepartmental and interjurisdictional coordination appears to be in place.

Over the last decade a general approach to implementation of ATIS by transportation agencies has been established. The approach is illustrated by Figure 3-1, an ATIS process map, starting on the left with data collection, going through data processing and fusion, and ultimately resulting in information dissemination on the right. The gray rectangles in Figure 3-1 represent processes, and green rectangles represent products (every process must create a product). Non-italicized bullets represent the type of data or information, while bullets in italics identify the device or method of information dissemination.

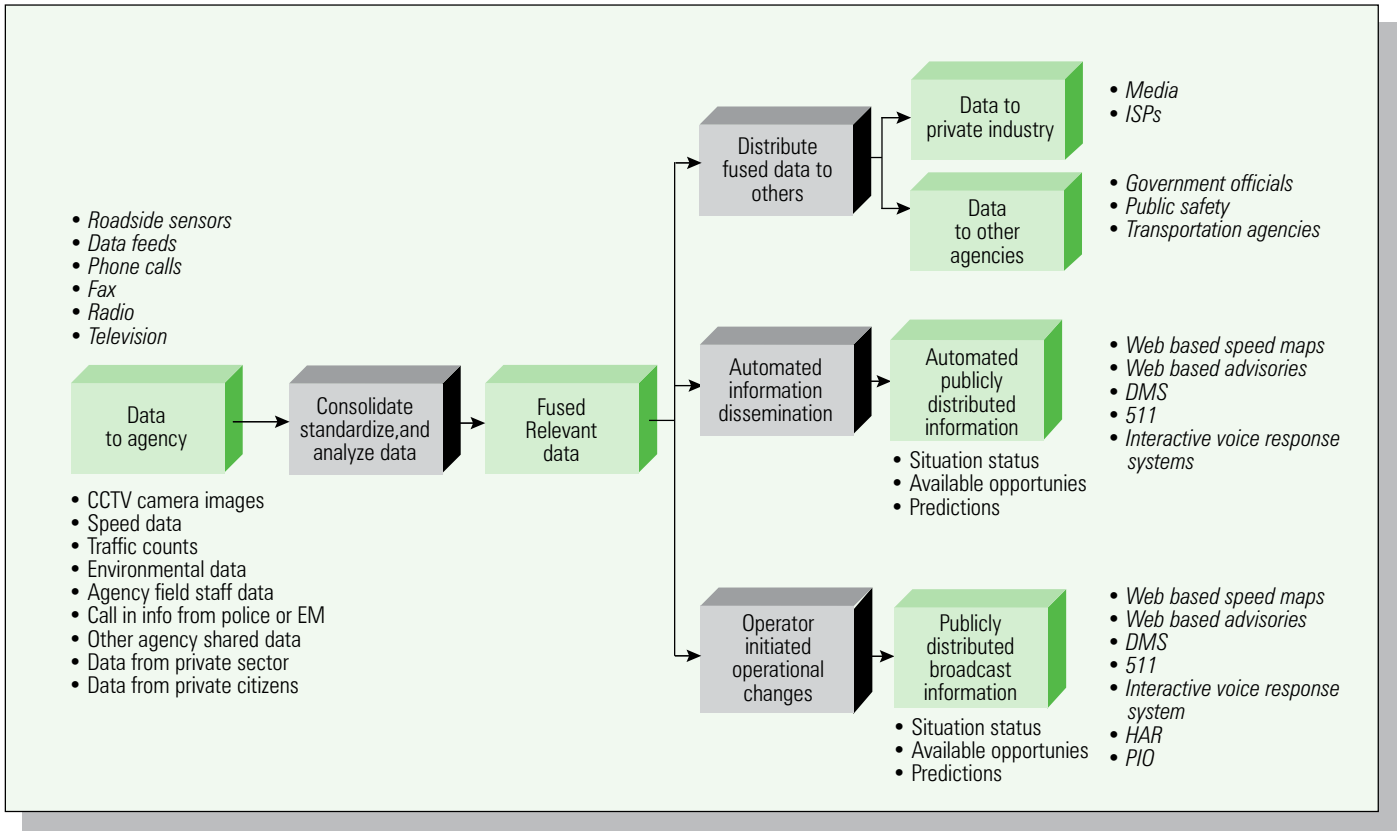

Figure 3-1. Process Map of Advanced Traveler Information Systems

While the process depicted is fairly simplistic, the effectiveness of traveler information systems is not without challenges, which vary from place to place. Moreover, how well an ATIS performs has implications for its use in management of incidents or planned special events. A couple of examples illustrate some of the challenges. Telecommunications is one area, including interference in radio transmission which is known to cause problems with the use of highway advisory radio (sidebar). Another area of concern is interjurisdictional coordination. Traveler information systems are typically deployed for a given jurisdiction, such as a state or metropolitan area, and that in turn presents a problem for using ATIS for an incident that crosses jurisdictional boundaries. For example, 511 systems have not yet achieved full market penetration. 511 systems may not exist in neighboring states or, when they do, they may not be interoperable. This is a problem reported by some rural states, who wish to share winter weather information across state lines. For example, while Nebraska's 511 system can broadcast adverse winter road condition information within its borders, travelers driving from Wyoming or Colorado are often not able to get that information in time and may become stranded until the storm passes.

ATIS will continue to evolve and improve, and with time many technical and operational problems will be resolved. Nevertheless, ATIS today are important assets that transportation agencies are using for effective management of normal incidents and special events in many locations.

Traveler Information During Disasters: Five Case Studies

While transportation incidents are standard occurrences for agencies, disasters are significantly more complex and beyond normal emergency operations. Five disasters occurring without notice and impacting the transportation system served as case studies to determine how information was communicated to the public and how ATIS played a role. Disasters result from natural or manmade causes and can occur in any location. The disaster case studies were chosen to reflect various characteristics and are summarized in Table 3-2.

HIGHWAY ADVISORY RADIO

In a small pilot project at the Phoenix International Raceway held during the spring 2005 NASCAR races, Maricopa County DOT (MCDOT) rented additional portable HAR units from a private vendor. The goal was to disseminate different messages to both incoming and outgoing traffic throughout the course of the weekend events. The HARs performed well in testing, but once the event began, MCDOT found that the HARs became inoperable due to radio interference from the sheer number of communications devices operating at the same time in the area. Interference came from radio communication being used by radio and television stations, by internal communications of the Raceway and public agencies, and by increased use of commercial radio by travelers, causing the HAR to be unsuccessful.

Contributing to the problems with HAR is the fact that it is licensed as a secondary user under the guidelines established by the Federal Communications Commission (FCC), which means HAR transmission cannot interfere with primary users such as commercial broadcast stations. In addition, the FCC limits antenna height to approximately fifty feet, which limits its broadcast quality. Deployment in rural or suburban areas tends to be more successful than in urban areas, where structural interference is a problem.

Table 3-2. Disaster Case Study Sites and Their Characteristics

Characteristics	**South Salt Lake City, UT:** Leaking rail tank car near I-15 & I-80.	**Rockdale County, GA:** Warehouse fire involving chlorine product near I-20.	**San Diego County and City, CA:** Major wildfire known as Cedar Fire.	**Clark County, NV:** Snow avalanches in winter resort area and flood in Moapa Valley.	**Seattle/Olympia, WA:** Nisqually Earthquake [Magnitude 6.8] in Puget Sound Area.
Date	March 2005	May 2004	October 2003	January 2005	February 2001
Relative scope and event context	Very localized. Urbanized area. ITS assets in event vicinity.	Fairly localized. Mixed suburban and rural area. No ITS assets in event vicinity.	Fire in large portion of County and some parts of City. Included uninhabited areas, small towns, and suburban neighborhoods. Some ITS assets near city limits.	Separate events involving two small communities, each reached by state highways in rural areas. No ITS assets in vicinity of either event.	Multi-county urban, suburban, and rural areas damaged. Many transportation jurisdictions affected. Some ITS assets on urban freeways.
Duration and disruption	14-hour Interstate closure on all lanes. Minimal traffic impact due to Sunday occurrence. Resolved before Monday rush hour.	35 hours of intermittent freeway closures. Three rush-hours affected. Traffic detoured around 20 miles of I-20.	120 hours for acute phase of fire. Uncertainty about path of fire created potential for unanticipated rush hour closures on major freeways.	Over 60 hours. Closures on secondary highways only--no rush hours affected. Winter resort area inaccessible due to road closure.	Earthquake less than a minute. Acute consequence for 2 days. Many weeks of repairs, with closures exacerbating freeway congestion.
Special features of disaster event	Lack of accurate information about contents of leaking rail tank car prolonged closure. No transportation infrastructure damage.	Long-lasting fire continuously generating smoke plume downwind over or alongside the freeway. No transportation infrastructure damage.	Rapid and unpredictable wildfire due to wind conditions. Difficult to provide accurate information. Scattered transportation infrastructure damage.	County and NDOT assets had to be distributed between two events, distant from each other.	Damage less than immediately assumed. Transportation infrastructure damage, including bridges, in several counties.
Primary traveler and evacuee information needs	That freeways were closed in both directions for short stretch. That people in nearby neighborhoods should evacuate until further notice.	That freeway was closed in both directions at times. That plume contents irritating to skin and lungs. That people in nearby town of Conyers should evacuate.	That state and county roads were closed and opened as fire moved around. That orders to evacuate were based on immediate danger. That evacuation routes were limited.	That roadway cleanup and repair were needed in many locations. That events created personal risk in some areas so evacuation was prudent. That specific state roads were closed due to risk from event.	That there were several short term bridge/road closures for assessment or quick repair. That some road closures were prolonged and detours were necessary.

Disaster-Related Road Closure and Detour Information on Georgia DOT's Website and Phone System

Even though Interstate 20 carries a high volume of commuter traffic into Atlanta from the east as well as heavy east-west truck traffic, the site of the chemical fire adjacent to I-20 was beyond the range of Georgia DOT's traffic surveillance and detection equipment. Nevertheless, the absence of automated data gathering near the disaster site did not hinder GDOT's ability to provide information by telephone to travelers. During the industrial fire, road information was relayed by GDOT's HERO and maintenance units participating in traffic management in the vicinity of the disaster. That information, in turn, was available on a 24-hour basis from live operators on GDOT's Star-DOT (*DOT) system. In addition, the GDOT Navigator website was able to carry the full description of the detour routes when I-20 was closed, although its maps of real time traffic congestion did not extend out as far as Rockdale County where the disaster was occurring.

Dissemination of information about travel conditions to the public took two principal forms: through ATIS and through the media (radio and television).

Role of ATIS. ATIS technologies were used by all the DOTs to various degrees to provide information on road closures and other details about the disaster. Technologies including VMS, websites, free telephone services (511 or 1-800) with a frequently updated recorded message about traffic conditions and road closure information, and in one case HAR. Table 3-3 summarizes the ATIS used at each site.

Fixed VMS were used in all sites, but typically only existed for Interstate and other state highways in highly urbanized areas. For example, for the industrial fire in Rockdale County, Georgia, VMS in Atlanta alerted travelers to the closure of I-20, but there were no VMS on I-20 for travelers from the east. Portable VMS were available on the state roads in the rural Nevada county and were particularly useful for the San Diego County fire, because the locations of road closures were constantly changing as the fire moved through the county.

All five sites had toll-free telephone numbers, which can provide more detailed information than VMS. California, Washington and Nevada had statewide road condition telephone numbers with recorded information on specific routes.

Table 3-3. ATIS Used for Disaster-Related Road Closures

Disaster Location	Toll-Free Telephone	Website	Variable Message Signs		Highway Advisory Radio
			Fixed	Portable	
South Salt Lake City, UT (2005)	X	X	X		
Rockdale County, GA (2004)	X*	X	X	X	
San Diego County and City, CA (2003)	X	X	X	X	
Clark County, NV (2005)	X	X	X	X	
Seattle/Olympia, WA (2001)	X	X	X	X	X

*Toll-free line at GDOT uses live operators

Clark County, Utah, also had a local citizen information line with recorded information about the disaster, but callers often encountered busy signals due to the large call volumes during the event. Utah was the only site to have a 511 telephone system in place at the time of its disaster, and its automated messages reported on closures and estimated minutes of delay on specific routes.

All five sites had one or more websites with travel information. For example, in San Diego the California Department of Transportation (Caltrans) website had a special link to a list of road closures and also posted the computer assisted dispatch (CAD) log from the California Highway Patrol. The Georgia DOT Navigator website posted the detailed detour information, and on Utah DOT's CommuterLink website VMS messages could be viewed along with camera images and textual descriptions of road conditions around the disaster site.

HAR was used during only one of the disaster events—the earthquake in the Seattle/Olympia area. The HAR message provided updated lists of closures, and could provide other details, such as the closure being due to inspection. Various reasons appear to contribute to HAR not being used during the other disaster events, and some DOT staff do not view them as reliable technologies. Utah DOT's HAR is a case in point; it was not working the day of the event and, in addition, tends to have poor signal in the Valley when it is operational.

Role of Media. The media, and in particular the television news broadcasts, provided the most information overall about each disaster. The media actively sought information on the events, and all the DOTs reported that they counted on the media to get the road closure information out and, therefore, facilitated the media's access to such information. For example, all the sites had commercial traffic radio programs that typically got their information directly from the DOT's Traffic Management Centers (TMC). Given their metropolitan focus, traffic radio programs probably were least useful for the rural events, such as the flooding and avalanches in Clark County, Nevada, although they were helpful for providing information on which roads were experiencing flooding in the urbanized areas in the Las Vegas Valley at the same time.

Most agencies involved in the disaster response had a public information officer (PIO) who was designated to be the contact for the media for the disaster event. In two of the cases, Utah and Georgia, an area at some distance from the incident command post was designated for the media to congregate and get information from the PIOs and from time to time the incident commander, who would provide a more general overview of the status of the event and answer questions. For the other three cases, the county or state emergency management agency, or both, activated an emergency operations center (EOC) for the purpose of coordinating activities and information across the agencies participating in the response. These EOCs included a joint information center (JIC) where the individual agency PIOs would provide information from their agency's field personnel to be combined with information from other agencies. Information for release to the media would be developed by the communications staff of the emergency management agency, with the purpose being to produce information that was consistent as well as comprehensive. The press briefings provided in this

Recognition of Circumstances As Not Normal

The Clark County (Nevada) Emergency Manager was aware of the avalanche death in the Mt. Charleston area, and the continuing avalanche danger, but it was not until the additional danger of flooding became known that the situation was recognized as exceptional. The overall situation called for active coordination of the resources and information. He activated the Clark County EOC, an action that had been done in the past for planned events (such as the New Year's Eve celebration along The Strip) but had not been done for an actual unplanned emergency. He declared the situation a county emergency, because it appeared that state resources would probably be necessary to supplement some of the Clark County activities.

The number of simultaneous emergencies in Clark County created a situation beyond normal response capabilities, and special efforts were needed. This created a very heavy demand on all the agencies in that area, including the volunteer fire department, the Clark County Public Works Department, the Nevada Highway Patrol, and the American Red Cross. Given the scale of the emergency, NDOT and the NHP, as state agencies, had to split their resources to cover both areas, as did the Clark County Public Works Department. The Clark County Emergency Manager reported that, in all, twenty-two different agencies were involved in the response.

manner resulted in many media representatives all getting the same information at the same time.

Dissemination of Evacuation Information. Evacuation of residents in areas threatened by the event occurred at four of the sites, typically by law enforcement officers going on foot or in vehicles with public address systems to tell residents in the specified areas of the need to evacuate. In some cases, such as the San Diego County wildfire, the order to evacuate also had to indicate what route would be safe. The information about what areas had been evacuated then became part of the information provided to the media who informed the public so people would know what areas were closed or what areas had been reopened.

Experience With One Disaster Leads to New Procedures at Utah DOT

UDOT wasn't as directly involved in the response to the leaking railcar in the early morning hours as they would have been had it occurred on the highway. Being somewhat "out of the loop" when the adjacent highway had to be closed limited UDOT's ability to estimate when the highway would be ready to use again. Since the incident occurred on a Sunday, staffing at UDOT Traffic Operations Center (TOC) was light, and those on duty tended to be the least experienced. As a result, escalation of the TOC's response was delayed, and incident response planning for a prolonged closure into the Monday morning commute period did not begin until more senior staff arrived in the early evening. The experience with the disaster led UDOT to develop threshold criteria for "non-normal" incidents that will enable TOC staff on duty to make decisions in a more timely fashion about when management needs to be notified and additional resources applied. UDOT felt that the criteria will help the operations people do their job of dealing with the details of information about the incident and the highway impacts, while at the same time people outside the control room can look at the bigger picture and longer-term impacts and think about what needs to be done.

In each of the rural settlements in Clark County, Nevada, where evacuation was necessary, local information dissemination systems in the form of phone trees were used to get information about the need to evacuate and the location of shelters to as many residents as possible. In the communities affected by the flooding, trained volunteers also were used to follow up the phone tree notifications, by going to certain residences in order to ensure that everyone had received the information and to see if there were people who needed assistance to evacuate.

A telephone-based emergency notification system, known as Reverse 911®, can be used to automatically dial a specified set of telephone numbers in order to deliver a pre-recorded message when the phone is answered. This type of notification system was used in South Salt Lake City along with police officers going house to house or along streets with loud speakers to tell people to evacuate.

Alerting San Diego Motorists to the Danger of Rapidly Spreading Wildfire

The Caltrans Traffic Management Team (TMT) was the front line for the task of getting signs along the highways to alert motorists to closures. They took care of the messages on the limited number of fixed VMS. Portable message signs proved more useful. Using their six trucks with affixed VMS and 16 trailers with portable VMS, the TMT would go to where they were directed to put up a sign about a road closure. There was usually a law enforcement officer already at that point to get the traffic stopped. This was followed up by the Caltrans maintenance units placing some sort of barrier across the road. The TMTs were very busy changing the portable signs to new locations as the fire moved about. The TMTs also tried to assist with the county roads, because there are many more of them, but couldn't do much given the demands on them for the state roads. For the county, closures were established first with a patrol car and an officer, and the public works department provided barriers. The information about the status of these closures was passed on to the field supervisors to provide to the Emergency Operations Center who got the word out to the media and general public.

The Need for Traveler Information During the Recovery Phase

Earthquakes, such as Washington State's Nisqually, can impact transportation for weeks or months, leaving a visible legacy of the disaster and need for traveler information long after the emergency is over. In Olympia, the prolonged closure of the 4th Street Bridge made access to downtown Olympia difficult for commuters. In Seattle, the prolonged closure of the Magnolia viaduct made it necessary for residents to use a more complicated route to get to their neighborhood. Immediately after the earthquake, air traffic had to be curtailed significantly at the SeaTac airport because the FAA air traffic control tower was badly damaged. A terminal for Washington State Ferries that carries commuters back and forth across Puget Sound had to be closed for a day for repairs. While each instance of damage was manageable by itself, the disruptions occurring all at once compounded their impact on residents of the area and their need for information about how to get around.

Key Findings Related to Disaster Information Dissemination

Looking across all five of the disaster sites examined by the study team, the following general findings defined the current state of communication with the public during disasters and the potential role of ATIS.

- **Prominence of the Media in Information Dissemination.** It is the media, and not ATIS, that is currently viewed as the principal disseminators of information to the public during disasters. Agencies view the media as partners during an emergency, and the timely and reliable provision of information to the media could result in the news coverage of the event playing an important role in disseminating information that the agencies wanted the public to have, such as where highways and roads are closed or what areas are dangerous. Technology such as the Internet makes it easy for agency personnel such as public information officers to distribute each news update from a response agency to a large set of media contacts simultaneously.

- **Awareness of ATIS Among Responders and the Public.** Greater awareness or education about ATIS assets is needed among all parties involved in disaster planning and response. They need to understand the range of ATIS and their capabilities and how they can complement the media coverage of the disaster. Moreover, the traveling public may also need to be educated about ATIS as a source of information on travel during disasters, rather than or in addition to some of the other sources they may think to use.

- **Joint Information Center for Coordinating Information to the Public.** All the sites studied sooner or later instituted a process for bringing various pieces of information about the disaster together and synthesizing them for news briefings and dissemination on ATIS. The establishment of a joint information center (JIC) signals a formal structure for information dissemination that supports the Incident Command System. A JIC helps ensure delivery of consistent and accurate information regardless of the number of agencies that are involved.

4.0 Concept of Operations for Maximizing Use of Traveler Information Systems During Disasters

Lessons learned from prior experience with disasters and other types of incidents are the basis for a concept of operations that captures a recommended or ideal system for communicating with the public using ATIS during disasters. The concept of operations provides an overview of the various stakeholders, their roles and responsibilities, the type of information exchanged between them, operational needs and requirements, and system overview for agencies to apply their ATIS assets to inform the public during disasters. This section summarizes a previously published document on the topic (http://www.itsdocs.fhwa.dot.gov/JPODOCS/REPTS_TE/14262.htm).

An ideal ATIS system and disaster information mechanism requires systems, devices, and all activities and players to communicate and coordinate their actions and messages to make the system the best it can be. This ATIS disaster system includes functions of three subsystems: transportation system operations, emergency management and operations, and traveler information. The functions performed can be categorized into three main components:

1. Agencies/organizations that gather, operate, and provide the information

2. Structure/timeline of activities at the onset, during, and after the disaster

3. Dissemination mechanisms/delivery of information.

Agencies/Organizations

Typically when a disaster occurs, public agencies are the first organizations to be involved in some form. The agencies vary from state, local, and sometimes federal based on the extent and nature of the disaster. The nature and size of the disaster also affect the level of involvement, type of agency, and the size of agencies that are part of a disaster response, including the provision of information to the public. Another fact to note is that most of the ATIS assets in the United States are currently owned and operated by public agencies, although the private sector role is growing, especially in the dissemination component. Typical agencies that need to be involved during a disaster include:

- **Transportation Agencies –** These range from State DOTs or regional transportation operations entities, which typically control the ATIS assets in a given region, to public works departments of county and city governments. These agencies are responsible for the road and transit network and the assets on these networks. Their roles during a disaster can vary from being an early responder to the event, through supporting the lead agency or incident commander, to managing post-event transportation and possibly the return of an evacuated population. The DOT operations staff communicates with their public information officers and the media to ensure that appropriate information is being disseminated to the public. The DOT tends to be an active participant during a disaster due to the fact that they are responsible for constantly maintaining, updating, and providing information to the traveling public on road and transit conditions relative to the disaster.



Photograph courtesy of the Federal Emergency Management Agency (FEMA), 2006.
Photographer—Michelle Miller-Freeck.

- **Public Safety Agencies –** For any major incident or disaster that occurs, public safety agencies (law enforcement, fire and rescue) take the prime response role at the disaster site. An incident commander is established and that person is responsible for all aspects of the incident response. The Unified Command Structure (UCS) is a recognized and accepted organizational variation on the incident command structure (ICS) that is appropriate for handling large scale incidents and disasters that involve multiple agencies. The purpose and the structure of the UCS is to allow more than one agency or jurisdiction to participate in the incident command to better apply assets and authorities of the different agencies. The primary function of incident command is to assess the situational status and provide leadership for decisions that have to be made about appropriate response operations. Since the incident commander has the most accurate and current information, related to response activities and outcomes, other agencies as well as the media expect the ICS to include a function for providing information to them.

- **Emergency Management Agencies (EMA) –** The primary function of an EMA is to provide emergency planning and preparedness for its jurisdiction between emergencies and to coordinate the provision of resources for the support of emergency response operations during major emergencies or disasters. EMAs typically maintain an emergency operations center (EOC) that can be activated in the event of a major emergency or disaster to facilitate integration of information from agencies in order to provide an overview of the event consequences and emergency response operations, and to activate a joint information center (JIC) for coordinating the development of integrated news releases. If it appears that the consequences of a disaster will overwhelm the ability of the jurisdiction to respond and recover, the jurisdiction's emergency manager provides the assessment of the situation that will be the basis for the declaration of an emergency in order to obtain resources through the vertical hierarchy of local, state, and federal emergency management systems.

- **Federal Agencies –** Based on the scale and nature of the disaster, one or more federal agencies may be involved. These include but are not limited to the Department of Homeland Security (DHS) and its Federal Emergency Management Agency (FEMA), and, when a

criminal act is suspected, the Department of Justice, which includes the Federal Bureau of Investigation (FBI). These agencies tend to play a coordinating or investigative role after the disaster has taken place, and after local and state agencies' initial response to the event.

- **Private Sector Providers –** Although a majority of ATIS assets are owned by public agencies, most widely used by travelers are commercial radio and TV. Examples of other privately owned ATIS assets are commercial websites and satellite radio. Information used by private providers can come from both public and private sources. Traffic reporters for TV and radio stations are sometimes co-located at the DOT's TMC and can be an integral part of the agency's overall approach to information dissemination.

Timeline of Events

When a disaster occurs, the personnel of the various agencies shift into their respective roles and responsibilities outlined in their emergency plans and procedures for assessment, response, and then recovery. As discussed above, multiple organizations perform multiple roles at different times during a disaster. As the condition of the transportation system changes due to the response and recovery operations, the information needs of travelers will change accordingly.

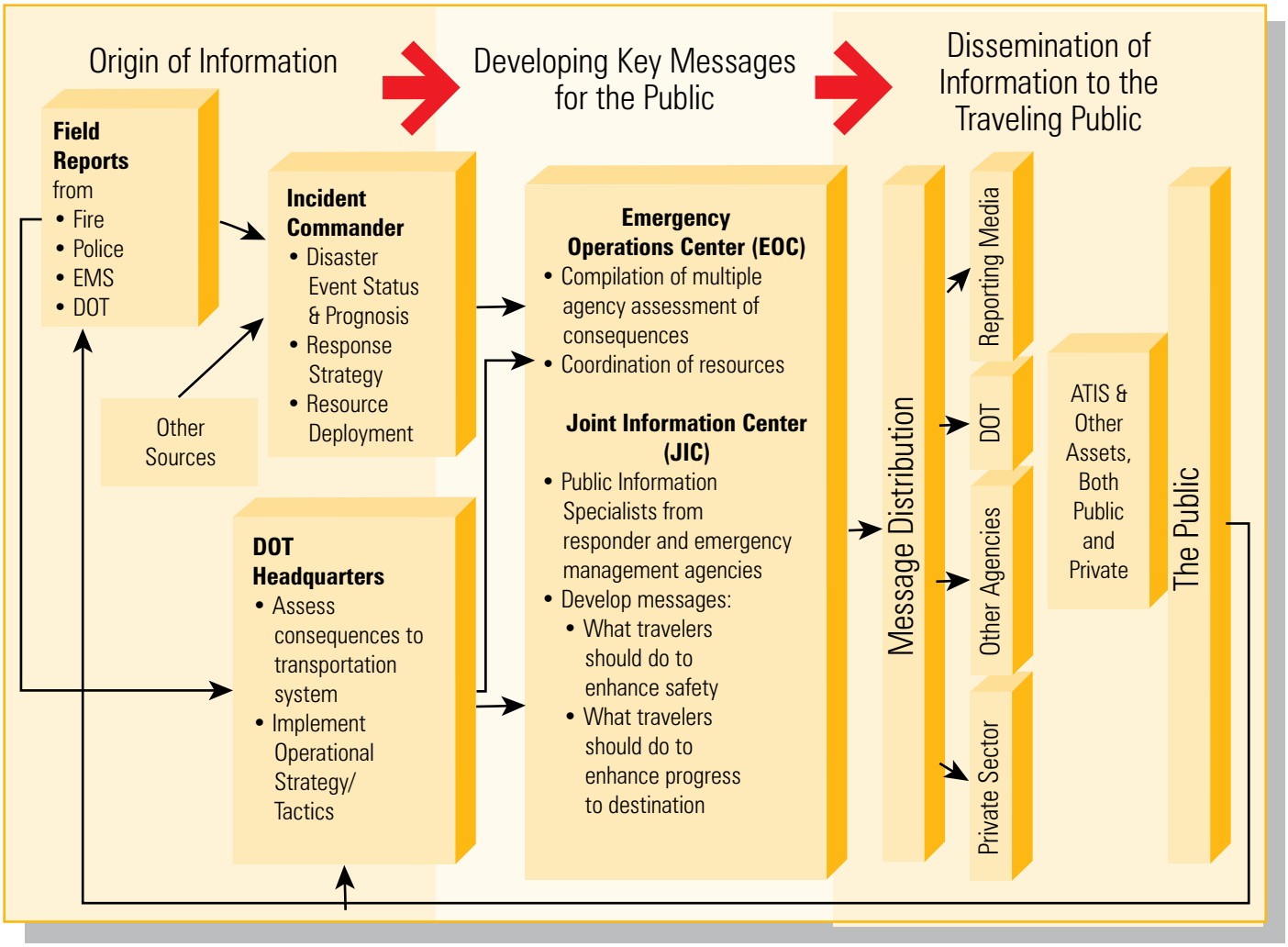

Figure 4-1. Process for Traveler Information Dissemination During Disasters

Table 4-1. Activities Related to Traveler Information Delivery During Disasters

Early Detection/Notification	During the Event	Recovery
• Field reports from public or other agencies • Transportation agency may be first on the scene • First responders notified • ATIS operator alerts public to any immediate/known impacts to transportation network • Information may be more general as specifics may not be known	• First responders reach the site • Incident Commander assesses the event • ATIS operator may need to modify initial public messages quickly. • EOC and JIC are activated – transportation provides a supporting role • As the event unfolds, ATIS messages are modified based on the event's status • EOC and JIC craft and disseminate all messages, with the help of staff trained in creating messages for different types of media, i.e., e-mail vs. DMS • Public agencies monitor messages sent out by private sector in the field	• EOC and JIC work with multiple agencies to develop a recovery plan and public messages • ATIS operator disseminates the messages, either general or targeted • ATIS operator changes messages over time as the event or transportation network's status changes

The ideal sequence of processes for providing information that meets travelers' needs is as follows:

1. The compilation of assessments of the condition of the transportation system from persons engaged in response operations in the field

2. The distillation of these assessments into messages that are key to ensuring traveler safety and mobility despite circumstances created by the disaster event

3. The dissemination of messages to the traveling public.

Figure 4-1 highlights these three main processes and the agencies, operations, and type of information that flows and is disseminated during a disaster. The information flows depicted in this figure are intended to illustrate the full range of information that is generated and communicated to the public throughout a disaster situation. It should be noted that elements of timing and dependency relationships come into play as a disaster unfolds, as players enter or exit the picture and as situational knowledge evolves. This flow of information involves a feedback loop, in that the adjustments travelers make in reaction to the information they receive about the status of the transportation system can alter the situation by, for example, creating a surge of traffic onto an alternate route or reducing the congestion created by damage or danger affecting the highway. Table 4-1 further expands upon the aspect of timing according to three disaster stages: early detection and notification, during the event, and recovery after the event. The situation in the earliest stages is characterized by uncertainty and incomplete information. As the disaster proceeds, the situation becomes clearer with respect to the degree of disruption to the transportation system, and the information to the public can be coordinated more effectively. Finally, in the recovery stage, the urgency has passed; nonetheless, the public continues to need information about continued disruption along some routes or the recovery of routes for use.

Dissemination Mechanisms

In many parts of the U.S., ATIS has become such a regular part of travel, especially for commuters, that it is now often considered a necessary source of information. The types of ATIS systems, their capabilities, and the technologies available

have grown and matured considerably over the past few years. Common types of ATIS dissemination mechanisms include:

- Variable Message Signs (VMS)
- Telephone (landline or cell) including 511
- Highway Advisory Radio (HAR)
- Websites
- Personal handheld devices
- E-mail alerts
- Commercial radio and TV – the media
- Satellite radio.

VMS are among the ATIS devices used by public agencies. Both the fixed and portable signs can be used to inform motorists on travel conditions, road closures, and alternate routes; and the signs can be programmed remotely to change the message "dynamically" as conditions change. Portable signs also enable transportation agencies to inform travelers outside the disaster area or in rural areas where fixed VMS are not available. VMS are most useful when the message is concise, allowing the traveler to read it while in motion.

While many DOTs have operated toll-free telephone numbers for road conditions for several years, 511 systems are rapidly replacing them. Automated 511 systems, either statewide or regional, can provide commuter information, road weather conditions, amber alerts, and information on other major events. VMS can direct travelers to dial 511 where more extensive information is available. Accessible pre-trip from landlines or while en-route from cell phones, 511 bridges the gap between information available in urban and rural areas. There are currently twenty-nine 511 systems deployed in the United States.

HAR is another technology available to transportation agencies to provide travelers with dynamic and up-to-date information. It is preferable to use this technology to provide messages with minimal details on the disaster, due to its limited range. Reliant on low-power radio transmission, HAR can be plagued by technical problems as noted in the previous section.

Websites, another very commonly used ATIS technology, are very effective in providing travelers pre-trip information on road conditions, real-time traffic, alerts, incidents, alternate routes, etc. The websites provide a platform for offering the most detailed information in a variety of formats, such as map displays, text, images from surveillance cameras, recorded messages, and displays of messages, on VMS. Websites also offer a means to provide information on recovery efforts after the disaster.

As consumer electronics continue to evolve and penetrate the market, handheld devices such as BlackBerrys, cell phones with text messaging, and other personal digital assistants (PDAs) represent another means for travelers to receive information. They are effective devices for receiving text alerts and, in some cases, can connect to the Internet to get real-time information before a trip or while en-route. Several public agencies offer a service to the general public to receive personalized alerts and e-mails to handheld devices through a sign-up process on their websites.

Radio and television reports on travel conditions are still the most prevalent form of traveler information. The media are viewed as an important means for making the public aware of the disaster events through the broad reach of commercial radio and TV broadcasts. Throughout the disaster phases, it is critically important to involve the media actively to get road condition, shelter information, and disaster recovery information out to their audiences.

Concept of Operations Summary

The concept of operations provides a high level overview of a framework and its components that make up an idealized ATIS disaster system. The concept of operations paints an overall picture showing the agencies that need to be involved, activities and messages that need to be crafted, and the availability of ATIS technologies to disseminate critical traveler information to the public. It is recommended that agencies compare their current practice with the concept of operations with the goal of maximizing the effective use of ATIS in their emergency planning and response. Tools for developing a strategy for assessing current practices and addressing areas for improvement are discussed in the next section.

5.0 Toolkit for Developing an ATIS Strategy

A toolkit provides agencies involved in transportation management, emergency management, and traveler information with a brief and focused set of the items necessary to develop a strategy for providing accurate and useful information to the public during times of disaster. The toolkit is meant to be general: something that can be taken to any region, metropolitan area, or state and used as a template or blueprint for creating a consensus on how a region can use its ATIS assets during a disaster.

Covered in the toolkit are the institutional processes for contacting the agencies and suggestions of the personnel, or the types of people, necessary in times of disaster to distribute and disseminate proper information in the most efficient way possible. The toolkit is meant to serve as a "jumping off" point for regions and/or metropolitan areas, even states, to organize workshops to address the issues faced during times of disaster in the communication of information to the public, using ATIS. The major components of the toolkit and the process for organizing a workshop to develop an ATIS strategy are outlined in Figure 5-1.

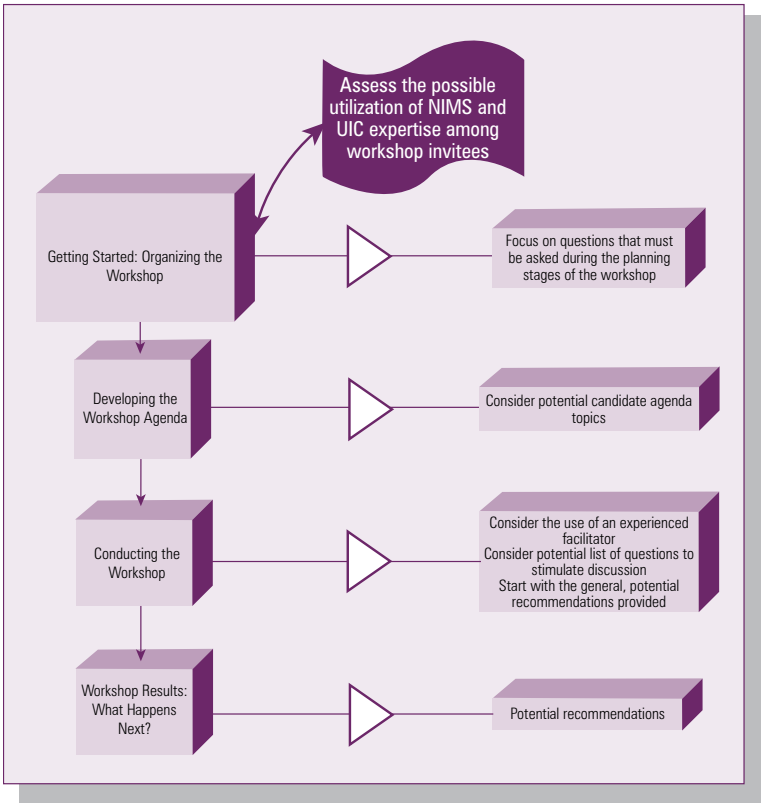

Figure 5-1. Toolkit for Developing an ATIS Strategy

By tailoring the ideas in the toolkit to local needs, workshop participants can create a cohesive strategy, informed by the input of all involved, which allows a region, metropolitan area, or state to use available ATIS assets to aid the public to the greatest extent possible.

Getting Started: Organizing the Workshop

Initial questions that need to be answered during the planning stages of the workshop include:

Who organizes the workshop? What agency and/or individual(s) with the appropriate level and skills can be called upon to organize the workshop? Is a subcommittee needed with representatives from a few agencies to get buy-in to the workshop concept and to tap their knowledge and resources?

When and where will the workshop take place? Consider the needs and travel arrangements of all invited participants, as well as a room layout that is conducive to interaction.

Who participates: what agency and what type of person?
This toolkit offers some lists of personnel/agencies that should be considered when bringing together a complete set of participants for a workshop. Potential workshop invitees include:

Emergency Planning, Management, and Response
- State Department of Public Safety or State Department of Emergency Management
- County Emergency Management personnel
- City Emergency Management personnel
- Incident Commander
- Fire Chief and subordinates
- Police Chief and subordinates
- Reverse 911® Coordinator
- Public Information Officer
- MPO personnel involved in emergency management
- FEMA
- Department of Homeland Security
- FBI
- Military Installations (National Guard, DOD)
- Companies involved in HAZMAT transportation and/or production

Transportation Management
- County Transportation agencies
- City Departments of Transportation
- State DOT Traffic Management Center Managers
- ITS Coordinator
- ATIS Coordinator
- Public Information Officer
- Transit Agency Managers
- MPO personnel involved in transportation management

Media and Other Private Sector
- Television stations
- Radio stations
- Dedicated traffic information services
- Internet informational websites
- HAM radio associations

Who facilitates the workshop and who serves as recorder during the workshop? The roles of facilitator as well as those who will be recording the proceedings should be decided beforehand and included in the information distributed to invited attendees.

What information should be prepared in advance that will be needed at the workshop? Examples include material from after-action reports or a scenario for a tabletop exercise. Invited attendees can be asked to bring potentially needed or reference materials to the workshop.

Developing the Workshop Agenda

Depending upon how long the workshop is intended to be, an agenda needs to be structured not only to ensure that all the intended topics are covered, but also to keep the participants engaged and contributing to the discussion. Another consideration is how much preparatory work the organizer(s) decides to do prior to the workshop. An agenda developed for a workshop for which there is minimal advanced work can be positioned as a session for the participants "to get their arms around" the topic. In that case, the agenda could be designed to let the audience become the source of the technical information and identify gaps in knowledge and processes that can be worked on after the workshop.

On the other hand, the agenda could incorporate prepared materials, if the organizers choose to invest time in such preparations. For example, subject matter experts could give short presentations on specific topics for discussion, or scenarios could be developed for participants to conduct a tabletop exercise, or other similar materials could be prepared.

There is no right or wrong method, but it is up to the organizers to decide what best fits with local needs. The objective is to begin the process of development of a strategy by getting the appropriate stakeholders involved in discussion. Shown in Table 5-1 is a list of general issues that should be considered in the workshop agenda.

Conducting the Workshop

Effectively run workshops require good facilitation and recording of results. A good facilitator keeps the discussion on track with the agenda and time available and provides an opportunity for all participants to provide input and stay engaged in the discussion. Equally important is to have a written record of the discussion for follow-up actions. It is highly recommended that a minimum of two individuals are identified for these separate roles. If resources allow, organizers should consider the use of an experienced facilitator. Multi-jurisdictional workshops can benefit from the presence of a professional facilitator, specifically not associated with any of the agencies sponsoring the workshop. This can make participants feel that no one agency will take precedence in the discussions, and neither benefits nor resource allocation will fall too heavily on one agency. If resources don't permit hiring a facilitator, an alternative would be

Table 5-1. Candidate Agenda Topics

- **What are the current protocols and SOPs?** Beneficial to the attendees of a workshop or tabletop exercise is the **assessment of current protocols and standard operating procedures (SOP) for interagency communications. Protocols and SOPs** for communication of information to the public during a disaster can be part of this assessment. After-action reports are of particular importance during this step, as these documents can illustrate exactly what methods and communication infrastructure are not only available, but actually used during a disaster or emergency. After-action reports can provide a vehicle for not only documenting system improvements but serve as a blueprint for a work plan for how these improvements can be implemented.
- **What contact lists are maintained, who maintains them, who has access to them?** There are **"layers" of information** that must be circulated during a disaster, and contact lists of appropriate people who should receive the different layers of information can be created and kept by all participating agencies. For instance, is a regional master list kept, with complete contact information, of emergency management and transportation management agencies and personnel who should be contacted during a disaster? Is it a living document, able to be updated via a web interface by those who appear on the list? Are there lists of special groups who should have access to more information than the general public, such as hospitals, HAZMAT facilities and transportation companies, nursing homes, large office parks, and schools?
- **What are the current, planned, and potential ATIS assets?** The scope and breadth of a region's, state's, or metropolitan area's ATIS infrastructure, including planned projects and emerging technologies, should be identified and that knowledge brought to the table for discussion. A workshop that has gathered experts in the fields of emergency management and transportation should have a clear understanding of what devices and services are available for use during a disaster and who has ownership over each set of devices. Which agency has ownership over which devices, and which are, or can be, controlled jointly? How many devices exist? What services do private traveler information providers have to offer? What plans are in place to expand current networks? It is possible that personnel from agencies involved in emergency management and transportation might not be aware of the devices and services that exist outside of their own jurisdiction. Taking time to identify all ATIS in a region can also sometimes reveal unnecessary redundancy. In addition, the risks involved in relying too heavily on one set of devices as opposed to another should be identified and examined.

Table 5-1. Candidate Agenda Topics (continued)

- **How and by whom is ATIS message content generated during emergencies?** The **content of messages disseminated via ATIS devices should be examined.** ATIS devices can be a powerful tool to disseminate information during a disaster, but care needs to be taken regarding what messages are being disseminated. These messages can be generated by multiple agencies, and if they are not coordinating their information dissemination, there can be disparity in the quality and content of the message.

Level of Message Detail	Dissemination Tool
Most Details	• Broadcast radio • TV
Fewer Details	• E-mail, pager and text message alerts • Telephone and websites (including 511 and Reverse 911® systems) • HAR
Least Details	• Fixed and portable VMS • Telephone – a phone-in system can typically be modified to reduce message length to allow the system to handle a larger number of simultaneous calls

Figure 5-2. Dissemination Tools and Level of Message Detail During Emergencies

Some messages may even contradict, giving the public conflicting information. In addition, not all messages fit all devices. For instance, detailed information given via a 511 floodgate is certainly more information than is appropriate for VMS or a text alert. However, the average traveler increasingly has convenient and consistent access to cell phones, and that ubiquity illustrates why shorter messages are just as important as longer ones.

- **How do public policies affect private sector disseminators of traveler information?** The policies developed by public agencies must take into account the **private sector** collectors, consolidators, and disseminators of traveler information. Media outlets such as radio stations, television stations, and websites should be privy to the details of the policies that affect the sharing of traveler information during times of emergency. Creation of those policies should take into account the needs, capabilities, and added value the private sector brings to the dissemination of traveler information, especially during emergencies.

- **What type of expertise not residing in agencies is needed and when? Expertise** that does not exist where a disaster occurs **can be brought** in prior to or during the disaster. A region, metropolitan area, or state meeting to discuss the communication issues that may be presented during a disaster need to touch upon expertise that may not exist within the region at all. A region experiencing a disaster not typical of that area may need to contact experts in other parts of the country in order to seek advice pertinent to the situation. Examples might include identification of a biological or chemical substance that is the basis of the disaster or expertise in communicating with particular segments of the population, such as particular ethnic or language groups.

to enlist an agency employee who does not have a direct stake in the subject matter (or who is not a participant's supervisor) but is known for his/her facilitation skills.

For each discussion item on the agenda, the facilitator will want to have a set of key questions that should be addressed in the workshop.

As the discussion proceeds through each agenda item, the recorder's role will be to capture information in appropriate formats. Depending upon how each specific agenda item is designed, the records may vary. For example, they might range from a whiteboard list of points contributed on a topic by participants, to individual responses to an exercise to rank certain items, to summaries of breakout groups' discussions. At the end of the workshop, all the records can be accumulated and made available for follow-on use.

Workshop Results: What Happens Next?

The focus of the workshop is to bring the right emergency management, transportation, and communications officials and staff together from multiple agencies to address the need for better communication with the public during disasters. The workshop is not intended as an end in itself, for it should serve as the first step in development of a strategy on how best to use ATIS assets in disaster communications.

During the course of the workshop, participants will most likely identify ideas for improvement and further discussion. Table 5-2 presents several potential recommendations that could emerge during the workshop or in the post-workshop analysis of the records of the workshop discussion. In an attempt to create a list general enough to find merit in a variety of regions, readers will find that some recommendations will fit, some will need to be expanded upon based on local influence and tailored to meet local needs, and others may be dropped from consideration altogether. Those recommendations that are applicable in a given jurisdiction may additionally cover the broader intent of ATIS strategy. A final picture that emerges from the workshops can result in an overall, comprehensive view of the dialogue, from all levels.

As a next step, the general recommendations will need to be refined so that a list of action items can be developed for the region. They can be arranged from low-tech to high-tech and from near-term to long-term. This will give the region a variety of actions that can be addressed by different groups or agencies and have the potential of requiring varying levels of commitment, funding, and direction.

Additional Resources

Participants in the workshop will want to assess the extent to which the agencies they represent have been trained and utilize National Incident Management System and Incident Command System/Unified Command as this could have a significant impact on the terminology used during the discussions.

National Incident Management System. In February, 2003, President Bush directed the Secretary of Homeland Security to develop and administer a National Incident Management System (NIMS). The NIMS provides a consistent nationwide approach for federal, state, and local governments to work

Key Questions

- What information is needed, by whom, when, and how?
- What dialogues need to occur between agencies and personnel and in what order?
- What do these dialogues trigger – action, response, other?
- What are the messages being communicated among players in a given scenario?
- How does information currently flow among the parties that generate or use information?
- How does the type of disaster affect the information needed and how it flows?
- Are there sufficient means/mechanisms currently available to provide accurate and timely information to the public? What has been successfully used and what has not worked?
- What are the procedures that agencies follow to gather, coordinate, and disseminate information in normal situations and how does that differ in disaster situations?
- What is the protocol that agencies follow for providing information to the media and the public?
- Is information always relayed through a public information officer or joint information center?
- What problems arise with regard to information and how are they resolved, such as miscommunication, rumor control, inconsistent information, and delayed information?
- Are there agreements in place that describe the roles and responsibilities of agencies regarding information dissemination during major disasters?
- Are there ways in which a Department of Transportation's or other agencies' ATIS assets can serve the purpose of other agencies involved in the response? How would this be coordinated?

Table 5-2. Potential Recommendations for the ATIS Strategy

- **Consider future needs and emerging technologies.** ATIS is a field where technology is constantly changing and undergoing improvements. A discussion of how agencies can communicate with the public during emergencies can benefit from an expert familiar with how technologies that drive ATIS are changing, and how these can affect the provision of emergency and traveler information in the future.
- **Coordinate with adjacent jurisdictions.** While jurisdictions may have well-thought-out and practiced emergency plans, these may not include communicating with adjacent regions.
- **Examine "push" technologies** such as Reverse 911®, text and e-mail alerts. Push technology is by definition geared towards a section of the public who has requested that information be sent when it is relevant, and emergency information can be effectively disseminated widely to those who are already equipped with the devices that can receive information. This could be as simple as using e-mail or pager systems that already exist across multiple agencies, but improving the database of recipients to include major real estate management firms, high-rise complexes, jails and prisons, or younger citizens who tend to be early adopters of technology.
- **Bring private sector information disseminators into the discussion.** Private sector disseminators of traveler information, a market sector that is growing significantly both in customers and technology, often enhance their public agency data with those of private sources, and can often provide a more comprehensive view of the event. Recognize them as a true partner in the community. Include them in the development of policies that govern the sharing of traveler information, taking into account that while media outlets may not strictly qualify as true ATIS, they take care of widespread dissemination of information, and their importance in the value chain is firmly established.
- **Disseminate information via website.** Traveler information websites run by both the public and private sectors can offer graphical information not available with text-based information.
- **Identify how messages must differ given the scenario.** Emergencies come in many different forms, and response to those must differ as well. Development of a comprehensive plan to use ATIS during emergencies must also include a focus on the content of the message. What needs to be communicated when a tsunami is coming vs. after an earthquake has already happened? Consider how the needs of the public differ, as well as their access to different ATIS devices depending on the type of disaster.
- **Identify the different needs of a rural as opposed to metropolitan setting.** The ATIS infrastructure is typically more robust in an urban setting, and emergency response and transportation personnel possibly more experienced with its uses. Using ATIS to communicate with the public during emergencies has different implications in rural versus more urban settings.

together effectively to deal with emergencies. The system also intends to include private-sector and non-governmental organizations to work together during emergencies and domestic incidents. FEMA offers courses on NIMS for interested personnel. Further information regarding NIMS can be found online at FEMA's website, http://www.fema.gov/emergency/nims/index.shtm.

Incident Command System/Unified Command. The Incident Command System (ICS) is a concept designed for the benefit of first and subsequent responders to natural and/or man-made disasters. An ICS facilitates communication and planning by dividing a disaster response into five categories: Command, Operations, Planning, Logistics, and Finance and Administration. ICS may be expanded into a Unified Command (UC) for coordinating response of multiple jurisdictions and allowing responders to adopt a cohesive organizational structure without being hindered by jurisdictional boundaries. Further information on the ICS and UC can be found at http://www.osha.gov/SLTC/etools/ics/index.html.

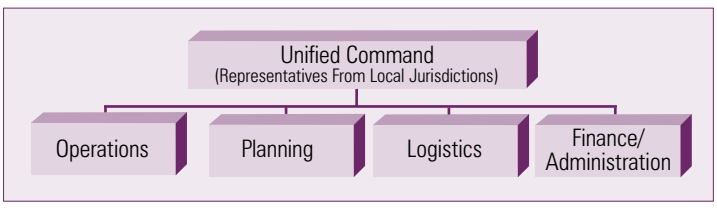

Figure 5-3. Unified Command Structure

6.0 Looking Ahead

The need for improving communications to the public was a key finding in the *Catastrophic Hurricane Evacuation Plan Evaluation: Report to Congress* published in June 2006 (http://www.fhwa.dot.gov/reports/hurricanevacuation/index.htm). While states along the Gulf Coast used a variety of methods, including radio and the Internet, to inform residents before an evacuation began, the study found that the methods for communicating during an evacuation were less developed. The study noted that 511 telephone systems and highway advisory radio could help the public by providing route-specific information, but in many locations the equipment for monitoring real-time traffic conditions was not deployed. While the study focused on the Gulf States, the findings are likely to be just as valid for other parts of the country.

As the public sector continues to improve its plans for dealing with disasters, a key element must focus on dissemination of information to the public. Despite common misperceptions about how people behave in a threatening situation, research has shown that panic is not the norm and that people make decisions that are rational based on the available information and their particular situation. Thus, providing the public with the most accurate and actionable information available can only serve to assist agencies responding to an emergency.

ATIS assets can become an even greater component of information dissemination during disasters than they have been in the past. However, transportation, public safety, and emergency management agencies need to develop a clear strategy on how ATIS fits within the overall emergency management plan and develop clear processes for utilizing ATIS to assist with evacuations and keep travelers out of harm's way when disasters impact the transportation system. This document is intended to assist agencies in that endeavor.

This document is part of FHWA's Emergency Transportation Operations (ETO) program aimed at supporting the activities of state and local agencies. Additional ETO materials can be viewed at http://ops.fhwa.dot.gov/opssecurity/index.htm.

Additional Resources

Federal Emergency Management Agency. *Guide for All-Hazards Emergency Operations Planning, State and Local Guide (SLG) 101,* 1996 (http://www.fema.gov/pdf/plan/slg101.pdf).

Federal Highway Administration, Office of Operations. *Simplified Guide to the Incident Command System for Transportation Professionals,* FHWA-HOP-06-004, EDL #14234, February 2006 (http://ops.fhwa.dot.gov/publications/ics_guide/ics_guide.pdf).

Federal Highway Administration, Office of Operations. *Concept of Operations for Emergency Transportation Operations.* Prepared by Science Applications International Corporation, January 2004.

Lindell, Michael K. and Ronald W. Perry. *Communicating Environmental Risk in Multiethnic Communities.* Sage Publications, Thousand Oaks, CA, 2004.

Perry, Ronald, and Lindell, Michael. *Emergency Planning,* Washington, D.C.: John Wiley, 2006.

Wolshon, B., "A Way Out: The Emergence of Homeland Security Stresses the Importance of Evacuation Management." *Transportation Management and Engineering,* April 2004, Vol. 9, No. 2, pp. 16-21.

U.S. Department of Transportation
Research and Innovative Technology Administration
Federal Highway Administration

U.S. Department of Transportation
1200 New Jersey Avenue SE
Washington, DC 20590

ITS Joint Program Office, HOIT
Toll-Free "Help Line" 866-367-7487
www.its.dot.gov

FHWA Office of Operations, HOP
http://ops.fhwa.dot.gov

EDL 14339

FHWA-HOP-07-068