

## North Carolina Digital Government Application – Communications Infrastructure

**Title of Nomination:** Traveler Information Management System (TIMS)  
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### Category for Judging: Communications Infrastructure

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## Executive Summary

In the fall of 1999 the North Carolina Department of Transportation (NCDOT) was faced with a unique challenge: “How to provide accurate, timely and accessible information to the travelling public about the 1500 roads that were closed due to flooding caused by Hurricane Floyd in eastern North Carolina?” The website that was created to address this need has grown into NCDOT’s Traveler Information Management System (TIMS), which can be found at [www.ncsmartlink.org](http://www.ncsmartlink.org). TIMS is North Carolina’s entry for a NASCIO Recognition Award in the “Communications Infrastructure” category.

TIMS provides communications capabilities between the North Carolina Department of Transportation and the public that can improve the safety and mobility of travel within our state. This is consistent with the mission of the Department and in line with the feedback on services our travelers want that DOT has solicited from many stakeholders and customers across the state. TIMS helps the Department provide real time transportation information in a society that is becoming increasingly demanding of this type of service from their governments.

The TIMS system has expanded in the past three and one half years to become a comprehensive statewide, web based system that reports any incidents that affect travel in North Carolina including accidents, work zones, snow and ice conditions, evacuations, etc. The system that was created in response to the 160,000 phone calls for flooded road information. It has logged over 6 million hits to date. It also serves as a “push” system by paging emergency responders across the state when incidents occur and provides links to other traveler information. This system was developed within the Department of Transportation with no use of costly external resources. TIMS continues to grow each year and truly provides a valuable and cost-effective service to our citizens.

## A. Description of Project

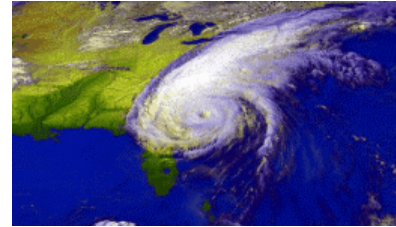
Information:

What type of information is available?

Is the information accessible when the customer wants it?

Is the information what the customer wants?

These were three big questions that the Intelligent Transportation Systems (ITS) Operations Unit of the North Carolina Department of Transportation (NCDOT) were faced with when developing the Traveler Information Management System (TIMS). The ITS Operations Unit's task to provide traveler information on North Carolina's roadway systems came to fruition in September of 1999. On September 16, 1999, Hurricane Floyd slammed into the North Carolina coastline and created havoc in our state for approximately 6 to 8 weeks. The impact from Hurricane Floyd flooded more than 1500 of North Carolina's roadways east of I-95. NCDOT was inundated with calls, more than 160,000 in total, requesting information on accessibility of roadways in the coastal portion of our state. At this time, all information was being routed to our 1-877-DOT-4YOU Customer Service hotline. This line was originally created to allow the public to get information from NCDOT on things such as how to request a traffic signal, or where they could renew their Driver's License. This hotline had never had to handle the types of requests for information that were generated by Floyd's widespread flooding. The Customer Service staff had to contact NCDOT field personnel across the eastern third of the state about the status of the roadways on a continual basis to ensure that the information was up to date. Communications to and from these field personnel was by fax, NCDOT's internal mainframe application, or phone. One can imagine the resources and time it took on both ends to keep this information current, especially since the status of a given road could change from open to closed and back to open again several times in one day.



Due to the magnitude of calls that were generated for travel information/conditions of the roadways following the storm, the NCDOT created the "beta version" of TIMS. A "Road Closure" website provided current conditions on the roadways and their status in the coastal region in the weeks following Hurricane Floyd. The information was accessible to NC's customers via the Internet and as calls came into the 1-877-DOT 4YOU Customer Service hotline, the employees manning the phones used the website as a resource for providing information instead of having to contact the field personnel. The "Road Closure" website recorded more than 2.5 million hits in the weeks following Floyd and was deemed a huge success.



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Although the development of the website was a result of a reaction to an event, the successes and possibilities were obvious and the task of developing a permanent Traveler Information Management System (TIMS) was set in motion. NCDOT assessed the limitations of the information gathering process during Hurricane Floyd. There was a cumbersome process to get information from the field to the website, the information provided was in a format and terms not easily understood by the public, and the information only related to flooded roads. NCDOT then set out to create an improved permanent system.

TIMS is designed as a tool to improve safety and mobility through the dissemination of better traveler information. The scope of information available via TIMS was the first task to be conquered. From the deployment of the “Road Closure” website, NCDOT realized that NC’s travelers want information pertaining to any disruption that may affect travel on NC’s roadways. With the “Road Closure” website, only information that pertained to which roads were flooded in NC’s coastal region was available. The ITS Operations Unit decided to expand the amount of information available to include any incident that affected travel on NC’s roadway systems (accidents, construction/maintenance activities, and adverse weather). Having the information available via a website was determined to be the best method for disseminating the information to the public. Once the information to be provided and the method of dissemination had been decided, the ITS Operations Unit needed to begin to develop the website. The ITS Operations Unit turned to the Department’s Information Technology Division to request their assistance in developing the website to the specified standards and requirements had been established for the Department.

The elements to be included were defined as:

- ◆ County
- ◆ Affected Route Number
- ◆ Road’s “Common Name”
- ◆ Mile marker
- ◆ Condition (Lane Closed, Road Closed)
- ◆ Closure limits (from X to Y)
- ◆ Severity (High, Medium, Low)
- ◆ Reason for the Closure
- ◆ Comment area to expand on details of closure
- ◆ Start Time of Incident
- ◆ Expected End Time of Incident
- ◆ Contact Name\*
- ◆ Contact Number\*

\* Denotes information that cannot be viewed by the public

Once in the hands of Information Technology personnel, the website began to take form. Personnel for the Information Technology Division selected hardware and software platforms and developed the application. The TIMS web site is an ASP/COM web application. The web server is IIS 5 with a clustered SQL 7 data backend. The middle tier (COM) is written in VB6. TIMS is co-hosted with many other DOT systems on a single first generation Compaq DL380 web server. The SQL 7 database server runs on a Dell Power Edge cluster.

The front page, seen in the graphic on the left side below is the page the public can select either a county or route of interest. Once the user has selected the county or route name, TIMS provides a screen that looks like the image on the graphic on the right side below. At this screen, the program will provide any information pertaining to any incidents in the area of their selection. For this example, I-77 has been selected. Two incidents are reported for I-77, one in Mecklenburg County and one in Iredell County. The level of the impact to traffic caused by the incident is denoted by colors. Green represents a low severity, yellow, a medium severity, and

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red, a high severity incident. Approved NCDOT personnel across the state input information into the TIMS database directly onto the Internet.

**Welcome to NCDOT's Traveler Information Management System. (TIMS)**

Get real time information on events that cause severe and unusual congestion on NCDOT maintained roadways in North Carolina by clicking a region on the map, by choosing a county, or by choosing a road below. (Click [here](#) for Site Disclaimer.)

Please click a region:

Choose a County  or Route Number

Click [here](#) to download all active incidents into an Excel spreadsheet.

**You Have Selected Current Road Conditions for I-77**

The Following Incidents were found for I-77

Location	Severity	Reason	Start/End
Mecklenburg County MM:18 Both Directions		Congestion	1/15/2003 6:02:00 PM
I-77 between Exits 23 (Gilead Road) and Exit 13 (I-85)		Construction: Rea Construction will be working in the area in conjunction with the I-77 widening project. Heavy congestion will occur at various times during the project due to intermittent lane closures. The speed limit has been reduced in this area to 55 MPH and is strictly enforced. For more information: <a href="#">click here</a>	6/30/2004 5:00:00 PM
Iredell County MM:33 Exit #33 Both Directions		1 of 2 Lane(s) Closed	3/14/2003 11:14:00 AM
Exit #33 and Centre Church		Construction: Construction consisting of bridge widening, realignment of ramps, loops, and intersections of I-77, US 21 (Williamson Rd.), and Centre Church Rd. Expect delays throughout area	9/30/2003 12:00:00 PM

Other features included in the TIMS website are a hyperlink that allows users of the system to provide comments, make suggestions for improvements, provide feedback on the system, ask questions, etc. Also, links are available to traffic camera views, emergency information (including evacuation information), train and ferry information, and to similar traveler information systems in other states.

Once the development of the website was complete, the ITS Operations Group began using TIMS internally to NCDOT in June of 2000. Once NCDOT had tested the system in-house, a marketing campaign was launched in July 2000, to promote the use of the Traveler Information Management System (TIMS) to the public. The marketing efforts promoted the use of the website as an ITS tool that would provide traveler information on NC's roadway system. As the usage statistics below show – TIMS has become a well-used resource for our travelers.

Report for: TIMS		Date Range: 07/01/2000 - 05/13/2003
<b>Traffic Summary</b>		
Total Sessions		315,819
Total Pageviews		6,312,405
Total Hits		22,598,396
Total Bytes Transferred		91.09GB
Average Sessions Per Day		1,555.75
Average Pageviews Per Day		31,095.59
Average Hits Per Day		111,322.14
Average Bytes Transferred Per Day		459.51MB
Average Pageviews Per Session		19.98
Average Hits Per Session		71.55
Average Bytes Per Session		302.45KB
Average Length of Session (H:M:S)		00:04:57

**B. Significance to the Improvement of the Operation of Government**

The TIMS website is a significant asset to the operations of state government as well as outside entities, such as the media and the users of NC’s roadway systems. As stated previously, phone operators at the 1-877-DOT-4YOU hotline had to continuously contact field forces for any type of road condition information. The creation of the TIMS database has reduced this communications transmission time. Delayed responses to our transportation users could impact their confidence in our services as an organization. By implementing TIMS, NCDOT is able to provide prompt information to our customers during both normal day-to-day operations (construction/maintenance activities) and during any major event (accidents, hurricanes, flooding, snow/ice, any other natural disaster, etc.) to assist them in their travel plans and travel decisions.

Sharing this information with Emergency Response Agencies, Media Entities, Law Enforcement, etc., has benefited the NCDOT’s operations immensely. Not only does TIMS function as a site where the public can access road condition information on demand, but it also functions as a “push” service to public safety agencies. NCDOT offers free subscriptions to TIMS to law enforcement, fire and rescue, and emergency management agencies across the state. When an incident occurs that meets user-set thresholds, TIMS pages or emails a notice of the incident to the subscriber. The NC Forestry Service, the NC Trucking Association, several NC school systems and the United States Military also subscribe to this service. The relationships, benefits, and improvements developed from the sharing of this information are significant. Having these partners benefits the entire NCDOT and particularly the ITS Operations Unit’s Incident Management Program. This program is responsible for quickly clearing anything disrupting travel on NC’s highways. The partnerships that have been developed through the sharing of information has enhanced our role in the response to incidents on NC’s roadways and also in the dissemination of information pertaining to these incidents.



NCDOT is also piloting a program in which information is sent to TIMS as it is dispatched by the State Highway Patrol. By being notified of these incidents even earlier, NCDOT is able to alert motorists of an incident ahead of time; therefore, allowing them to make choices on their trip that in turn will maximize capacity on our roadway system.

**C. Benefits realized by service recipients, taxpayers, agency or state.**

With the implementation of the Traveler Information Management System (TIMS), the benefits reaped from the information available are astronomical to both public and private entities. NCDOT has benefited greatly in it’s the public perception of operations, its day-to-day operations, and its development and enhancement of partnerships. The taxpayers/citizens of NC, as well as other users of our roadway systems, have greatly benefited from the implementation of TIMS. Those individuals and agencies that utilize our roadway systems are able to access travel information prior to making their trip. This includes the everyday commute,

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as well as the vacation travel to any region of our state. Many users of TIMS contact NCDOT via the TIMS email with questions about roads that are closed so they can make their travel arrangements. Anytime NCDOT can provide information to users of the transportation system that help them make decisions that improve the safety and mobility of their trip, we are providing a valuable service.

Many media outlets across NC utilize TIMS as a resource to disseminate information to their audiences about current road conditions and incidents in their areas. Currently, North Carolina and Virginia notify each other via email of incidents occurring in their respective states.

Although the system is web-based currently, a future benefit that can be recognized from TIMS is that it will be used as the information resource for highway information to North Carolina's 511 service. NC's free 511 service will allow a user to dial "511" from a cellular or landline telephone and retrieve information on incidents that are affecting NC roadways, as reported in TIMS.

### **D. Return on Investment, Short-term/Long-term Payback**

The return on NCDOT's investment in the creation and operations of the TIMS System can be measured in 2 ways. The first is in the cost savings to the state in being able to utilize in-house forces at no additional cost to create and operate the system. The second is in the significant improvement in the ability to get real time travel information to our customers without overloading NCDOT's Customer Service hotline, 1-877-DOT-4 YOU.

Two engineers and one computer programmer within NCDOT created TIMS. This was done in addition to their other duties and at no additional cost to the state. More than 200 NCDOT employees are currently authorized to enter incidents into the system, again at no additional cost to the state. Many states have systems similar to TIMS that were created by consultants. While it is difficult to obtain an accurate cost estimate of this type of creation, it is not unreasonable to think that states may pay up to \$500,000 for development of such a system. Once the system was in place, if a private entity were to operate, it would easily cost at least \$100,000 per year, plus would still rely on information generated by DOT personnel and require their time and effort to relay the information to the private entity. NCDOT has saved this development cost and continues to save the on-going operations cost every year. While NCDOT undertook the TIMS project because we felt it was a service that the public should have to help improve the safety and mobility of travel in North Carolina, upcoming Federal Highway Legislation is likely to require that each state create and operate a system similar to TIMS.

TIMS also benefits the staff of and callers to NCDOT's Customer Service hotline. When a major incident occurs, such as the snowstorms that paralyzed North Carolina over the winter of 2002-2003, the hotline is quickly inundated with calls. For a system that typically handles less than a thousand calls a week, the system receives hundreds of thousands of calls when a major event occurs. When the primitive version of TIMS was put in place during Hurricane Floyd, a clear decrease in call volumes was obvious once the website went on line. Busy signals once frustrated callers; these callers are now urged to access TIMS at [www.ncsmartlink.org](http://www.ncsmartlink.org) to access their information "self-serve" without waiting for an operator. During the first winter storm that TIMS was operational in December of 2000 the site logged over 40,000 hits. Less than two years later another winter storm generated a tenfold increase in usage. The public is using TIMS in increasing numbers with each major event.