

# North/West Passage Transportation Pooled Fund Study



## Work Plan Phase I Projects

2004

*Approved by the North/West Passage  
Transportation Pooled Fund Study Membership  
on December 5, 2003*

# North/West Passage Transportation Pooled Fund Study Work Plan

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## Phase I Projects – Integrated Traveler Information and Maintenance Network

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### Purpose

The purpose of Phase I Projects is to implement and evaluate integrated traveler information systems and coordinate maintenance operations across state borders. Using appropriate delivery systems, traveler information will be made available to internal staff, and the traveling public via 511 Dynamic Message Signs (DMS) and other systems. The long-term vision of the North/West Passage Corridor states is to influence ongoing standards development; operate database systems that can transmit and receive multiple data streams; and utilize effective methods for sharing, coordinating, and integrating traveler information across state borders.

Based on initial commitments from North Dakota, Wisconsin, and Minnesota, the initial geographic focus of this project will be I-94 through Wisconsin, Minnesota, and North Dakota. This limited geography will allow a manageable exchange of data among the states for delivery via each states' 511 service. Also included is the ability to integrate DMS and bridge de-icing across state lines with installation of additional DMS/bridge deicing. Focus will also be placed on developing a web site for communication of North/West Passage information.

### Status

Today in the North/West Passage states (Washington, Idaho, Montana, North Dakota, South Dakota, Minnesota, Wyoming, and Wisconsin) there are numerous systems for collecting transportation data, for processing and integrating the data, and for delivering the information to users. While the information is valuable to users, it is difficult for them to determine which system can provide the information they need and to determine how accurate and timely the information is. All the states involved have worked on various elements of an integrated traveler information network and have had significant success. However, due to many issues the current traveler information systems are not fully integrated across state borders.

### Strategy

By coordinating their efforts to develop an integrated traveler information and maintenance operations network the North/West Passage states can influence ongoing standards development; operate database systems that can transmit and receive multiple data streams; and utilize effective methods for sharing, coordinating, and integrating traveler information across state borders. When completed the systems should be seamless to users and maintenance operations supplying the timely and accurate traveler information they need.

On some Phase I Projects involving significant construction or equipment purchases the North/West Passage Transportation Pooled Fund (TPF) Study will serve as project initiator. On these projects the North/West Passage TPF Study will develop preliminary scoping studies, planning, scheduling, communications design, and pre-design to fully define the project, its objective, current status, strategy and benefits. Necessary multi-state memorandums of understanding or agreements will also be prepared. On these projects, funding for project construction and equipment purchases will be obtained from other sources including state/federal/local construction, operation, maintenance, or equipment budgets as appropriate.

In Phase I, the participants will develop a series of independent, but closely related projects for integrating traveler information systems and for coordinating maintenance operations. They are described as follows:

# Project 1.1

## Integrate North Dakota, Wisconsin, and Minnesota Reporting Systems

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### **Project Champion**

Minnesota DOT, Ginny Crowson

### **Project Purpose/Objective**

To integrate reporting systems in North Dakota, Minnesota, and Wisconsin such that seamless access to traveler information, including both road conditions and weather information, will be provided via 511 and other services.

### **Current Status**

Minnesota and North Dakota 511 users are unable to access road condition information from each others state because Minnesota's Condition Acquisition Reporting System (CARS) is currently unable to import road condition data from North Dakota's #SAFE system and #SAFE cannot accept CARS data. In contrast, North Dakota's 511 system provides travelers with weather information for Minnesota and adjacent states. Minnesota's 511 system provides traveler weather information for Minnesota only.

Wisconsin 511 is in its beginning planning stage and has not been deployed. Currently, Wisconsin traveler information is available by dialing 1-800-ROADWIS. Information is entered into this system from the Wisconsin State Patrol. Wisconsin does not use the CARS, however significant elements of the system are completed. Project 1.2 addresses deploying a limited version of CARS in Wisconsin.

### **Strategy/Approach**

Through deployment of a North Dakota reporting system, a limited Wisconsin system and an existing system in Minnesota, the states will be able to share traveler information among the three states. This will allow North Dakota weather and road condition information to be shared via Minnesota's, and eventually Wisconsin's, 511 services. It will also allow internal state staff an opportunity to observe traveler information projects on I-94 in all three states.

Modify North Dakota's #SAFE system to once again accept and interpret the XML feed from CARS. This will allow the North Dakota 511 service to convey I-94 road condition information for both Minnesota and Wisconsin.

### **Benefits**

Travelers will be able to readily access multi-state traveler information to improve their long distance travel planning and safe travel decisions.

### **Participants**

Minnesota DOT, Wisconsin DOT, North Dakota DOT, University of North Dakota, and Vendors

### **Duration**

4 – 6 months

### **Project Cost**

\$29,500 from the North/West Passage TPF Study

*Deployment costs for a statewide reporting system in ND will be funded through other sources by the NDDOT*

### **Tasks**

- 1.1.1 Study and planning
- 1.1.2 Vendor develops and tests exchange formats
- 1.1.3 Test import of data
- 1.1.4 Approval and full scale operational testing
- 1.1.5 Both systems operational for evaluation and assessment

## Project 1.2

# Deploy Limited CARS Study Application for Wisconsin

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### **Project Champion**

Wisconsin DOT, Phil DeCabooter

### **Project Purpose/Objective**

To allow Wisconsin staff to study the inputting of road condition, construction, incident, and special event information into Condition Acquisition Reporting System (CARS) along the I-94 corridor, and to assess the results. Possibly to include Amber Alert.

### **Current Status**

Wisconsin location routing codes were initiated in CARS through a previous project, and the state is in the midst of early planning for 511.

### **Strategy/Approach**

Deploy a limited CARS study application for I-94 in Wisconsin. The limited deployment will allow Wisconsin staff to study the input of road condition, construction, incident, and special event information affecting I-94. Through this limited study deployment and with input from Project 1.8 they can better assess the value of, and operational requirements for CARS as a statewide reporting system. The limited application will be provided at no charge to Wisconsin, with the exception of fine-tuning existing location codes for I-94 through the state. This project also provides an opportunity to develop coordination with the Division of State Patrol.

### **Benefits**

This study of an operational reporting system along I-94 will provide both important traveler information, and an opportunity for Wisconsin staff to study and become familiar with using CARS.

### **Participants**

Wisconsin Department of Transportation and Vendors

### **Duration**

4 – 6 months

### **Project Cost**

\$7,500 from the North/West Passage TPF Study

### **Tasks**

- 1.2.1 Study alternatives and size of project
- 1.2.2 System design and location
- 1.2.3 Vendors deploy CARS application for I-94
- 1.2.4. Training for operators
- 1.2.5 Operational testing and study
- 1.2.6 System operational for evaluation and assessment

## Project 1.3

# Develop Automated Road Condition Reporting System

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***NOTE:** This project was tabled at the July 29, 2003 Steering Committee meeting, due to the separate and ongoing Maintenance Decision and Support System (MDSS) project. We will revisit the project in 12 months to assess our role.*

### **Project Champion**

Minnesota DOT, Ginny Crowson

### **Project Purpose/Objective**

To develop, test, and evaluate automated road condition reporting that will reduce the need to manually enter situations in statewide reporting systems.

### **Current Status**

Currently, road condition information for North Dakota is manually entered into #SAFE and Minnesota road condition data is manually entered into Condition Acquisition Reporting System (CARS). Unfortunately the time when the data is needed most by 511 travelers and users is the time when staff members are busiest with management operations. A separate project through FHWA is addressing some of these needs as part of MDSS.

### **Strategy/Approach**

Work with, and support, the MDSS project in developing an approach to automated road condition reporting and in leveraging the results into an improved traveler information system. Vendors to develop parameters for generating applicable good/fair/difficult road condition situations based on the weather forecasts, in an automated fashion based. This will allow for testing the reliability, accuracy and timeliness of automated road condition reporting. The automated reports should also allow for override of reports manually entered by staff in each state.

### **Benefits**

This project will provide an operational test of automatically generated road condition reports. Automating the reports will save staff time at their busiest operational time, improve accuracy, and reduce delays on making the information available to travelers.

### **Participants**

North Dakota DOT, Minnesota DOT, Wisconsin DOT, University of North Dakota, and Vendors

### **Duration**

16 – 18 months

### **Project Cost**

\$00 \*

### **Tasks**

- 1.3.1 Study alternatives and planning
- 1.3.2 Define concept and develop preliminary parameters
- 1.3.3 Preliminary testing of concept
- 1.3.4 Develop first generation design for automated road condition reporting
- 1.3.5 Operational testing
- 1.3.6 Evaluation and assessment

\* Project Tabled until 2004 (see NOTE at the top of this page)

## Project 1.4

### Provide Integrated Communications Capabilities for North Dakota DMS

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**NOTE:** This project was tabled at the July 29 Steering Committee meeting. North Dakota has received grant money to upgrade their signs to National Transportation Communications for ITS Protocol (NTCIP) compliance, and as of July 29, 2003 was preparing an RFQ. We will review this project in 12 months to look at how we can integrate with other applications.

#### **Project Champion**

North Dakota DOT, Ed Ryen

#### **Project Purpose/Objective**

To allow district border offices to communicate and remotely operate Dynamic Message Signs (DMS) by integrating central control software. Possibly including Amber Alert capabilities.

#### **Current Status**

North Dakota has a number of trailer mounted DMS, some of which are semi-permanently stationed during the winter months, but communication, and message status reporting is difficult.

#### **Strategy**

Procure and test a NTCIP compatible communication system for one or more, North Dakota DMS that provides for integrated communications and control of DMS for messages, maintenance operations, emergencies, and law enforcement. Such a system was demonstrated at the 2003 ITS America conference in Minneapolis, Minnesota. The use of central control software will be investigated.

#### **Benefits**

North Dakota operations staff would be able to coordinate use of the DMS and messages displayed for the traveler. Minnesota and North Dakota transportation managers could coordinate messages across state boundaries.

#### **Participants**

North Dakota DOT, Minnesota DOT, and North Dakota State University - Ayman Smadi

#### **Duration**

4 – 6 months

#### **Project Cost**

\$00

#### **Tasks**

- 1.4.1 Study and select site(s) and communications needs
- 1.4.2 Investigate relationship to other NDDOT initiatives (i.e., Amber Alert Plan)
- 1.4.3 Prepare RFP and acquire NTCIP compatible communication equipment
- 1.4.4 Acquire VTOC or other similar software system capabilities
- 1.4.5 Install NTCIP communications links
- 1.4.6 Install communications and Virtual Transportation Operations Center (VTOC)
- 1.4.7 Preliminary testing
- 1.4.8 Operational testing & evaluation
- 1.4.9 Final approval and acceptance

\* Project tabled until 2004 (see NOTE at the top of this page)

**Preliminary Design for DMS Deployment on I-94 Eastbound in North Dakota**

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**Project Champion**

North Dakota DOT, Ed Ryen  
Minnesota DOT, Dennis Redig

**Project Purpose/Objective**

To install Dynamic Message Signs (DMS), which provide traveler information to travelers eastbound on I-94, as they approach the North Dakota/Minnesota border.

**Current Status**

Minnesota DOT has a contract for installing a DMS on westbound I-94 during this construction season. No similar project is underway in North Dakota, however North Dakota has a number of portable DMS they can utilize as needed.

**Strategy/Approach**

Install a DMS on I-94 eastbound in North Dakota to complement a DMS being installed on I-94 westbound by the Minnesota DOT. The Minnesota DOT DMS will be installed during the 2003 construction season on I-94 westbound just east of the intersection with Highway 336. The North Dakota DMS will provide for remote operation from the North Dakota DOT facility in the central office, the Fargo district office, and the Minnesota DOT district office in Detroit Lakes. Conversely, the Minnesota DOT DMS should also be modified to allow for remote operation from North Dakota. To support the mutual operation of these signs, an operations plan will also be developed.

**Benefits**

Travelers approaching the Minnesota/North Dakota border on I-94 will receive the latest traveler information that has been coordinated between states.

**Participants**

Minnesota DOT, North Dakota DOT, and North Dakota State University - Ayman Smadi

**Duration**

4 – 6 months

**Project Cost**

\$12,000 from North/West Passage TPF Study for preliminary design/assessment, cost estimates, survey, identify communications & power, and base map development (Tasks 1.5.1 and 1.5.2)

\$50,000 from other North Dakota DOT sources (for final design and deployment costs)

\$50,000 from other Minnesota DOT sources (for final design and deployment costs)

**Tasks**

- 1.5.1 Communications and site study
- 1.5.2 Preliminary design/assessment and cost estimates
- 1.5.3 Draft memorandum of understanding for operations between states
- 1.5.4 Design and sign cooperative agreement
- 1.5.5 Request for Proposal
- 1.5.6 Procure and install DMS
- 1.5.7 Operational testing and approval

**Preliminary Design for DMS Deployment at the I-94 & I-90 Split at Tomah, Wisconsin**

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**Project Champion**

Wisconsin DOT, Phil DeCabooter

**Project Purpose/Objective**

To supply westbound travelers with road condition information in Minnesota, North Dakota, and South Dakota so they can make early and safer decisions on route selection.

**Current Status**

Travelers receive only limited information via weather broadcasts.

**Strategy**

Deploy a Dynamic Message Sign (DMS) on I-94, I-90 southeast of Tomah, Wisconsin including communication links to Virtual Transportation Operations Center (VTOC) type software so that road condition information on I-94 and I-90 can be communicated early to travelers on these routes. This will allow long distance travelers to make early decisions on route selection.

**Benefits**

Long distance travelers will be able to make early decisions on route selection based on road conditions for the next 1000 miles.

**Participants**

Wisconsin DOT and Minnesota DOT

**Duration**

10 – 12 months

**Project Cost**

\$12,000 from the North/West Passage TPF Study for preliminary design/assessment, cost estimates, survey, identify communications & power, and base map development (Tasks 1.6.1 and 1.6.2)

\$50,000 from other sources for final design and deployment

**Tasks**

- 1.6.1 Communications and site study
- 1.6.2 Preliminary design/assessment & cost estimate
- 1.6.3 Draft memorandum of understanding for operations between states
- 1.6.4 Design
- 1.6.5 Request for proposal
- 1.6.6 Procure and install
- 1.6.7 Operational testing and approval

## Project 1.7

### Develop a North/West Passage Program Web Site

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#### **Project Champion**

North Dakota State University, Ayman Smadi

#### **Project Purpose/Objective**

To develop a web site which allows easy access to North/West Passage information and to communicate and educate users about the North/West Passage Transportation Pooled Fund (TPF) study.

#### **Current Status**

Currently North/West Passage TPF Study members and other key persons receive information by e-mail and voice messages. North Dakota State University has web development capabilities and has secured the domain name of [www.nwpassage.info](http://www.nwpassage.info) for use by the North/West Passage TPF Study membership. Example of a similar pooled fund site is available at: <http://tmcdfs.ops.fhwa.dot.gov/index.cfm>.

#### **Strategy**

North Dakota State University will investigate the possibility of developing the web site.

#### **Benefits**

Developing the web site will provide easier communications for those persons working on the North/West Passage Project. Project information will be available worldwide for anyone interested and for general education purposes.

#### **Participants**

North Dakota State University, North Dakota DOT, Wisconsin DOT, and Minnesota DOT

#### **Duration**

2 – 3 months

#### **Project Cost**

\$4,000 from the North/West Passage TPF Study

*North Dakota State University in-kind contribution for development*

#### **Tasks**

- 1.7.1 Study needs and options, and develop a test page
- 1.7.2 Select appropriate options
- 1.7.3 Prepare/write web site content
- 1.7.4 Operational test
- 1.7.5 Modifications
- 1.7.6 Web site operational

# Project 1.8

## Develop a Communication Plan for the De-icing System to be Installed on the I-94 Bridges at Red River

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### **Project Champion**

Minnesota DOT, Dennis Redig

### **Project Purpose/Objective**

This project will develop the communications plans associated with development and deployment of automated de-icing technology on the I-94 bridges over the Red River, and adjacent 5<sup>th</sup> Street, in Fargo, North Dakota.

### **Current Status**

De-icing is conducted by operations staff as a normal part of winter maintenance. No de-icing equipment is installed on the bridges at the Red River on I-94. However as of July 17, 2003 the states have begun meeting to discuss a bridge de-icing project and are working on necessary agreements for construction and maintenance.

### **Strategy/Approach**

The bridges on I-94 over the Red River and over the adjacent 5<sup>th</sup> Street in Fargo, North Dakota are subject to accumulation of frost and ice, creating a hazardous condition on the bridges. Accidents on the bridges can close I-94 especially during poor driving conditions. This North/West Passage project will be responsible for the system communication design and operational agreement, which will include local government input, visual detection options and consideration of a regional architecture. Construction and deployment of the automated deicing technology will be completed by the Minnesota DOT and the North Dakota DOT.

### **Benefits**

Red River bridges will be de-iced when needed - automatically and continuously - providing safer driving conditions for travelers. Communications systems will allow North Dakota and Minnesota maintenance staff to share system information and traveler's information. This is especially important during situations where icing occurs unexpectedly.

### **Participants**

Minnesota DOT - Thomas Swenson, North Dakota DOT - Ed Ryen, and Local Governments

### **Duration**

14 – 16 months

### **Project Cost**

\$20,000 from North/West Passage TPF Study for site planning and communications (Task 1.8)

\$550,000 from other North Dakota DOT sources for detail design, including plan details/engineering estimate, survey, base map development, construction, and deployment

\$550,000 from other Minnesota DOT sources for detail design, including plan details/engineering estimate, survey, base map development, construction, and deployment

### **Tasks**

- 1.8.1 Communications and site planning
  - 1.8.1.1 States meet to discuss project and project funding (July 17 2003)
  - 1.8.1.2 Funding options selected
- 1.8.2 Preliminary design
- 1.8.3 Draft memorandum of understanding for operations between states
- 1.8.4 Design
- 1.8.5 Request for proposal
- 1.8.6 Procure and install
- 1.8.7 Operational testing and approval

**Develop a Lessons Learned Document Comparing Requirements for CARS Deployment in Wisconsin to Meridian's System Deployment in North Dakota**

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**Project Champion**

North Dakota State University

**Project Purpose/Objective**

Identify typical requirements for developing a road condition reporting system for any state, including both technical and institutional. Use this information to develop a Lessons-Learned document that can be used to guide other states in deploying similar systems.

**Current Status**

Wisconsin is exploring the use of Condition Acquisition Reporting System (CARS) through a limited deployment along the I-94 corridor in Wisconsin. Similarly, North Dakota is looking at possibly deploying South Dakota's system developed by Meridian. Minnesota's CARS is fully operational, however, South Dakota's system is under development.

**Strategy/Approach**

Use information generated from pilot deployment of Minnesota's CARS system and South Dakota's DOT (Meridian) system to provide specific requirements. Then use these requirements to compare the planned CARS system deployment in Wisconsin to Meridian's planned system deployment in North Dakota. The comparison will highlight cost, data, system integration, organization structure, and other relevant issues. The compatibility of the two systems will also be examined. The product of the comparison will be a Lessons-Learned document that could guide other states in deploying similar systems.

- 1) Develop general requirements for developing a road condition reporting system
  - a) Conduct an inventory of available systems
    - i) Quick survey of state DOTs
  - b) Obtain documentation/description of systems and their implementation
    - i) CARS and Meridian's systems
    - ii) Other existing systems (if available, Arizona, Kansas)
  - c) Summarize requirements (applicable to any state)
- 2) Illustrate system implementation requirements using Wisconsin and North Dakota as case studies.
  - a) Develop a description for the two systems used by Minnesota and South Dakota
  - b) Work with consultants (Castle Rocks and Meridian), the North Dakota DOT, and Wisconsin DOT to document the deployment approach in their respective states
    - i) Identify compatibility (for possible coordination) between the two systems
  - c) Identify agency related issues/requirements
    - i) Motivation for implementation
    - ii) Management support
    - iii) Resources allocated to implementation
    - iv) Relationships to existing systems
- 3) Prepare a Lessons-Learned document that will be helpful to other states considering the implementation of similar systems.

**Benefits**

States considering the development of a statewide condition reporting system will benefit from information on the limited (test) deployment of the Minnesota and South Dakota systems.

**Participants**

North Dakota State University's Advanced Traffic Analysis Center (ATAC), Minnesota DOT, North Dakota DOT, Wisconsin DOT, and Reporting System Vendors

**Duration**

12 months (depending on deployment of North Dakota and Wisconsin reporting systems)

**Project Cost**

\$15,000 from North/West Passage TPF Study

\$5,000 from NDSU-ATAC in match funds

**Tasks**

- 1.9.1 Conduct an inventory of existing systems
- 1.9.2 Obtain available documentation on systems
- 1.9.3 Develop a thorough description of systems
- 1.9.4 Develop a case study for limited deployment of CARS in Wisconsin and Meridian's system in North Dakota
  - 1.9.4.1 Assess compatibility of the two systems (and possible interface requirements)
  - 1.9.4.2 Document requirements for deployment in Wisconsin and North Dakota
  - 1.9.4.3 Conduct interviews with key personnel
- 1.9.5 Develop lessons-learned document