

TS 1, Project 1, November 22, 2006 to April 30, 2007  
Progress Report: February 2007

## **Congestion Relief by Travel Time Minimization in Near Real Time**

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## I. Purpose

This document summarizes the activities concerning the project: Congestion Relief by Travel Time Minimization in Near Real Time since the inception of the project (November 22, 2006) through February 15, 2007.

## II. Project Organization

This project has been organized into three subprojects shown in the boxes in Figure 1.

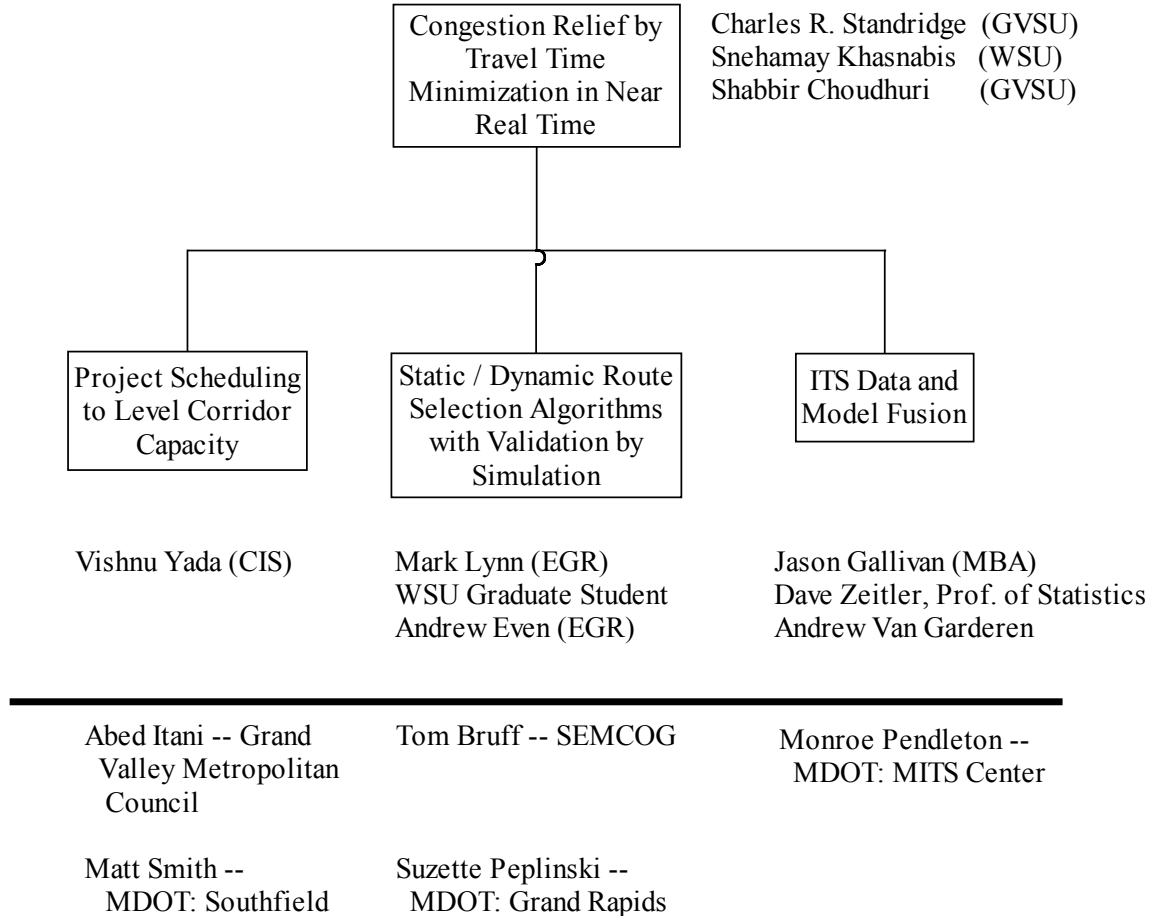


Figure 1: Project Organization

The investigators share responsibility for each subproject. Shabbir Choudhuri is the lead investigator for Project Scheduling to Level Corridor Capacity and for Static / Dynamic Route Selection Algorithms with Validation by Simulation. Charlie Standridge is the lead investigator for ITS Data and Model Fusion. Snehamay Khasnabis serves as a consultant to all subprojects. Dave Zeitler is consulting with regard to the statistical analysis of traffic data collected by the MITS Center in Detroit.

Each subproject is supported by one or more students as shown in Table 1.

Table 1: Student Participation on Project

Subproject	Student	Department	Degree Program	Status on Project
Project Scheduling to Level Corridor Capacity	Vishnu Yada	GVSU, Computer Information Systems	Master of Science	20 hours weekly, Graduate Assistant
Static / Dynamic Route Selection Algorithms with Validation by Simulation	Mark Lynn	GVSU, Engineering	Master of Science	20 hours weekly, Graduate Assistant
	Andrew Even	GVSU, Engineering	Master of Science	Capstone project, unpaid
		WSU, Civil Engineering	Master of Science	Hourly, Graduate Assistant
ITS Data and Model Fusion	Jason Gallivan	GVSU, College of Business	MBA	20 hours weekly, Graduate Assistant
	Andrew Van Garderen	GVSU, Statistics Department	Bachelor of Science	Semester stipend

In total there are four faculty and six students participating in this project.

### III. External Constituents

We have made contact with and met with our external constituents representing the following organizations:

1. Grand Valley Metropolitan Council – Abed Itani, Transportation Director and staff
2. SEMCOG – Tom Bruff and staff
3. M-DOT
  - a. Michigan Intelligent Transportation Center Detroit – Monroe Pendleton
  - b. Michigan Intelligent Transportation Center Grand Rapids – Suzette Peplinski and staff
  - c. Southfield Office – Matt Smith

These key external constituents are also shown in Figure 1.

#### *IV. Technical Progress*

During this initial period, emphasis has been on obtaining technical information and data from our external constituents as well as on developing state of art literature reviews in each of our three subproject areas.

##### IV.A Project Scheduling to Level Corridor Capacity

1. A state-of-the-art literature review is under development.
2. A design for an on-line, searchable, and updatable form of this literature review is being developed. It is intended that this design and its subsequent implementation will serve as the capstone Masters degree activity for Vishnu Yada. This effort will result in a living document that:
  - a. Can be kept current over time.
  - b. Organize and maintain a large volume of literature.
  - c. Make a large volume of literature widely accessible.
3. Contact has been made with Mark Smith of MDOT concerning the congestion mitigation-project management activity he is managing.
4. Information concerning construction project selection has been obtained through Abed Itani for the Grand Valley Metropolitan Council region. Similar information is available on the SEMCOG web site.
5. Initial concepts for modeling construction project selection and the effect of construction projects on traffic flow are under development.

##### IV.B Static / Dynamic Route Selection Algorithms with Validation by Simulation

1. A state of the art literature review is under development.
  - a. An initial literature review through 2005 was prepared by Andrew Even as a part of his Masters degree capstone project proposal.
  - b. Mark Lynn is updating this proposal through 2006.
2. Mark Lynn is studying the optimization methods used for static and dynamic route selection to support the choice of one or more such methods for use on this subproject.
3. Contact has been made with Mark Smith of MDOT to help assess the appropriateness of using the corridor chosen for the congestion mitigation-project management activity he is managing for this subproject.
4. The purchase of the optimization and genetic algorithm tool boxes for MATLAB has been authorized to support the technical efforts of this subproject.

#### IV.C ITS Data and Model Fusion

1. Emphasis has been on the design and implementation of the integrated software environment that includes all models as well as all data fusion capabilities. An initial version of the software environment is under development by Jason Gallivan.
2. Monroe Pendleton of the MITS Center in Detroit is in the process of supplying the last five years of traffic data to this subproject.
3. Traffic data concerning 2007 is downloaded bi-weekly from the MITS center. An initial analysis of the traffic data is being conducted under the direction of statistics professor Dave Zeitler by Andrew Van Garderen, an undergraduate student in statistics.
4. Initial information upon which to begin the state-of-the-art review of ITS systems has been obtained from the MITS centers in Detroit and Grand Rapids as well as from the Grand Valley Metropolitan Council, including the Grand Rapids ITS strategic plan.