

# STRATEGIC DEPLOYMENT PLAN



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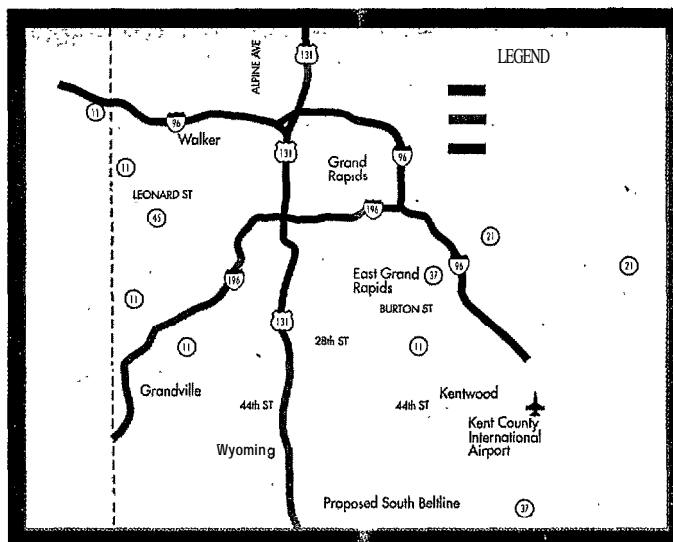
The United States has one of the most extensive and best transportation systems in the world. However, increasing vehicle miles of travel have resulted in increased congestion and decreased mobility in many urban areas. The increasing demand for transportation comes at a time when there are limited opportunities to build more roadway lanes. Land development often physically constrains the addition of lanes, limited highway funding is available, and environmental considerations often suggest that other alternatives be explored.

In response to the need to address increasing congestion and increasing demand without building additional facilities, as well as the need to better utilize the existing facilities, more and more urban areas are turning to advanced technologies. Computer, communications and process control technologies are used to improve the efficiency and safety of the transportation system. These advanced technologies are generally components of an intelligent transportation system. Recognizing the importance of these systems, United States Secretary of Transportation Federico Pena has identified ITS as a national priority. Early deployment studies are being

conducted in the 75 largest urban areas, and Intelligent Transportation Infrastructure is targeted for implementation within the next 10 years in these metropolitan areas.

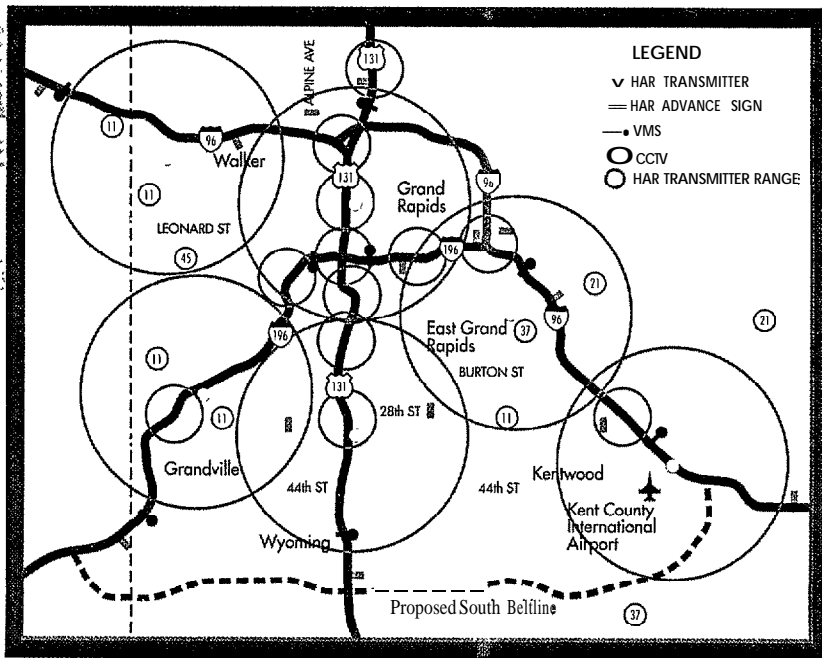
The purpose of the Intelligent Transportation System (ITS) Early Deployment Study for the Grand Rapids metropolitan area is to identify the ITS user services appropriate for Grand Rapids and to develop a Strategic Deployment Plan to provide these user services.

The study focused on the freeway system, and considered the arterial and transit systems to the extent that they affect the operation of the freeway system and contribute to mobility in the metropolitan area. The freeway system in Grand Rapids is basic, with I-96 to the north and east, I-196 traveling east-west through downtown and US-131 traveling north-



*Deployment phases for freeway management system.*





*Initial system recommendations.*

south through downtown. Though not extensive, the freeway system serves approximately 6,125,000 daily vehicle miles traveled in the area. There are areas that experience recurring congestion, such as US-131 and r-196 through downtown. Unless some action is taken, recurring congestion may be expected to increase as traffic volumes increase.

Currently, much of the congestion in the metropolitan area is related to incidents, and many issues that were identified as priorities are related to incidents. These issues include both

technical issues, such as rapid identification and verification of incident location, and institutional issues, such as agency coordination and recognition of the goals and objectives of all the agencies at the incident site.

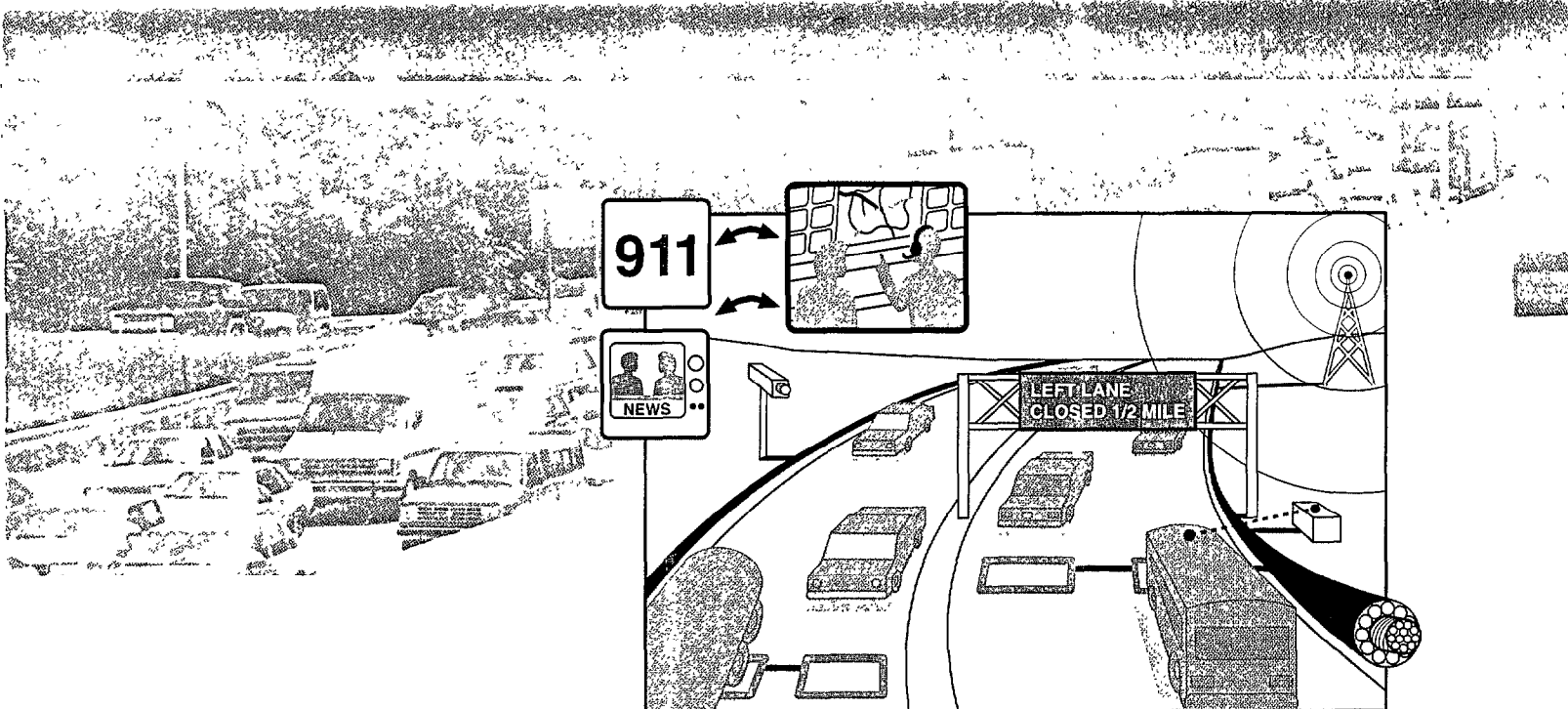
The highest priority user services, based on agency rankings, are Traffic Control, Incident Management, Hazardous Material Incident Response, and Emergency Vehicle Management. These user services address both recurring and incident related congestion, and contribute to the prompt identification and removal of incidents,

**THE TECHNICAL BLUEPRINT**

The system architecture may be considered a technical blueprint for the coordination of all the ITS activities. Development of the system architecture was based on an examination of three different architecture alternatives; centralized, distributed or hybrid. A distributed system is recommended to be implemented for the short-term time frame. This will provide the Grand Rapids metropolitan area with a high return

PHASE	SHORT TERM	MEDIUM TERM	LONG TERM
Annual Benefits (in millions)	\$8.34	\$1.07	\$0.24
Annual Cost (in millions)			
Capital	\$1.38	\$0.58	\$0.74
Operating and Maintenance	\$0.65	\$0.19	\$0.25
Total	\$2.03	\$0.77	\$0.99
Benefit Cost Ratio	\$4.10	\$1.39	\$0.24
* Benefits and costs in millions of dollars			

Table ES-1. Benefit Cost Ratio for Each Phase.



*Freeway management system includes video monitoring, vehicle detection and motorist information.*

baseline system. This system will have the ability over time to evolve into a hybrid system, or eventually into a centralized system. Coordination will also be enhanced by specification of a single Traffic Operations Center (TOG). Emergency management coordination will be based on the existing 911 dispatch system, TOC operators will contact emergency responders directly using the 911 system. A separate number for non-emergency incident reports will be set up for cellular phone users. These calls will go directly to the TOC. The arterial signal control systems will remain outside of the traffic operations center in the City's traffic control room. The location of the TOC has not been finalized.

## SYSTEM ELEMENTS

An examination of costs and benefits is provided for both the development of a Route 131 incident management system and the implementation of ITS technologies throughout the metropolitan area. The proposed incident management

system addresses incident detection, confirmation, and response, and includes vehicle detectors, closed circuit television cameras, highway advisory radio, variable message signs and a traffic operations center. The costs and benefits associated with the development of the freeway and incident management systems were calculated for three stages of implementation. The estimated annual costs, benefits, and benefit cost ratios are shown in Table ES-1 for each stage. The total capital cost for the implementation of the long term plan is estimated to be \$26.2 million.

The primary focus of the implementation plan is a freeway management system. System components have been identified for a freeway management system that provides coverage of the entire metropolitan area. Based on the estimated benefit cost ratios, a freeway management system is justified for the Short (under five years) and Medium Term Plans (5 to 10 years). Deployment at the same level of concentration as the Short and Medium Term Plans is not

justified under forecasted conditions for the Long Term (10 or more years); however, the plan as well as the strategic placement of the system elements at critical locations in the outlying areas should be reevaluated in the future.

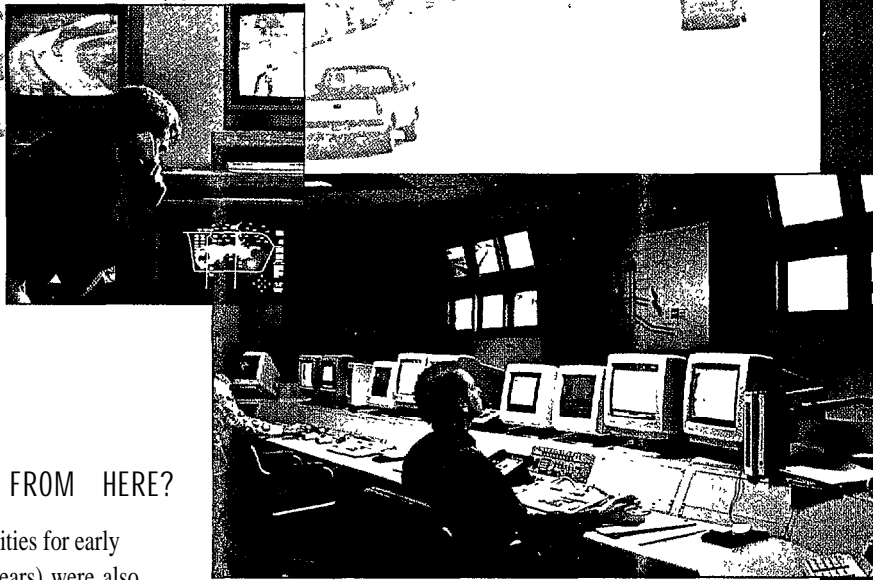
Other activities identified in the implementation plan, but not reflected in the costs shown in Table ES-1, include integration of weather information into the TOC (short term), coordination with transit for the provision of information (medium term), coordination with the provision of in-vehicle information (long term), and the implementation of technologies to encourage alternatives to the single occupancy vehicle and enhance compliance with clean air mandates (long term). A number of ongoing activities have also been identified, including coordination of arterial signal systems on freeway diversion routes and coordination with emergency responders and local public works agencies. The implementation plan also includes transit applications such as automatic vehicle location systems.



## WHERE DO WE GO FROM HERE?

A number of priority activities for early implementation (within two years) were also identified. These include "early winners", projects that have a relatively low cost, require a short development time, are relatively high priority, contribute to the core infrastructure, and are expected to be successful and enhance the public image of ITS. Priority activities also include activities which set the stage for future ITS activities. Projects representing priority activities include:

- Implementation of closed circuit television cameras in selected priority locations in Grand Rapids.
- Procurement of additional portable variable message signs.
- Implementation of variable message signs at major diversion points.
- Implementation of an area-wide highway advisory radio.
- Implementation of Motorist Assist Patrol on US 131 during peak periods.
- Freeway milepost markers and overpass signing on priority facilities.
- Coordination of arterial signals for freeway diversion.
- Development of standards for construction to include ITS elements.



*Traffic Operations Center.*

- Development of a policy for the provision of traveler information.
- Legislation and regulations to allow immediate removal of disabled vehicles.
- Consideration of a partnership with a private entity for the provision of traveler information in the short term.
- Coordination with planning agencies to assure inclusion of ITS projects in local and regional plans.
- Consideration of facility needs for the Traffic Operations Center during the planning and design of the Michigan State Police District 6 headquarters.

There is no specific funding set aside for ITS applications. For this reason, applications are expected to be incrementally deployed. Fortunately, significant benefits can be realized by the strategic application of selected technologies. These technologies will lay the foundation for the complete intelligent transportation system that will ultimately be implemented in Grand Rapids.