1. INTRODUCTION

ITS Strategic Plan 2000 is Minnesota Guidestar Board of Directors' guide for implementation of an integrated statewide program for Intelligent Transportation Systems. Strategic Plan 2000 is the Board of Directors' direction for future ITS deployment. The plan is intended to be used by the Board of Directors, as well as by the broad community of ITS users and providers, to promote the development, deployment and use of ITS within the State of Minnesota. If this plan is to succeed, it needs the cooperation of all affected groups involved in ITS and transportation planning and deployment in the state. Strategic Plan 2000:

1) Establishes a mission, vision, goals and action items for the Board of Directors;

2) Explores impediments and issues that need to be overcome;

3) Suggests programs for deployment along with a deployment strategy that can be used by agencies, institutions, cities and counties as a roadmap of where future ITS investments are going to occur; and

4) Provides a historical overview of the Minnesota Guidestar Program and the projects that have been deployed since the 1997 Strategic Plan was adopted.

ITS Strategic Plan 2000 is as much a process as it is a document. The foundation of the plan was a Board of Directors' retreat conducted in 1999, attended by most of the Board members. The retreat offered a forum for the Board to discuss and develop the future direction of ITS in Minnesota.

The development of ITS Strategic Plan 2000 incorporates a variety of information sources:

- The 1997 Minnesota Guidestar Strategic Plan.

- Consideration of existing Minnesota Guidestar initiatives and program activities.

- The 1999 retreat attended by the Minnesota Guidestar Board of Directors.

- Continuing input from the Minnesota Guidestar Board of Directors, the Executive Committee and other key stakeholders.

- Analysis of existing transportation processes and systems.

2. MINNESOTA GUIDESTAR PROGRAM OVERVIEW

PROGRAM HISTORY

Since its inception in 1991, Minnesota Guidestar has performed a broad range of ITS activities including needs assessments, research and development, full-scale operational testing, and deployment of ITS strategies and technologies. The success of Minnesota Guidestar has been more than advancing ITS technology. Its success is based on a strong cooperation between the public and private sectors, which has produced innovative and unique programs and projects.

A large part of the Minnesota Guidestar program's early work focused on the Twin Cities metropolitan area. Numerous operational tests evaluated a variety of ITS concepts and technologies. The Twin Cities area is now completing the Orion model deployment initiative. Orion activities cut across a wide variety of functional areas and emphasize system integration to create an intelligent transportation infrastructure.

In an effort to move toward statewide ITS deployment, Minnesota Guidestar completed a Rural ITS Scoping Study in 1994. The study identified and prioritized the needs of travelers in Greater Minnesota.

In 1995, the Polaris Statewide Architecture Project outreach activities confirmed and expanded upon the Rural Scoping Study findings. The Polaris findings described the need for both rural and urban ITS applications in Minnesota and served as the basis for development of a statewide ITS architecture.

Also in 1995, Minnesota Guidestar developed a statewide business plan for Commercial Vehicle Operations (CVO) in Minnesota. Following a comprehensive process re-engineering effort, an action plan was agreed upon with initiatives in enforcement, business processes, information dissemination and computer systems. Minnesota was selected as one of seven states to receive Federal funding for CVO model deployment, known as Commercial Vehicle Information Systems and Networks (CVISN).

In 1996-1997, Minnesota Guidestar developed its Strategic Plan that led to implementation of 14 separate projects. Of these, the most far-reaching is the Virtual Traffic Operations Communication Center projects in Duluth and St. Cloud.

In December 1998, under the direction of the Board of Directors, a Statewide Advanced Traveler Information Plan was prepared to guide future coordination and implementation of traveler information issues in Minnesota.

In the fall of 1999, Minnesota Guidestar was one of four groups to receive funding for an Intelligent Vehicle Initiative (IVI) project dealing with specialty vehicle platform. (The other groups selected were truck manufacturers.)

Between the completion of the 1997 Minnesota Guidestar Strategic Plan and the end of 1999, 57 initiatives were started and 18 initiatives were completed. (For a listing of initiatives, refer to Appendix A.)

ORGANIZATIONAL STRUCTURE

Minnesota Guidestar was founded as a partnership of the public, private and academic sectors to implement ITS in Minnesota. Responding to changing emphases, the organizational structure continues to evolve. Minnesota Guidestar involves its partners at several levels:

The Board of Directors includes officers and senior managers from both public- and private-sector organizations in addition to representatives from academia and the general public.

The Executive Committee reports ideas and initiatives to the Board of Directors and functions on its behalf between the Board's quarterly meetings.

Mn/DOT's Office of Advanced Transportation Systems (OATS) provides administrative support to the Minnesota Guidestar program, provides staff support to committees, administers funding, marketing, and management of selected projects, and acts as a liaison with local, state and federal organizations.

Partners involved in program and project development, deployment and operation work with OATS staff to make ITS projects a reality. Partners come from a broad spectrum of organizations including private corporations, academia, the Department of Public Safety/Minnesota State Patrol, the Department of Public Commerce, cities, counties, councils of government, metropolitan planning organizations, transit agencies, local emergency response units, and the Department of Transportation.

3. MISSION, VISION and GOALS

Strategic Plan 2000 outlines the mission, vision, goals, implementation issues and action items for Minnesota Guidestar's Board of Directors and the ITS community in the near- to mid-term. During a 1999 retreat attended by Guidestar's Board of Directors, its members had an opportunity to discuss goals, implementation issues and action items that were not in the 1997 Strategic Plan or needed additional attention. A key outcome of the retreat included adoption of a mission for the Board that complemented the vision that grew out of the 1997 Strategic Plan.

MISSION

The Mission Statement summarizes the role that the Minnesota Guidestar Board of Directors will play in the development of ITS:

The Minnesota Guidestar Board provides strategic direction and advice for statewide application of advanced technology and information systems in transportation to save lives, time and money. The Board serves as a catalyst for innovative partnerships and resource investment so desired outcomes can be achieved.

VISION

The vision represents the desired future for ITS from which goals and objectives can be derived.

> **Minnesota's citizens, businesses and visitors will benefit from the application of ITS to the state's transportation system. ITS will be fully integrated into transportation strategies to enhance safety, mobility, and economic vitality, to protect the natural environment, and to develop sustainable communities.**

Based on this vision, Minnesota's transportation system will achieve a new level of safety, mobility and effectiveness, as follows:

> *In-vehicle technology will automatically and instantaneously communicate the location of vehicles involved in crashes, as well as the severity, for rapid emergency response.* In-vehicle location and navigation systems will guide emergency response to the crash location, or will help drivers find their way if they are lost. When roads are icy, fog is heavy or road conditions are otherwise dangerous, travelers can receive information prior to their trip and also while they travel.
>
> *Collision-avoidance sensors in vehicles will warn travelers when they are too close to other vehicles or objects.* Vision enhancement systems in vehicles will allow travelers to see better at night and in poor weather. New detection and warning systems at railroad grade crossings will prevent crashes between trains and vehicles, including school buses. Electronic message signs in advance of construction work zones will advise of actual speeds or accidents in the work zone. Other

technologies will detect motorists who drive dangerously and violate motor vehicle laws.

Travelers will receive real-time traffic and road condition information in their vehicles on electronic displays, advanced radios and cellular phones. Interactive television, pagers, fax machines, telephones, electronic kiosks, personal computers, personal digital assistants and other devices will be used to obtain this information from a variety of sources. The information will be available in customized form for individual travelers. Comprehensive information on tourist attractions, food and lodging, and on a wide variety of other services and facilities will also be easily accessible.

Advanced technologies installed on all major roadways will greatly speed the detection of traffic accidents and incidents. Integrated communications systems (exchanging voice, data and video) will assist transportation and emergency response organizations. Travelers, especially the injured, will receive help more quickly and in a coordinated fashion. Traffic delays will be shortened.

A statewide network of transportation operations and communications centers will facilitate travel across Minnesota. Real-time information and shared facilities will ease transfers between modes (highway, bus, rail and air). Detectors installed on all major roadways will monitor road surface conditions, traffic levels, traffic conditions and vehicle type and weight. The data generated will benefit travelers, shippers, transportation engineers and planners, and enforcement agencies.

State-of-the-art traffic signal systems will smooth traffic flow by responding to and adapting to current conditions, including incidents, poor weather and special events. To improve travel speeds, signal systems will be coordinated between arterial roads, freeways and ramp meters.

Travelers will be presented with information and travel options to help reduce reliance on the single-occupant automobile. Real-time ridesharing and door-to-door transit service will be feasible through computerized call-taking, ride-matching, and dispatching systems. Telework centers, home telecommuting, and teleconferencing will be commonplace. The quality of transit and paratransit services will be enhanced through automated scheduling and fleet management systems, including automatic vehicle location.

Commercial vehicle technology will facilitate truck operations through consolidated weighing, inspection and credentialing systems, and improved information to drivers. The systems will be coordinated within Minnesota and integrated with other states. Electronic payment technologies such as “smart” cards will eliminate the need for cash at parking meters and on buses.

Agencies operating fleets, including public safety, transit and maintenance, will consolidate dispatch centers in their geographic areas, thereby reducing the cost of

new infrastructure. Information will be shared with local agencies and directly with users of the transportation system.

Partnerships with public, private, non-profit, and academic organizations will result in increased coordination, greater funding levels and flexibility for transportation infrastructure and services. Private firms will profit from the provision of products and services and will provide much of the capital needed for deployment of ITS in return for user fees. Businesses in Minnesota will benefit from improved access by customers, through reduced shipping costs, and easier commutes for employees. Finally, Minnesota will be integrated with the national and international ITS network to allow seamless travel anywhere and at anytime, safely and efficiently.

GOALS

Goal 1: Expand ITS Outreach and Education Efforts

If ITS is to be mainstreamed and become accepted as an integral component of the transportation system and everyday activity, an effort needs to be undertaken to promote its benefits. Three groups are particularly important:

(a) The general public: Needs to understand how ITS benefits their every-day travel, particularly in terms of safety, travel-time savings, and providing better information about transportation choices.

(b) Agencies and institutions: Not all institutions that have a role in implementing ITS enjoy the same level of awareness or commitment to ITS. Furthermore, not all departments within agencies and institutions have a similar level of understanding of the potential benefits of ITS or of the need for supporting ITS implementation.

(c) Policymakers and legislators: Are in a position to make key funding, regulatory and administrative decisions that can affect whether and how ITS programs are implemented.

The Board needs to provide direction to others on how to go about reaching key individuals in these groups. And, once identified, the Board can take the initiative in identifying available information and materials (e.g., materials developed by the Intelligent Transportation Society of America, ITS Minnesota and others) for use in conducting outreach programs to educate the target groups about the benefits of ITS.

Goal 2: Facilitate Innovative Partnerships

Partnerships are key to the success of Minnesota Guidestar's ITS deployment efforts. As ITS proceeds towards full deployment, public-sector institutions and agencies will need to work cooperatively to deal with ITS programs that transcend jurisdictional and

administrative boundaries. At the same time, the private sector is likely to take on greater responsibility for the marketing and promotion of intelligent transportation systems, as well as for development of ITS products and services. The board can play a substantial role in the formation of innovative partnerships among public-sector organizations as well as between public- and private-sector entities to take advantage of these future trends.

Goal 3: Provide Strategic Direction to Policy-Making Bodies

The Board can play an important role in coordinating and integrating ITS efforts in the state. These efforts include working to reduce institutional barriers and improving coordination among agencies and institutions charged with ITS implementation. Key institutions are Mn/DOT, Metropolitan Planning Organizations, Regional Planning Organizations, cities, counties, transit agencies, Department of Public Safety/Minnesota State Patrol, State Planning, etc.

Goal 4: Mainstream ITS into the Statewide Transportation Planning and Implementation Process

In the relatively short history of ITS in Minnesota and the country, ITS has been treated somewhat as a stand-alone set of technology-based enhancements to mostly pre-existing transportation systems and processes. The Board and many others now believe that many elements of ITS are ready to be mainstreamed into the overall transportation planning and implementation process. This means that many ITS applications will no longer be seen as stand-alone projects or systems; instead, they will be considered intrinsic elements of more traditional transportation projects and systems whose effectiveness can be greatly improved by ITS.

This change in course poses some challenges for ITS. First, it enters a more competitive arena where it has to find its place among broader transportation applications; second, since statewide project selection and funding are currently done through the Transportation Improvement Plan (TIP) and Statewide Transportation Improvement Plan (STIP) processes, both involving Area Transportation Partnerships (ATPs) with Metropolitan Planning Organizations (MPOs), cities and counties, ITS will have to compete with multiple jurisdictions for limited funding; third, the concept of ITS is not universally understood by the public, policymakers and even by all elements within transportation agencies. As a result, mainstreaming of ITS will require increasing education and dissemination efforts on all fronts; finally, as large-scale, statewide deployments become more common, it is anticipated that the private sector will play an increasing role in ITS promotion and education efforts, and in the development of products and services. Steps need to be taken to facilitate this transition.

Goal 5: Promote Conformance with State and National Architecture, Standards and Protocols

Before ITS can be fully deployed, the necessary communications and supporting infrastructure must be in place. Deployments need to conform to adopted state and national architectures as well as with provisions of TEA-21.

4. IMPLEMENTATION ISSUES AND ACTION ITEMS

This chapter of Strategic Plan 2000 highlights the issues that pose the greatest threat to successful program implementation. This chapter also provides a number of steps or actions that can be undertaken to overcome those challenges, not only by the Board of Directors, but also by partners in ITS development, deployment and operation in Minnesota.

IMPLEMENTATION ISSUES

This section examines a number of impediments to ITS implementation in the state.

1. Overcoming the General Lack of Knowledge Regarding ITS Benefits

   It appears that the industry has not been very successful in explaining ITS concepts and their benefits to its main constituencies: the public, customers within agencies, legislators and policymakers. Until ITS and its benefits are clearly defined (i.e., what ITS can do to improve safety, reduce travel time, provide better information about choices and reduce costs), "selling" the concept will remain difficult.

2. Overcoming Institutional Barriers to Communication and Cooperation Between and Within Public Institutions

   As ITS implementation moves from project-specific into broad statewide programs and systems, a greater number of agencies and institutions will be affected. (For example, the Advanced Rural Transportation Information Coordination (ARTIC) project required the cooperation of Mn/DOT, the Department of Public Safety/Minnesota State Patrol, Arrowhead Transit and Virginia Transit.) Furthermore, a greater number of departments within agencies will be called upon to successfully implement the progressively more complex systems. (Again, the ARTIC project required the coordination of a Mn/DOT District, Minnesota Guidestar, Mn/DOT Maintenance, and Mn/DOT's Office of Electronic Communications, among others.) The level of cooperation experienced by these projects requires leadership, commitment and clarity of vision. It also requires willingness on the part of participating agencies to accept that the overall program benefits are sufficient to overcome, and therefore justify, a certain diminution of control and autonomy.

   As the benefits of ITS programs become better understood and disseminated, it will become easier for participating agencies to overcome their misgivings and eliminate barriers in exchange for anticipated benefits.

3. Overcoming Public/Private Sector Cultural Differences

It is anticipated that as ITS deployments become more widespread, and their benefits better understood, the role of the private sector will increase substantially. For this to happen, however, public- and private-sector entities need to overcome cultural differences that often prevent successful partnership formation. Primary among these barriers is the need for the public sector to better understand the profit motivation that, in part, drives the private sector. And conversely, the need for the private sector to better understand what the public sector perceives as a responsibility to safeguard the public interest. Ultimately, a doctrine of sharing equally in the resulting risks and benefits will have to guide the successful formation of equitable partnerships.

4. Funding ITS Deployment, Operation and Maintenance

Mainstreaming of ITS, which is a necessary next step, will require that ITS projects compete for limited funds with more traditional transportation systems and services. Furthermore, as the number of ITS projects deployed increases, the operation and maintenance costs associated with these projects will need to be funded up-front and on an ongoing basis. This is different from past Operational Tests, where operation and maintenance costs were funded as part of the overall test and ceased once the operational test was completed.

5. Expediting the Transfer of Research Results into Practical Applications

It is necessary to take steps to expedite the transfer of ITS research results into practical applications that are useful to the traveling public. The current pace of delivery is considered an impediment to ITS deployment.

6. Overcoming the Shortage of ITS Expertise and Lack of Continuity of Experienced Professionals on Projects

The current shortage in the transportation professional labor market is particularly felt in the ITS field because of its relatively late entry into the market. Training of new professionals or retraining of current ones will be needed if deployment is to proceed forward. Institutionalization of ITS – mainstreaming – will assist in this process by creating a greater pool of professionals in this area of practice. One of the phenomena that the shortage of ITS expertise has created is a lateral move of managers that results, in turn, in a discontinuity of experience on key projects. This phenomenon occurs in both the public and private sectors.

ACTION ITEMS

The following list of actions have been developed based on the Board's goals (extracted from input provided by the Board at its June 1999 retreat) and on the need to overcome the impediments to deployment discussed in the preceding section. These action items are intended to provide direction to all ITS partners in research, planning, deployment and ongoing support.

1. Develop High-Level Principles to Guide ITS Deployment, and Criteria for Measuring Accomplishments

   The following five principles reflect the ITS Vision and the Commissioner of Transportation's goals:

   - Promote safe and efficient travel in terms of improved travel times, and reduction in energy use and environmental impacts
   - Provide supporting communications and information infrastructure
   - Support integrated regional transportation operations and communications
   - Support transportation system efficiency and economic development
   - Support statewide transit programs

   The Board should develop criteria for determining the extent to which the programs deployed achieve their objectives. This task could be delegated to the Executive Committee or some other group who would then submit the criteria to the Board for approval. Once developed, the principles and criteria could be used to guide whomever is charged with project implementation. Projects or programs that do not reflect these principles would receive less support.

2. Oversee Development of the ITS Message: What are its Benefits?

The most effective way to "sell" ITS is to demonstrate its benefits to potential customers. The message would start (1) by identifying current and anticipated problems (i.e., safety, congestion/delays, system inefficiencies and limited information); (2) by demonstrating how specific ITS programs are able to improve each of these problem areas; and (3) by quantifying the direct and indirect benefits of ITS.

3. Communicate the ITS Benefits Message to all Affected Groups

The purpose and benefits of ITS need to be communicated to opinion leaders, elected officials, policymakers, transportation and planning professionals and managers, other governmental agencies and the traveling public. This information, together with educational materials, needs to be presented through a well-conceived public outreach program.

The Board needs to define who will lead this outreach effort, and seek opportunities to present the message at conferences, workshops and a variety of public forums.

4. Continue to Investigate Ways to Improve Project Delivery

ITS could greatly benefit from speedier project and program delivery. Until a critical mass of ITS systems are in place, it will be more difficult to demonstrate the benefits of ITS. The Board should provide opportunities for internal and external discussion on how to improve the ITS project delivery process, including identifying models that can be used to fine-tune current contracting and procurement practices.

5. Review and Provide Input During Development of the ITS Strategic Plan and Seek Input from Others

In the fast-moving field of ITS, it is important that the ITS Strategic Plan be updated on a regular basis (probably every two to three years). As these updates are initiated, the Board has the opportunity to set the direction for future ITS deployment in the state. The Board could provide a forum for representatives from the public, private and academic sectors to openly discuss where they see the ITS field going, and to exchange information about successful (and unsuccessful) deployments.

6. Continue to Support Research and Operational Tests

Because ITS is such a fast-changing field, the Board needs to ensure that research and development efforts continue and operational tests are carried out. The goal should be to advance the state-of-the-art of ITS products, services, systems and processes to ultimately serve deployment. Partnerships between public sector institutions, national and local academic institutions and the private sector are crucial to accomplish this effort.

7. Continue to Support System Integration and Interoperability

The system integration and interoperability should be consistent with the national system architecture. In addition, integration of all levels of public/private organizations is needed to ensure successful deployment. A critical element of system integration is the development and deployment of a statewide communications infrastructure.

8. Continue to Facilitate Innovative Partnerships

In order to continue to form successful public/private-sector partnerships, the issue of shared risks and benefits needs to be better understood by all partners. Short-term risks need to be separated from long-term risks, and different approaches to each. One area to explore is whether large infrastructure systems can or should be built without private sector involvement.

5. DEPLOYMENT PROGRAMS AND STRATEGIES

PROGRAMS FOR DEPLOYMENT

Priority programs for deployment of ITS are presented herein as a basis for Minnesota Guidestar's program activities. Many of these programs are based on ideas expressed by the Board of Directors and by building on ongoing ITS projects and programs. Most of these programs respond to the need for improvements in communications, traveler safety, system efficiency, multimodalism and statewide connectivity. In some cases, the programs represent the expansion of completed or current projects, and assume that the lessons learned will be incorporated into future deployments. The programs also include a number of ongoing or planned initiatives that can be extended to other locations statewide. To support these deployments, it will be necessary to implement a research and operational test program.

The proposed programs are not intended to be all-inclusive or to preclude other innovative ideas. As described later in the chapter, a flexible approach to project implementation is recommended. This approach focuses on programs that meet customer needs and can be integrated with other systems and projects to create maximum impact.

1. Design and Implement a Communications Infrastructure

    - Connecting MN (fiber optics)
    - Backbone Communications System (800 MHz, Microwave, Infrared)

2. Implement an Advanced Traveler Information Systems (ATIS) Statewide

    - Road/Weather Information
    - Traveler Information Network (TIN)
    - Congestion/Delay
    - Construction/Detours
    - Incidents/Safety

3. Deploy the Regional Traffic Management Center in the Metro Area and TOCCs Statewide

    - Physical Building
    - Computer-Aided Dispatch (911)
    - Mobile Data Computer (MDC)

4. Complete Deployment of the ORION Program in the Twin Cities

5. Implement ITS Technologies on Interregional Corridors (IRCs)

   - Surveillance Cameras (Closed Circuit TV)
   - Variable Message Signs (VMS)
   - Advisory Speed Limits

6. Install Advanced Public Transportation Systems (APTS) Technology on Future Metro Area Transit Systems Including Bus, LRT and Commuter Rail Fleets

   - Automatic Vehicle Location (AVL)
   - Global Positioning Systems (GPS)
   - Transit Signal Priority

7. Expand Public Transit System Support Statewide

   - AVL/GPS
   - Trip reservations
   - Computer-Aided Dispatch (CAD)
   - Integration of multiple transit systems
   - Emergency Response

8. Deploy Advanced Traffic Management Systems (ATMS) Statewide

   - VMS
   - CCTV
   - Freeway Entrance Ramp Gates
   - Railroad Crossing Treatments

9. Deploy Intelligent Vehicle Initiatives (IVI)

   - TH 7
   - Safe Plow
   - Safety Automated Intelligent Locator (SAIL)
   - Smart Plow on TH 101 and TH 19

10. Implement Commercial Vehicles Technologies

    - Oversize/Overweight Permitting
    - Weigh in Motion (WIM)
    - Commercial Vehicle Information Systems and Network (CVISN) (roadside data, full credentialing, vehicle and driver information)

11. Improve Infrastructure Safety, Management and Operations

    - Snowplows
    - Bridge De-icers
    - Maintenance Task Identification
    - Flood Warning

12. Evaluate the Training Curriculum for the Entire Driving Age Spectrum

    - Increase driver training and retraining
    - Increase awareness of new technology aimed at assisting drivers (heads-up display, auditory signals and visual clues)

In addition to the programs outlined above, the private sector has participated or taken the initiative on a number of projects including Cell Phone #211, Cell Phone #7233, Kiosks for Travel Information Network, Scenic By-ways, websites, cable television and KBEM 88.5 FM.

STATEWIDE DEPLOYMENT STRATEGY

The strategy for deployment of ITS in Minnesota relies upon the principle of migration. Migration will occur in several ways:

- Migration of ITS concepts from research to field testing to deployment.

- Geographic migration from a few sites, roadways, communities, and regions to statewide.

- Migration towards integration and inter-operability between systems and the development of statewide ITS networks.

- Migration from a few organizations to multiple local partners within an integrated planning context.

Deployment implies permanent, ongoing systems that are integrated into existing transportation operations and management systems. The proposed deployment programs address local, regional and statewide transportation needs. In some cases these programs may be ready for immediate deployment, depending upon the availability of essential elements (funding, local support, project partners, etc.). In other cases, research and field operational tests may be required as precursors to deployment.

Clear linkages need to be established between deployment programs and any research or testing that is needed to ensure successful deployment. This research and testing is intended as a complement to, and expansion of, the ongoing program of research and testing. These activities will further the migration toward deployment and will maintain

Minnesota's leadership position in advancing state-of-the-art ITS. This approach recognizes that not all ITS systems are ready for immediate, widespread implementation in light of the developmental status of some of the technologies.

The statewide deployment strategy recognizes that ITS must be introduced not only within urban centers, but also within the wide range of geographic settings found across Minnesota, including rural highway corridors, interregional corridors, and large, dispersed regions. At the same time, certain ITS concepts are, by definition, more appropriate in some geographic settings than others. ITS programs applicable to specific geographic areas can be matched to all such area types across the entire state.

APPENDIX

Projects Implemented between Completion of the 1997 Minnesota Guidestar NOVA Statewide ITS Strategic Plan and the End of 1999

Minnesota Guidestar

BOARD OF DIRECTORS' STATEWIDE ITS STRATEGIC PLAN 2000

Minnesota Department of Transportation
Office of Advanced Transportation Systems

Prepared By:

SRF CONSULTING GROUP, INC.

March 2000

Table of Contents

MINNESOTA GUIDESTAR ITS STRATEGIC PLAN 2000

Minnesota Guidestar Board of Directors

Dennis Foderberg, Chair
Mn/DOT

Tim Nicholson, Vice Chair
ADDCO, Inc.

Paul Aasen
MN Department of Public Safety

James Barbaresso
Midwest Region Iteris, Inc.

Anne Beers
Mn Department of Public Safety

Richard Braun
R.P. Braun Consulting

John Collins, Ex officio
ITS America

Gerald Conover
Ford Motor Company

Fred Corrigan
Minnesota Transportation Alliance

Douglas Differt
BRW, Inc.

Tom Eggum
City of St. Paul

David Ekern
Mn/DOT

Gary Euler
PB Farradyne

Peter Fausch
SRF Consulting Group, Inc.

Vern Genzlinger
Hennepin County

Randy Halvorson
Mn/DOT

Randy Hodson
Electronic Design Company

Patrick Hughes
Mn/DOT

Bob Johns
University of Minnesota - CTS

Dan Murray
ATA Foundation

Marthand Nookala
Mn/DOT Program Support Division

James Oberstar, Ex officio
US House of Representatives

Bob Provost

William Russell
Image Sensing Systems, Inc.

Martin Sabo, Ex officio
US House of Representatives

Bob Sands
Edwards & Kelcey, Inc.

Brain Shorten
Fargo-Moorhead Council of Governments

Jim Solem
Metropolitan Council

Charles Sprado
3M

Alan Steger
Federal Highway Administration

Richard Stehr
Mn/DOT

Jim Swanson
Mn/DOT

John Story
Warning Lites of Minnesota, Inc.

Harry Voccola
Navigation Technologies

Douglas Weiszhaar
Mn/DOT

Minnesota Guidestar Board of Directors Support

Bob Benke
Mn/DOT

Max Donath
University of Minnesota - CTS

James Kranig
Mn/DOT

James McCarthy
USDOT, Federal Highway Administration

Donald Mueting
Minnesota Attorney General's Office

James Wright
Mn/DOT

Minnesota Guidestar Executive Committee

Dennis Fodeberg, Chair
Mn/DOT

Anne Beers
Mn Department of Public Safety

Randy Halvorson
MN/DOT

Bob Johns
University of Minnesota - CTS

Tim Nicholson
ADDCO, Inc.

Marthand Nookala
Mn/DOT

Bob Sands
Edwards & Kelcey, Inc.

Douglas Weiszhaar
Mn/DOT

Jim Solem
Metropolitan Council

Charles Sprado
3M

Minnesota Guidestar Executive Committee Support

Bob Benke
Mn/DOT

Jim Kranig
Mn/DOT

Committee Technical Support

Ferrol O. Robinson, Senior Vice President
Jacqueline Schroeder, Transportation Planner

SRF Consulting Group, Inc.

GLOSSARY OF ACRONYMS AND ABBREVIATIONS

AAA	Automobile Association of America
APTS	Advanced Public Transportation Systems
ARTIC	Advanced Rural Transportation Information and Coordination
ATC	Advanced Traffic Signal Controllers
ATIS	Advanced Traveler Information Systems
ATMS	Advanced Traffic Management Systems
ATP	Area Transportation Partners
AVL	Automatic Vehicle Location
BAI	Business Area Initiatives
CAD	Computer-Aided Dispatch
CARS	Next Phase of R/WIS
CATV	Cable Access Television
CCTV	Closed Circuit Television
CMS	Changeable Message Sign
COG	Council of Government
CTS	Center for Transportation Studies
CVISN	Commercial Vehicle Information Systems and Networks
CVO	Commercial Vehicle Operations
DIVERT	During Incidents Vehicles Exit to Reduce Travel Time
DMS	Dynamic Message Signs
DNR	Department of Natural Resources
DPS	Department of Public Safety
ESS	Environmental Sensor Stations
GCM	Gary/Chicago/Milwaukee Corridor
GPS	Global Positioning System
HAR	Highway Advisory Radio
http	Hypertext Transfer Protocol
ICTM	Integrated Corridor Traffic Management
IRC	Interregional Corridors
IRM	Mn/DOT Information Resource Management
ITE	Institute of Transportation Engineers
ITIS	International Traveler Information Interchange Standards
ITS	Intelligent Transportation Systems
ITSA	Intelligent Transportation Society of America
IVI	Intelligent Vehicle Initiatives
LRMS	Location Referencing Messaging Specification
LRT	Light Rail Transit
MDC	Mobile Data Computer
MDT	Mobile Data Terminal
MMUTCD	Minnesota Manual on Uniform Traffic Control Devices
Mn/DOT	Minnesota Department of Transportation
MPO	Metropolitan Planning Organization

NTCIP	National Transportation Communications ITS Protocol
NWS	National Weather Service
OATS	Mn/DOT Office of Advanced Transportation Systems
OEC	Mn/DOT Office of Electronic Communications
OIRM	Mn/DOT Office of Information Resource Management
OM	Mn/DOT Office of Maintenance
ORION	Model Deployment Program in the Twin Cities Metro Area
ORSS	Mn/DOT Office of Research and Strategic Services
OTE	Mn/DOT Office of Traffic Engineering
PC	Personal Computer
PCRS	Pavement Condition Reporting System
RDC	Regional Development Commission
RFP	Request for Proposal
RFPP	Request for Partner Proposals
RTMC	Regional Traffic Management Center (New in Twin Cities)
RWIC	UND Regional Weather Information Center
R/WIS	Road/Weather Information System
SAE	Society of Automotive Engineers
SAIL	Safety Automated Intelligent Locator
SDO	Standards Development Organizations
STIP	State Transportation Improvement Program
TC	Twin Cities
TCIP	Transit Communications ITS Protocol
TIC	Travel Information Center
TIN	Traveler Information Network
TIP	Transportation Improvement Program
TMC	Traffic Management Center (Twin Cities)
TMO	Transportation Management Organization
TOCC	Transportation Operations Communication Center
U of M	University of Minnesota
UND	University of North Dakota
USDOT	United States Department of Transportation
VMS	Variable Message Sign
WIM	Weigh-in-Motion

Projects Initiated Between the Completion of the 1997 MN Guidestar Strategic Plan and the End of 1999

1. ATIS – Advanced Traveler Information	Type of Project	Elements	Status Since 1997
ARTIC (Advanced Rural Transportation Information and Coordination) – Arrowhead Region	Op Test	▪ R/WIS ▪ In-Vehicle System	Completed 9/98
Blue Earth County Rural Addressing	Op Test	▪ QuickStart ▪ In-Vehicle System	Initiated 12/97
District 2 and 4 ATIS	Op Test	▪ QuickStart ▪ R/WIS ▪ Hotline	Initiated 9/98
DIVERT (During Incidents Vehicles Exit to Reduce Time) – St. Paul	Op Test	▪ Variable Message Sign	Completed 12/98
GAINS (Guidestar Advanced In-Vehicle Navigation System) – St. Paul	Op Test	▪ In-Vehicle System	Completed 12/98
ICTM (Integrated Corridor Traffic Management) – I-494	Op Test	▪ Variable Message Sign	To be Completed 12/99
Glencoe/Silverlake In-Vehicle Signing at Highway Railroad Crossings	Op Test	▪ In-Vehicle System	Completed 9/98
Next Generation R/WIS (Road/Weather Information System)	Research	▪ R/WIS	Initiated 8/97
Orion - Metro Area	Deployment	▪ R/WIS ▪ Hotline ▪ Variable Message Sign	To be Completed 12/99
R/WIS (Road/Weather Information System) – Statewide	Deployment	▪ R/WIS	Construction Underway
Scenic Byways ATIS – Statewide	Deployment	▪ Kiosk ▪ R/WIS ▪ Web Site	To be Completed 7/00
Southwest and West-Central Minnesota Transit Link	Op Test	▪ QuickStart ▪ Hotline ▪ In-Vehicle System	Initiated 11/98

1. ATIS – Advanced Traveler Information	Type of Project	Elements	Status Since 1997
Statewide Plan for ATIS	Plan	▪ Kiosk ▪ R/WIS ▪ Web Site ▪ Hotline ▪ Variable Message Sign ▪ In-Vehicle System ▪ Portable Device	Completed 12/98
TOCC (Transportation Operation and Communication Centers) - Duluth and Saint Cloud	Deployment	▪ QuickStart ▪ R/WIS ▪ Hotline ▪ Variable Message Sign ▪ In-Vehicle System	Initiated 11/98

2. ATMS – Advanced Traffic Management Systems	Type of Project	Elements	Status Since 1997
AUSCI (Adaptive Urban Signal Control Initiative) – Downtown Minneapolis	Op Test	▪ Coordinated Signals ▪ Variable Speed ▪ Arterial Management	To be Completed 12/99
ARTIC (Advanced Rural Transportation Information and Coordination) – Arrowhead Region	Op Test	▪ Advanced Snowplow ▪ Traffic Management Center	Completed 9/98
Automatic Passenger Counting in HOV Lanes – I-394	Research	▪ QuickStart ▪ Portable Traffic Management	Completed 6/99
Capacity Analysis for Dynamic Bottlenecks in Freeway Networks	Research	▪ Variable Speed ▪ Arterial Management	Initiated 3/99
DIVERT (During Incidents Vehicles Exit to Reduce Time) – St. Paul	Op Test	▪ Coordinated Signals ▪ Variable Speed ▪ Traffic Management Center	Completed 12/98

2. ATMS – Advanced Traffic Management Systems	Type of Project	Elements	Status Since 1997
I-90 Gates – Southern Minnesota	Op Test	▪ QuickStart ▪ Advanced Snowplow	Initiated 1/99
ICTM (Integrated Corridor Traffic Management) – I-494	Op Test	▪ Coordinated Signals ▪ Variable Speed ▪ Arterial Management ▪ Traffic Management Center	To be Completed 12/99
Measurement of Driver Reactions to Advanced Warning Flashers	Research	▪ QuickStart ▪ Coordinated Signals ▪ Variable Speed ▪ Arterial Management	Initiated 4/98
Moorhead Area Integrated Train Detection and Traffic Control System	Op Test	▪ QuickStart ▪ Coordinated Signals ▪ Train Detection/Traffic Control	Initiated 11/98
Orion – Metro Area	Deployment	▪ Coordinated Signals ▪ Advanced Parking ▪ Variable Speed ▪ Arterial Management ▪ Traffic Management Center	To be Completed 12/99
Pedestrian Control at Intersections – Phase 3	Research	▪ Coordinated Signals ▪ Variable Speed	Completed 4/98
Rural Corridor: Trunk Highway 7 Study	Study	▪ Coordinated Signals ▪ Portable Traffic Management ▪ Advanced Snowplow ▪ Variable Speed	Completed 12/98

2. ATMS – Advanced Traffic Management Systems	Type of Project	Elements	Status Since 1997
TOCC (Transportation Operation and Communication Centers) – Duluth and Saint Cloud	Deployment	▪ QuickStart ▪ Coordinated Signals ▪ Portable Traffic Management ▪ Advanced Snowplow ▪ Variable Speed ▪ Arterial Management ▪ Traffic Management Center	Initiated 11/98

3. APTS – Advanced Public Transportation Systems	Type of Project	Elements	Status Since 1997
ARTIC (Advanced Rural Transportation Information and Coordination) – Arrowhead Region	Op Test	▪ Fleet Management ▪ Regional Mobility Management ▪ Real Time Information	Completed 9/98
Metro Transit Park and Ride Security System	Op Test	▪ QuickStart ▪ Real Time Information	Initiated 7/98
Orion – Metro Area	Deployment	▪ Regional Mobility Management ▪ Computer Scheduling ▪ Real Time Information	To be Completed 12/99
Southwest and West Central Transit Link	Op Test	▪ QuickStart ▪ Fleet Management ▪ Regional Mobility Management ▪ Computer Scheduling ▪ Real Time Information	Initiated 11/98

3. APTS – Advanced Public Transportation Systems	Type of Project	Elements	Status Since 1997
TOCC (Transportation Operation and Communication Centers) – Duluth and Saint Cloud	Deployment	▪ QuickStart ▪ Fleet Management ▪ Regional Mobility Management ▪ Computer Scheduling ▪ Real Time Information	Initiated 11/98
University of Minnesota Transitway	Op Test	▪ Real Time Information	Completed 12/97

4. ERS – Emergency Response Systems	Type of Project	Elements	Status Since 1997
ARTIC (Advanced Rural Transportation Information and Coordination) – Arrowhead Region	Op Test	▪ Automatic Vehicle Location ▪ Mobile Data Terminal	Completed 9/98
Blue Earth County Rural Addressing	Op Test	▪ QuickStart ▪ Rural Addressing	Initiated 12/97
Mayday Plus	Op Test	▪ Accident Location	Initiated 5/97
Metro Transit Park and Ride Security System	Op Test	▪ QuickStart ▪ Accident Location	Initiated 7/98
Minneapolis Midtown Greenway Security	Op Test	▪ QuickStart ▪ Accident Location	Initiated 11/98
Moorhead Area Integrated Train Detection and Traffic Control	Op Test	▪ QuickStart ▪ Automatic Vehicle Location	Initiated 11/98
Orion – Metro Area	Deployment	▪ Automatic Vehicle Location ▪ Mobile Data Terminal	To be Completed 12/99
TOCC (Transportation Operation and Communication Centers) – Duluth and Saint Cloud	Deployment	▪ QuickStart ▪ Automatic Vehicle Location ▪ Mobile Data Terminal	Initiated 11/98

5. SCI – Sustainable Communities Initiatives	Type of Project	Elements	Status Since 1997
Bicycle Counter	Research	▪ Bicycle/Pedestrian	Initiated 8/97
Cambridge Telework Center	Op Test	▪ Telecommunications ▪ Telework Centers	Completed 6/99
Metro Transit Park and Ride Security System	Op Test	▪ QuickStart ▪ Bicycle/Pedestrian	Initiated 7/98
Minneapolis Midtown Greenway Security	Op Test	▪ QuickStart ▪ Bicycle/Pedestrian	Initiated 11/98
Southwest and West-Central Minnesota Transit Link Project	Op Test	▪ QuickStart	Initiated 11/98
University of Minnesota Transitway	Op Test	▪ Bicycle/Pedestrian	Completed 12/97

6. AHS – Automated Highway Systems (Now IVI – Intelligent Vehicle Initiatives)	Type of Project	Elements	Status Since 1997
IVI Highway 19	Op Test	▪ Vehicle Control ▪ Commercial/Heavy Vehicles	Initiated 9/98
IVI Highway 101	Op Test	▪ Vehicle Control ▪ Commercial/Heavy Vehicles	Initiated 9/98
Smart Tape – I-94, Fergus Falls	Op Test	▪ Vehicle Control ▪ Commercial/Heavy Vehicles	Completed 3/98

7. Electronic Payment Systems	Type of Project	Elements	Status Since 1997
No Projects		▪ Electronic Tolling/Congestion Pricing ▪ Electronic Parking Meters ▪ Smart Cards for Transit and parking	Nothing

8. DBS – Driver Behavior Systems	Type of Project	Elements	Status Since 1997
Automatic Detection of Driver Fatigue – Phase 3	Research	▪ Impaired Driver Detection ▪ Driver Alert Systems	Initiated 3/98
Improving Driver Visibility Using HUD and Vehicle Location Systems	Research	▪ Impaired Driver Detection ▪ Driver Alert Systems	Initiated 1/98
Measurement of Driver Reaction to Advanced Warning Flashers	Research	▪ QuickStart ▪ Driver Alert Systems	Initiated 4/98
Safetruck	Research	▪ Impaired Driver Detection ▪ Driver Alert Systems	Initiated 12/97

9. CVO – Commercial Vehicle Operations	Type of Project	Elements	Status Since 1997
CVISN (Commercial Vehicle Information Systems and Networks) – Statewide	Deployment	▪ Database Systems ▪ Filing Systems ▪ Permit Automation ▪ Roadside Data Access	To be Completed 12/00
Midwest Mainstreaming – Statewide	Op Test	▪ Database Systems ▪ Roadside Data Access	Completed 12/98