

Minnesota Department of Transportation Agreement Number: 73807P

Minnesota Intelligent Transportation Systems

# **Minnesota Transportation Agency Wants and Needs**



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24 April 1996

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## 1. EXECUTIVE OVERVIEW

Minnesota is a recognized leader in the development and application of Intelligent Transportation Systems (ITS). Significant research has been conducted to understand the need for ITS, its benefit to the traveling public and public agencies, and the best application of ITS technologies and services throughout the state. ITS technologies and services must compete for the same funding that is required to maintain the existing transportation infrastructure. ITS projects must therefore address the most important transportation needs and provide measurable benefits to the traveling public.

This market research effort, conducted for Minnesota Guidestar as a part of the Polaris Project, identified the most important transportation needs and service requirements of a cross section of Minnesota transportation agencies throughout the state. The research was conducted in a manner that did not predispose ITS as the potential solution, but rather sought to define transportation needs in language free of implementation or solutions. The research consisted of moderated group discussions, similar to focus groups, in which 84 representatives from various transportation-related agencies in the three largest cities in Minnesota participated.

### **Positive Experiences With Operating The Minnesota Transportation System**

Participants were asked to share their positive experiences with operating the current Minnesota transportation system. The most frequently mentioned areas they liked, and wanted preserved as improvements are being made to the system, are listed below. The numbers in parentheses indicate the number of participants, out of a total of 84, who mentioned these as positive experiences. Further amplifying comments for these positive experiences are provided in Section 3.3.

- ! Intergovernmental coordination/cooperation (between agencies, cities, counties and states) (60)
- ! Use of new technologies (27)
- ! Good state transportation/highway system (26)
- ! Good management of information (22)
- ! Citizen participation/involvement (16)
- ! Good transportation planning process (16)
- ! Computerization/coordination of traffic signals improves traffic flow, reduces congestion, contributes to safety and requires less law enforcement (10)
- ! All modes of transportation are recognized and encouraged (e.g.; bike trails, carpools, skyways, public transit, private auto) (10)
- ! Good roadway safety record results in lower accident/fatality rates and causes less delays and disruption to traffic flow, especially during peak periods (10)

- ! Major events have been managed well, with little congestion, resulting in good publicity for the state and city. This attracts additional events (7)
- ! Good winter road maintenance (snow and ice removal) resulting in better safety for travelers and faster response for emergency crews (7)

### **Negative Experiences With Operating The Minnesota Transportation System**

Participants were asked to share their negative experiences with operating the current Minnesota transportation system. The most frequently mentioned areas they disliked, or would like improved, are listed below. The numbers in parentheses indicate the number of participants, out of a total of 84, who mentioned these as negative experiences. Further amplifying comments for these negative experiences are provided in Section 3.4.

- ! Lack of coordination/cooperation among agencies (50)
- ! Lack of/inadequate funding or funding legislation (43)
- ! Policies not clear or often cause conflict (21)
- ! Not enough focus placed on improving the overall transportation system (17)
- ! Inadequate staffing levels and/or skills (16)
- ! Insufficient enforcement of laws (especially speeding) and lack of understanding of rules of the road by drivers (11)
- ! Increasing amounts of congestion (due to construction, ramp meter delays, general increase in traffic) reduces safety and delays maintenance response time (10)
- ! The general population's negative attitudes toward, and perceptions of, public agencies and employees as a result of the quality of services or information being provided by the public agencies (9)

### **Minnesota Transportation Agency Wants And Needs**

Transportation agency wants and needs, resulting from analysis of this statewide research, are listed below. These need statements capture the themes and ideas most often expressed by the agency representatives in describing their transportation needs. Definitions of each need statement are provided in Section 3.5. More detailed transportation service requirements identified by the agency representatives are provided in Section 3.7.

It was expected that different needs would be found among the different agencies; however, this did not turn out to be true. All participants expressed a set of common fundamental needs as providers of key transportation-related services. These are listed as follows:

- ! Effective interagency teamwork, cooperation, coordination
- ! Optimize use of intra/interagency resources
- ! Access to needed intra/interagency information
- ! Avoid information duplication among agencies
- ! Integrated across jurisdictional boundaries

- ! Involve/inform public as needed
- ! Not adversely affected by politics
- ! Policies encourage desired behavior
- ! Well understood, documented customer needs
- ! Expandable, flexible, adaptable to change
- ! Cost-effective to operate and maintain
- ! Dependable, reliable, easy to maintain
- ! Provide measurable benefits to users
- ! Balance transportation needs with community needs
- ! Provide multi-modal options
- ! Involve private sector
- ! Employ efficient, effective processes
- ! Provide access to all
- ! Does not adversely affect environment

### **Operational Benefits Desired From The Minnesota Transportation System**

Participants were asked to identify the most important operational benefits that would result from having the improvements to the Minnesota transportation system in place. The most frequently mentioned benefits are listed below. The numbers in parentheses indicate the number of the 84 total participants who mentioned these as benefits. Further amplifying comments for these benefits are provided in Section 3.6.

- ! Improved safety of the transportation system (39)
- ! Improved transportation system accessibility/availability (37)
- ! Improved quality of life (31)
- ! More efficient, effective use of transportation resources (23)
- ! Allow fast, predictable travel time (20)
- ! Protected/improved environment (19)
- ! Reduced cost of transportation system (17)
- ! Economic growth and development (15)
- ! Public participation in planning and decision-making, creating a transportation system that meets the needs of the public (13)
- ! Improved inter-agency cooperation, resulting in increased efficiency in use of personnel and resources and improved service to the public (7)

Minnesota Traveler Wants and Needs, a complementary Polaris research document, identifies the wants and needs of Minnesota transportation users. ITS Architecture Wants and Needs Analysis, another Polaris Project research document, presents an analysis of the relationship between the Minnesota transportation user needs resulting from the Polaris market research and ITS services that address those needs.

## **2. INTRODUCTION**

### **2.1 PURPOSE**

The purpose of the Polaris Transportation Agency Market Research documented in this report is to identify the fundamental wants and needs of key public agencies that provide Minnesota transportation services.

### **2.2 APPROACH**

The research included a series of moderated requirements gathering sessions conducted in the Twin Cities metropolitan area, Duluth and Rochester. Participants representing agencies that provide a broad range of transportation services were recruited. These moderated sessions gathered information on the agency participants' positive and negative experiences with operating the transportation system, their view of the characteristics and features of an Aideal® transportation system from an operational point of view, and the operational benefits that would result from having an ideal transportation system in place. Agency wants and needs were derived from an analysis of information collected across all the sessions.

### **2.3 DOCUMENT STRUCTURE**

The results of this transportation agency market research are presented in Section 3 which includes research objectives, approach and analysis results. Appendix A contains the question templates used in the Positive Experience, Negative experience, Benefits and Question Set exercises.

### 3. WANTS AND NEEDS RESEARCH

#### 3.1 OBJECTIVES

The objective of the research was to understand the fundamental transportation operational needs of the Minnesota transportation agencies throughout the state. Representatives of agencies in the Twin Cities metropolitan area, Duluth and Rochester participated.

#### 3.2 METHODOLOGY

##### 3.2.1 Number and Location of Sessions

A total of seven sessions were conducted in October and November, 1995. Five sessions were held in Minneapolis (the first was a Adry-run®). Two additional sessions were held in Duluth and Rochester (see Table 1). A total of 84 agency representatives participated in the discussion sessions.

**Table 1. Agency Discussion Sessions**

Date	Location	Number of Participants
		11
		11
		14
		12
		11
		14
		11
		<b>84</b>

The agencies recruited for the sessions include key transportation agencies from the Twin Cities. Agencies from Duluth and Rochester are representative of similar agencies across the state.

The Twin Cities metropolitan area is the hub of much of Minnesota's transportation activity. In 1990, approximately 40 percent of the daily vehicle miles traveled in the state were within or destined for the Twin Cities area. The number of workers commuting to the Twin Cities increased 55 percent from 1980 to 1990. The number of daily vehicle miles traveled is expected to continue increasing, resulting in increased congestion and delays in the Twin Cities.

Duluth (population 85,000) and Rochester (population 71,000) were selected for several reasons: They are the two largest cities in Greater Minnesota. Duluth has the state's largest port facility and is along I-35, a key north - south corridor stretching from Texas to Iowa to the Twin Cities and terminating in Duluth. Rochester is near the I-90 corridor, a key east - west interstate that originates in Seattle, Washington, traversing Idaho, Montana, South Dakota, Minnesota, Wisconsin, Chicago, and continues east to finally terminate in Boston, Massachusetts. Each corridor carries a significant volume of traffic.

Figure 1 presents the locations of the agency discussion groups.

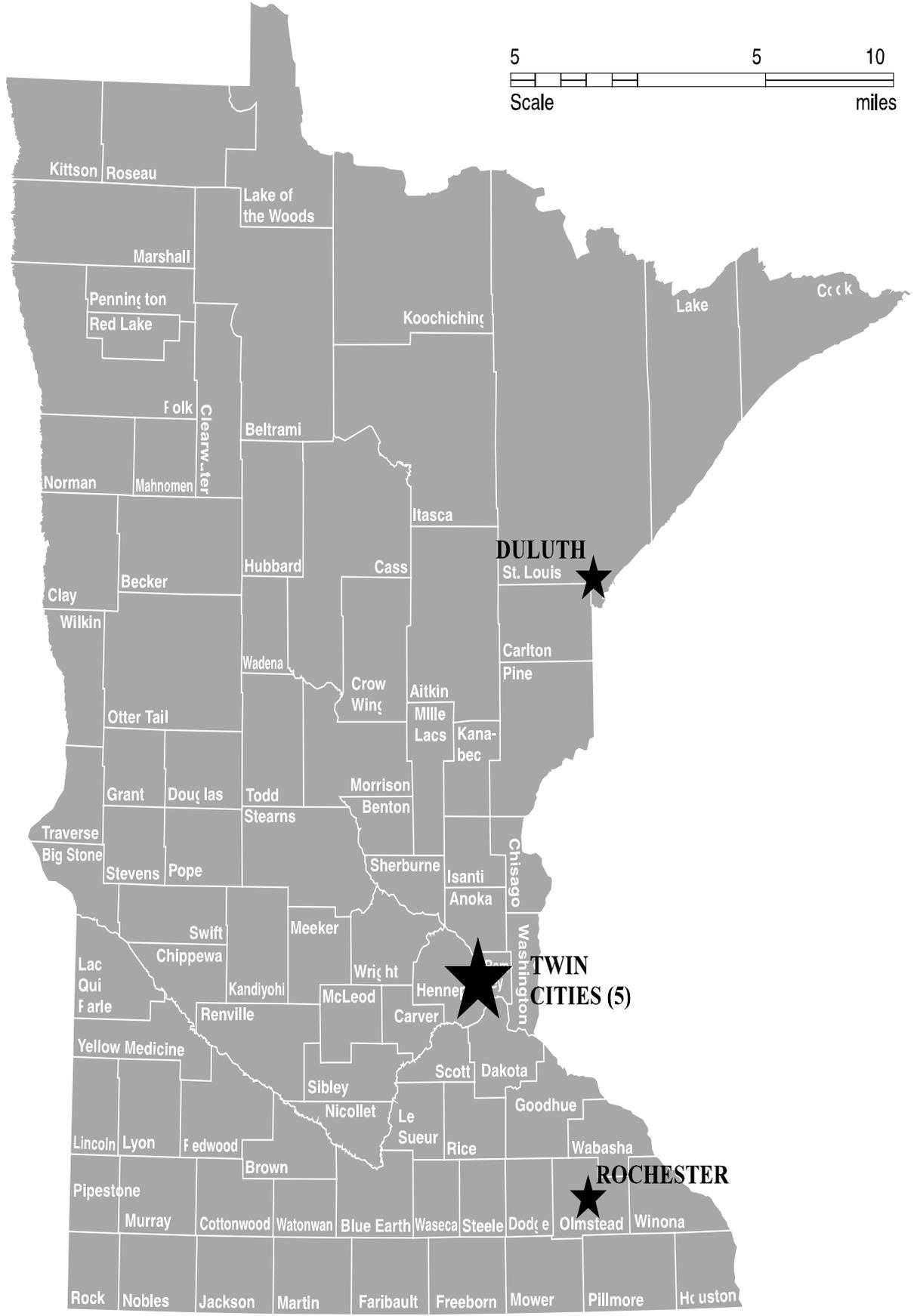
### 3.2.2 Participant Characteristics

Agencies were selected to represent diverse state, county and city transportation service providers: roadway operations, regional planning, transit operations, emergency services, public works, traffic management, environmental control and tourism. Arrowhead Transit is the only private organization that participated in the discussion sessions. Arrowhead Transit provides transit service in the Arrowhead Region in northeastern Minnesota and is a division of the Arrowhead Economic Opportunity Agency, a private, non-profit organization that provides various human services in the area.

Each session included participants representing a mix of different agencies and transportation services. Table 2 is a list of agency departments and divisions whose representatives participated in the discussion sessions.

**Table 2. Participating Agencies**

Agency Name	Department/Division
Anoka County	Anoka County Traveler
Arrowhead Economic Opportunity Agency	Arrowhead Transit
City of Bloomington	Public Works
City of Duluth	Duluth Transit Authority
City of Minneapolis	Police, Public Works
City of Richfield	Public Works
City of St. Paul	Public Works
Hennepin County	Medical Center, Traffic
Metropolitan Council	Planning, Transit Operations
Minnesota Department of Tourism	Travel Information
Minnesota Department of Transportation	Traffic; Truck Center; Traffic Management Center; Office of Electronic Communications; Districts 1, 6 and Metro; Freeway Operations
Minnesota Pollution Control Agency	Air and Noise
Minnesota State Patrol	Districts 2100, 2700, 3100
Rochester - Olmstead Council of Governments	Transportation
St. Louis County	Public Works
University of Minnesota	Transportation



### 3.2.3 Session Activities

The discussion sessions for agency users were based on a technique sometimes described as Astructured brainstorming.<sup>@</sup> The sessions included a mix of verbal sharing and written exercises, directed by a professional moderator. Group participants were asked about their wants and needs relating to operating the transportation system. Individual exercises were conducted as follows:

#### ! **Positive Experiences**

The goal of this exercise was to determine the operational characteristics and features of the current transportation system that the participant liked and would like to preserve. The exercise began with several positive experience phrases being presented on a flip chart to the participants.

These phrases were "A major success we have achieved is...", "...works well today", "...is very effective", "I would not change..." and "We have received positive feedback regarding...". Individual participants were then asked to write down their positive experiences by completing the sentence. These positive experiences were then collected verbally from the group and written on flip charts to form a group list. The final step in the exercise was for each participant to use the template (shown in Appendix A.1) and write what they felt were the top three positive experiences from the group list and why they felt those were the top three.

#### ! **Negative Experiences**

The goal of this exercise was to determine the operational characteristics and features of the current transportation system that the participant disliked or would like improved. The exercise began with several negative experience phrases being presented on a flip chart to the participants.

These phrases were "A big problem we have is...", "...does not work well today", "...is very ineffective", "We have received negative feedback regarding..." and "I wish we could eliminate...". Individual participants were then asked to write down their negative experiences by completing the sentence. These negative experiences were then collected verbally from the group and written on flip charts to form a group list. The final step in the exercise was for each participant to use the template (shown in Appendix A.2) and write what they felt were the top three negative experiences from the group list and why they felt those were the top three.

#### ! **Ideal Characteristics**

The goal of this exercise was to determine the operational characteristics and features of a future transportation system that the participant would like to have. The exercise began with participants being asked to complete the following statement: "The ideal transportation systems information and services would..., would be..., is..., has..., provides..., does not..., would not..., or something I wish we could do is...". The participants were then asked to write down their ideas by completing the sentence. These ideas were then collected verbally and written on flip charts to form a group list. The desire was to end up with a list of 100 to 150 ideas. Participants were not asked to pick the top three ideas from this list.

### ! **Benefits**

The goal of this exercise was to determine the operational benefits that result from having an ideal transportation system in place. The exercise began with several benefits phrases being presented on a flip chart to the participants. These phrases were "It improves...", "It broadens or expands...", "It encourages...", "It reduces..." and "It eliminates...". Individual participants were then asked to write down the operational benefits they felt would result from having the ideal transportation system that was described in the Ideal Characteristics exercise. These benefits were then collected verbally from the group and written on flip charts to form a group list. The final step in the exercise was for each participant to use the template (shown in Appendix A.3) and write what they felt were the top three operational benefits from the group list, why they felt each benefit was important and how they would know when they received this benefit.

### ! **Question Set**

The goal of this exercise was to determine the ITS services characteristics and features desired by the participants. Each participant was asked to complete a set of written questions (shown in Appendix A.4)

## **3.3 TOP POSITIVE EXPERIENCES SUMMARY**

The session data from the Positive Experiences exercise, consisting of the top three positive experiences identified by each participant, was analyzed to develop the following summary list. These positive experiences were grouped by common theme and ordered according to the frequency in which they were mentioned (indicated in parentheses). Each theme, and the statements that follow it, reflect the ideas and themes expressed by the participants.

- ! Intergovernmental coordination/cooperation (between agencies, cities, counties and states) (60)
  - \* Allows provision of better service/information to other agencies or the public (29)
  - \* Allows sharing of resources, knowledge and solutions to problems (18)
  - \* Reduces cost through the reduction of service duplication. Allows for faster project implementation (10)
  - \* Allows each agency to see overall plan and where it fits (3)
  
- ! Use of new technologies (27)
  - \* Allows agencies to provide better services to travelers such as new anti-icing technology, improvements in traffic control, better information to travelers (17)
  - \* Provides for better communication of information among agencies (10)
  
- ! Good state transportation/highway system (26)
  - \* Provides an effective system for getting people around congestion, accidents (15)
  - \* Provides a positive image for communities and transportation organizations (9)
  - \* Makes maintenance job more efficient (2)

- ! Good management of information (22)
  - \* Delivery of timely, accurate travel information (condition, weather, accidents, ridesharing) to motorists results in less delays and congestion (11)
  - \* Delivery of timely traffic/accident information to other agencies results in better traffic and incident management and faster incident response (11)
  
- ! Citizen participation/involvement (16)
  - \* Helps organizations base decisions on actual customer input (14)
  - \* Allows citizens to assume some responsibilities (Adopt-A-Highway Program) (2)
  
- ! Good transportation planning process (16)
  - \* Provides a process for the most efficient, effective use of funding (Comprehensive Operational Analysis (COA), Area Transportation Process (ATP)) (8)
  - \* Provides a process to gain input/buy-in from multiple agencies and from the public (8)
  
- ! Computerization/coordination of traffic signals improves traffic flow, reduces congestion, contributes to safety and requires less law enforcement (10)
  
- ! All modes of transportation are recognized and encouraged (bicycle, carpool, pedestrian, public transit, private automobile) (10)
  
- ! Good roadway safety record results in lower accident and fatality rates and causes less delays and disruption to traffic flow, especially during peak travel periods (10)
  
- ! Major events have been managed well, with little congestion, resulting in good publicity for the state and cities. This attracts additional events (7)
  
- ! Good winter road maintenance (snow and ice removal) results in better safety for travelers and faster response times for emergency crews (7)
  
- ! Projects such as the Advanced Rural Transportation and Information Coordination (ARTIC) and Emergency Vehicle Signal Pre-Emption have reduced/will reduce emergency response time (4)

### **3.4 TOP NEGATIVE EXPERIENCES SUMMARY**

The session data from the Negative Experiences exercise, consisting of the top three negative experiences identified by each participant, was analyzed to develop the following summary list. These negative experiences were grouped by common theme and ordered according to the frequency in which they were mentioned (indicated in parentheses). Each theme, and the statements that follow it, reflect the ideas and themes expressed by the participants.

- ! Lack of coordination/cooperation among agencies (50)
  - \* Conflicting agency missions hamper ability to provide new, or to improve existing, service to the consumer (get traffic information to the public, respond to emergencies, make traffic flow smoothly) (21)
  - \* Lack of trust or ability to reach consensus among agencies wastes time and money and causes delays in project implementation (21)
  - \* Overlapping/redundant services and information waste resources (8)
  
- ! Lack of/inadequate funding or funding legislation (43)
  - \* Not enough funding to maintain current levels of service, equipment and maintenance (17)
  - \* Not enough funding to keep up with growth in demand for services (16)
  - \* Unfunded mandates drain resources from other projects (5)
  - \* Funding process is too complex, laborious and lengthy (3)
  - \* Limited funding and lack of funding prioritization make agencies that should collaborate compete with each other (2)
  
- ! Policies are unclear and often cause conflict (21)
  - \* Highway planning and construction conflict with land use policies (11)
  - \* Hampers ability to improve service to the public (8)
  - \* Negatively affects ability to perform job (2)
  
- ! Not enough focus placed on improving the overall transportation system (17)
  - \* Too much focus on moving cars instead of people (10)
  - \* Lack of public transit improvements cause frustration and discourage use (5)
  - \* Failure to integrate modes (bicycle, pedestrian, automobile) (2)
  
- ! Inadequate staffing levels and/or skills (16)
  - \* Insufficient staffing levels reduce the quality of existing services and slow the implementation of new projects/services (10)
  - \* Lack of time and money for training reduces effectiveness of new technologies (6)
  
- ! Insufficient law enforcement (especially regarding speeding) and lack of driver understanding of rules of the road (11)
  
- ! Increasing congestion (due to construction, ramp meter delays, general increase in traffic) reduces safety and delays maintenance response time (10)
  
- ! Quality of services and information provided by public agencies to citizens result in negative attitudes toward, and perception of, public agencies and their employees (9)

- ! Insufficient maintenance (6)
  - \* Infrastructure deterioration is not being properly addressed (3)
  - \* Rough roads and delays in road sanding decrease ability to reduce accidents and make roads safer (3)
  
- ! Public expectations exceed service providers= ability to meet customer needs (6)
  
- ! Travelers are not getting the traffic information they want and need (information is not enough, is inaccurate, does not reflect real-time conditions) (6)
  
- ! Inappropriate political intervention causes solutions to be implemented which benefit only a minority of the people affected (5)
  
- ! Transportation planning process is too long, wasting money and delaying problem resolution (3)

### 3.5 AGENCY WANTS AND NEEDS

Session data, from the Ideal Characteristics exercise, was analyzed to develop a list of the most consistently mentioned transportation agency wants and needs. This analysis yielded the short definitions (found below in bold type) and an initial version of the expanded definitions. The expanded definitions were further refined through complete analysis of the responses to the Positive Experiences, Negative Experiences, Benefits and Question Set exercises. These refined expanded definitions appear below each bolded short definition.

- ! **Effective Interagency Teamwork, Cooperation, Coordination**  
Agencies should work together effectively to achieve common goals. Interagency cooperation leads to consensus on best solutions to solve problems that cross jurisdictional boundaries.
  
- ! **Optimize Use Of Intra/Interagency Resources**  
Agencies should make best use of available resources. Adequate resources should be available to meet existing needs and make improvements to meet future needs. Resources should be distributed based on best value.
  
- ! **Access To Needed Intra/Interagency Information**  
All agencies should exchange needed information quickly and efficiently. Agencies should be able to access concise, condensed information that meets specific agency needs
  
- ! **Avoid Information Duplication Among Agencies**  
Information should be owned and provided by the best source, not redundant or conflicting, well-maintained and up-to-date.

- ! **Integrated Across Jurisdictional Boundaries**  
Should be managed as a single region-wide network. Should be seamless across jurisdictions and between transportation modes. Priorities should be regional rather than local.
- ! **Involve/Inform Public As Needed**  
Public support of projects should be gained through active citizen participation in the planning process. Policies and laws should be explained, problems and issues discussed, questions answered, and project value to the public should be communicated.
- ! **Not Adversely Affected By Politics**  
Decisions should be based upon thoughtful consideration of all relevant issues and concerns, not biased by political motivation or special interest groups.
- ! **Policies Encourage Desired Behavior**  
Policies should be established with a clear understanding of the behavior modifications that are desired.
- ! **Well Understood, Documented Customer Needs**  
Good relationship should be established with end users to collect information on their present and evolving transportation needs. Agencies should clearly understand what end users want and need based on well-documented and communicated information.
- ! **Expandable, Flexible, Adaptable To Change**  
Transportation system should be dynamically responsive to changing conditions; flexible to incorporate new technologies; expandable to adapt to increased capacity demands over time; and adaptable to changing needs.
- ! **Cost-Effective To Operate, Maintain**  
Operations and maintenance should make best use of available resources: funding, facilities, people and equipment.
- ! **Dependable, Reliable, Easy To Maintain**  
System should be available for use whenever needed. It should operate reliably, be durable and require little maintenance. When problems occur, they should be easily detected and repaired.
- ! **Provide Measurable Benefits To Users**  
User benefits of systems and system improvements should be identified, meaningful and measurable.
- ! **Balance Transportation Needs With Community Needs**  
Transportation needs should be addressed in a manner that is compatible with existing and future needs of the community.

- ! **Provide Multi-Modal Options**  
Should provide a choice of viable, affordable alternative transportation modes. Should encourage and promote alternative modes to reduce dependence on the private automobile.
- ! **Involve Private Sector**  
Creative partnerships with private industry should be established to leverage private sector skills and resources where they best augment the public sector.
- ! **Employ Efficient, Effective Processes**  
Planning, design and development processes should involve multiple disciplines from the beginning and consider other systems, services and maintainability. Decision-making should be streamlined and incorporate long-term thinking. Cooperation should exist among all levels of government and the public sector.
- ! **Provide Access To All**  
All transportation services should be accessible to the entire population, independent of age, disability or other special needs.
- ! **Does Not Adversely Affect The Environment**  
Should efficiently use natural resources while maximizing use of renewable and recyclable resources. Should minimize environmental damage and pollution.

### 3.6 TOP BENEFITS SUMMARY

The session data from the Benefits exercise consisted of the top three benefits, identified by each participant, that would result from having the improvements to the Minnesota transportation system in place. The characteristics of an ideal transportation system were described in the Ideal Characteristics exercise (described in Section 3.2.3). The Benefits exercise data was analyzed to develop the summary list below. These benefits were grouped by common theme and ordered according to the frequency in which they were mentioned (indicated in parentheses). Each theme, and the statements that follow it, reflect the ideas and themes expressed by the participants.

- ! Improved safety of the transportation system (39)
  - \* Would decrease the number of injuries and deaths from auto and other vehicle accidents (33)
  - \* Would provide a safe, crime-free travel environment (6)

- ! Improved transportation system accessibility and availability (37)
  - \* Would provide choice of alternate transportation modes (14)
  - \* Would get people where they want to go, when they want to go (10)
  - \* Would encourage use of public transportation systems (buses, carpools, vanpools) (8)
  - \* Would provide everyone access to transportation, regardless of abilities (5)
  
- ! Improved quality of life (31)
  - \* Stress, confusion and anxiety related to using the system, including driving, would decrease (12)
  - \* Travel time would decrease /leisure time would increase (10)
  - \* Quality of neighborhoods would improve (6)
  - \* Users would be able to live anywhere (3)
  
- ! More efficient and effective use of transportation resources (23)
  - \* Transportation dollars would be used efficiently (14)
  - \* Current transportation systems and infrastructure would be used most effectively to reduce travel time (9)
  
- ! Allow fast, predictable travel time (20)
  - \* Delays due to congestion would be eliminated (12)
  - \* Time spent traveling would be reduced (8)
  
- ! Protected/improved environment (19)
  - \* Pollution would be reduced (10)
  - \* Sound land use decisions would be encouraged (6)
  - \* Consumption of natural resources would be reduced (3)
  
- ! Reduced cost of transportation system (17)
  - \* Would reduce cost to the users (taxes, licenses, fuel, insurance) (10)
  - \* Operations and maintenance costs would be reduced (7)
  
- ! Economic growth and development (15)
  - \* Economic development and planning for the future would be encouraged (9)
  - \* Better access to jobs would be provided (6)
  
- ! Would increase public participation in planning and decision making, creating a transportation system that meets the needs of the public (13)
  
- ! Would improve interagency cooperation, allowing more efficient use of personnel and resources, resulting in improved service to the public (7)

- ! Would provide real-time information to travelers so that they can make informed decision on travel mode and route (5)
- ! Would improve public perception of transportation programs and government employees (3)

### **3.7 TRANSPORTATION SERVICE REQUIREMENTS**

The data from the Question Set exercise was analyzed to develop a list of desired transportation service requirements. Each service requirements group, and the statements that follow it, reflect the ideas and themes expressed by the participants. The underlined information represents the major service themes that were expressed by the exercise participants. The major bullets represent the key attributes associated with each service and the sub-bullets represent the desired features and ideas associated with each key attribute. These service requirements were not compiled on a question by question basis because the participants responded to the questions with common themes and ideas rather than individual question by question answers. Refer to Appendix A.4 for the specific question set that participants responded to.

#### **1.0 Travel Conditions Information**

##### **1.1 Fast, easy access to current traffic/travel conditions**

- 1.1.1 Support agency-specific views of information
- 1.1.2 No duplication of conditions information
- 1.1.3 Covers freeways and arterials
- 1.1.4 Available many ways (radio communications, computer, telephone, fax, etc.)
- 1.1.5 Available many locations (in-vehicle, at agency, etc.)

##### **1.2 Conditions information available to all key agencies**

- 1.2.1 Police, emergency services, road maintenance
- 1.2.2 Public transit managers

##### **1.3 Support information input from various sources/devices**

##### **1.4 Information supports cooperative, coordinated traffic management decisions**

- 1.4.1 Accurate and current information
- 1.4.2 Consistent among all agencies
- 1.4.3 Sufficient for resource deployment/resource change decisions

##### **1.5 Travel conditions information includes:**

- 1.5.1 Traffic level, congestion, accidents
- 1.5.2 Weather, road surface conditions
- 1.5.3 Construction, planned events

## 2.0 Comprehensive, Real-Time Regulation/Enforcement Information

### 2.1 Fast, easy access to comprehensive driver and motor vehicle information

- 2.1.1 Accurate and current information
- 2.1.2 Available many ways and many locations

### 2.2 Provides complete information view to the user

- 2.2.1 Driver and vehicle information

### 2.3 Provides commercial vehicle (CVO) information

- 2.3.1 Driver record
- 2.3.2 Vehicle licensing, registration, insurance
- 2.3.3 Vehicle inspection, permitting, weight, cargo, etc.

### 2.4 Provides private automobile information

- 2.4.1 Driver record
- 2.4.2 Vehicle registration, insurance, inspections
- 2.4.3 Title transfers, etc.

## 3.0 Integrated Regional Incident Management

### 3.1 Support coordination among response agencies

- 3.1.1 State patrol, local police, emergency service providers
- 3.1.2 Traffic management center, highway helpers, maintenance (Mn/DOT, county, city, etc.)
- 3.1.3 For rapid response/removal of incidents

### 3.2 Support coordination at emergency scene

- 3.2.1 Patient care, traffic flow control, incident clearing/removal
- 3.2.2 Common information database, agency-specific views

### 3.3 Support sharing of resources and information

### 3.4 Integrated, computer-aided dispatch

- 3.4.1 Integrated view of various dispatch areas and information
- 3.4.2 Faster coordinated dispatching or redeployment of resources
- 3.4.3 Interface with mobile data terminals and records systems
- 3.4.4 Easy way to gather, store and retrieve field data
- 3.4.5 Easy way to generate reports and statistics

### 3.5 Automatic vehicle location for all emergency vehicles

- 3.5.1 Constant location tracking to dispatch vehicle closest to emergency

### 3.6 Adequate emergency vehicle access (ramps, shoulders, median, etc.)

#### 4.0 Integrated Regional Traffic Management

- 4.1 Traffic management integrated with dispatching and incident management
- 4.2 Support staff, equipment, resource and information sharing
  - 4.2.1 Within/between agencies
  - 4.2.2 Across jurisdictions
- 4.3 Incorporate needs of different stakeholders
  - 4.3.1 Cities, counties
  - 4.3.2 Mn/DOT, TMC, road maintenance, highway helper
- 4.4 Facilitate on-demand, real-time traffic flow control
  - 4.4.1 Along the freeway
  - 4.4.2 Along arterials
  - 4.4.3 Between freeway and arterials
- 4.5 Coordinated traffic management data collection and analysis
  - 4.5.1 Multiple agency/jurisdiction input and participation
  - 4.5.2 Storage and use of historical data
  - 4.5.3 Traffic, congestion, incidents, problem intersections, speed data, etc.
  - 4.5.4 Support planning: traffic management, growth, etc.

#### 5.0 Integrated Traffic Signal Management

- 5.1 Intelligent intersection/signal control
  - 5.1.1 Programmable traffic signals
  - 5.1.2 On-demand, real-time signal control
  - 5.1.3 Changeable based on traffic conditions
  - 5.1.4 Remote access via cellular telephone
- 5.2 Integrated signal control strategies
  - 5.2.1 Coordinated signal sequencing, progression
  - 5.2.2 Single-agency control along multiple jurisdiction arterials
  - 5.2.3 Along arterial/freeway corridors
- 5.3 On-demand traffic signal pre-emption
  - 5.3.1 For emergency vehicles at all traffic signals
  - 5.3.2 For transit vehicles at intersections and ramp meters along route

## 6.0 Integrated Transit Management

### 6.1 Demand-responsive transit dispatching and scheduling

- 6.1.1 Match vehicle availability with traveler demand
- 6.1.2 Allow timely accommodation of special needs (for example, paratransit)
- 6.1.3 Provide additional express routes

### 6.2 Integrated regional transit information system

- 6.2.1 Contains important operational information
- 6.2.2 Contains transit contract provider performance information
- 6.2.3 Allows transit provider access to information

### 6.3 Transit route planning

- 6.3.1 Based on ridership volume, travel patterns, route time, travel conditions
- 6.3.2 Minimizes wait time for connections
- 6.3.3 Reroutes transit vehicle around incidents and congestion

### 6.4 Encourage use of alternate modes of transportation (versus private auto)

- 6.4.1 More mode choices (including pedestrian, bicyclist, etc.)
- 6.4.2 More flexible (demand-responsive) scheduling
- 6.4.3 Upgrade/replace old equipment
- 6.4.4 Promote safety through enforcement
- 6.4.5 Provide flexible, on-demand ride sharing program
- 6.4.6 Complete, easy to understand instructions on public transit use

## **APPENDIX A. AGENCY DISCUSSION SESSION**

**A.1 Top Three Positive Experiences Template**

**A.2 Top Three Negative Experiences Template**

**A.3 Top Three Key Benefits Template**

**A.4 Question Set**

## A.1 Top Three Positive Experiences Template

Session #: \_\_\_\_\_

Participant #: \_\_\_\_\_

### Top Three Positive Experiences

Please indicate below your selection of the top three positive experiences from the ones we have just listed. Please select from only those items listed. Indicate why they are the top three.

1. What is a top Positive experience?

Letter #: \_\_\_\_\_ Description: \_\_\_\_\_

Why is this a top experience?

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2. What is a top Positive experience?

Letter #: \_\_\_\_\_ Description: \_\_\_\_\_

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---

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3. What is a top Positive experience?

Letter #: \_\_\_\_\_ Description: \_\_\_\_\_

Why is this a top experience?

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## A.2 Top Three Negative Experiences Template

Session #: \_\_\_\_\_

Participant #: \_\_\_\_\_

### Top Three Negative Experiences

Please indicate below your selection of the top three negative experiences from the ones we have just listed. Please select from only those items listed. Indicate why they are the top three.

1. What is a top Negative experience?

Letter #: \_\_\_\_\_ Description: \_\_\_\_\_

Why is this a top experience?

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2. What is a top Negative experience?

Letter #: \_\_\_\_\_ Description: \_\_\_\_\_

Why is this a top experience?

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---

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3. What is a top Negative experience?

Letter #: \_\_\_\_\_ Description: \_\_\_\_\_

Why is this a top experience?

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### A.3 Top Three Key Benefits Template

Session #: \_\_\_\_\_

Participant #: \_\_\_\_\_

#### Identify your top 3 key benefits

Choose from the entire listing what the three most important benefits are and answer the following questions about each one. Please select from only those items listed.

1. What is your key benefit?

Letter #: \_\_\_\_\_ Description: \_\_\_\_\_

Why is this benefit important to you?

\_\_\_\_\_  
\_\_\_\_\_

How will you know when you get this benefit?

\_\_\_\_\_  
\_\_\_\_\_

2. What is your key benefit?

Letter #: \_\_\_\_\_ Description: \_\_\_\_\_

Why is this benefit important to you?

\_\_\_\_\_  
\_\_\_\_\_

How will you know when you get this benefit?

\_\_\_\_\_  
\_\_\_\_\_

3. What is your key benefit?

Letter #: \_\_\_\_\_ Description: \_\_\_\_\_

Why is this benefit important to you?

\_\_\_\_\_  
\_\_\_\_\_

How will you know when you get this benefit?

\_\_\_\_\_  
\_\_\_\_\_

## A.4 Question Set

### TRANSPORTATION AGENCY

Please answer seven of the following questions.

- Place an X next to those you are going to answer.
- In earlier exercise, we talked in general terms. In answering these questions, please be as specific as possible.

#### General

- A. What transportation systems, information and services are you **most proud** of providing today? **least proud** of providing? Why?
- B. If you could do just **one thing to improve** the way your organization provides transportation systems, information and services, what would it be? Why would this be helpful to you?
- C. Ideally, **what red tape or key impediments** would you **eliminate** within your organization that would allow you to provide better transportation systems, information and services? Why would these be helpful to you?
- D. As improvements are made to systems, information and services you provide, what are the **particularly sensitive areas** that require **special attention**? Why?

#### Processes

- E. What processes within your functional area do you presently use to provide transportation systems, information and services that you consider **ineffective or least effective**? Why?
- F. In what areas do you see the most **duplication of effort or redundant data collection/storage/processing** within your agency or between agencies? Why?

#### Information or Services

- G. Ideally, what **additional information or services** would you like provided to your organization so you could provide better transportation systems, information and services? Who might provide it? Why would this (these) be helpful to you?
- H. Ideally, **what additional systems, information and services** would you like to provide and **to whom** if you had sufficient funding and resources? Why?
- I. **What transportation systems equipment** that your organization is responsible for most needs to be **replaced or modernized**? Why would this (these) be helpful to you?

### **Interagency Cooperation**

- J. In what areas do you perceive the largest potential benefits if different groups within or between agencies could **share data and/or coordinate activities**? Why would this (these) be helpful to you?
  
- K. What **tasks** does your agency routinely perform in cooperation with other agencies that need significant improvement? Why would this (these) be helpful to you?

### **Public/Private Partnerships**

- L. What new organizational partnerships (with either other public agencies or with the private sector) would you like to see established to better help you provide transportation systems, information and services? Why would this (these) be helpful to you?
  
- M. What systems, information and services would you specifically not want the private sector to own, operate and/or maintain?