

Alaska Iways Architecture Update

Summary Report

FINAL

January 26, 2009

Prepared for:

Alaska Department of Transportation and Public Facilities



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1 SUMMARY REPORT

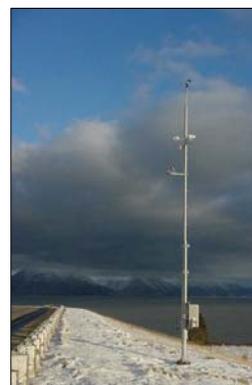
1.1 Introduction

The Alaska Department of Transportation and Public Facilities (ADOT&PF) is continually looking at ways to improve the efficiency, safety, and reliability of Alaska's transportation system. This effort includes the application of advanced communications, control, and information processing technologies including computer hardware and software at locations throughout the state. When integrated, technologies like these form what is commonly referred to as an Intelligent Transportation System (ITS). To ensure that these technologies are implemented in an effective, coordinated, and cost-effective fashion the ADOT&PF through its consultant Telvent developed the Alaska Statewide ITS or Iways Architecture. Iways is the state adopted label for ITS that stands for intelligence, integration, internet and information (the "I") for air, sea, and roadways (the "ways").

The Alaska Iways Architecture consists of the following 6 documents, broken down by chapters available for download at the Alaska Iways website www.dot.state.ak.us/iways/.

- Chapter 1: User Needs
- Chapter 2: User Services
- Chapter 3: ITS Long-Range Vision
- Chapter 4: Operational Concept
- Chapter 5: Physical ITS Architecture
- Chapter 6: Implementation Plan

Each of the six chapters represents a major step taken to develop the Iways Architecture. Each chapter was initially developed in 2003. In 2008, each chapter was updated in part to reflect changes in needs, project status and implementation, and developments in the National ITS Architecture.



1.1.1 What is ITS

In the past, transportation problems were typically addressed through capacity and safety improvements, such as additional roads and lanes, airports, or ferry runs. Today, engineers and planners rely on a broader approach to transportation system improvement, which includes the application of advanced computer and telecommunications technologies to improve system capacity, safety, and efficiency.

ITS elements are the particular applications of electronics, communications, or information processing, used alone or in combination to improve transportation network safety and efficiency. In Alaska, ITS components range from simple devices such as variable message signs deployed along highways, to more complex technologies including automated incident detection, weather sensing, and vehicle location. ITS strategies are applied to many aspects of transportation system

operations and management including traffic management, traveler information dissemination, transit operations, commercial vehicle operations, and weather and pavement condition sensing.

1.1.2 Benefits of ITS

ITS can help improve the safety, efficiency, convenience, and security of all modes of travel. Through the application of information systems, computers, communications, and sensor technology, ITS elements deployed as part of Alaska Iways Program will open the door to new ways of understanding, operating, expanding, refining, reconfiguring, and using the transportation system.

1.1.3 Purpose

One way to improve transportation facilities and services in Alaska's challenging environment is to apply technological advances in ITS to the unique Alaskan context. Used effectively, ITS can provide solutions to many of these challenges.

ADOT&PF and other agencies across the state are currently designing and deploying a variety of ITS projects. To date, agencies have planned and deployed these projects to meet specifically defined local and regional needs – and are in the early phases of maximizing their potential value as part of an integrated, statewide system. The Alaska Iways Architecture provides a blueprint of how the individual ITS elements fit together into an integrated whole. Alaska's Iways Architecture and Implementation Plan will serve to coordinate and integrate existing and future ITS projects so they can function as a technologically compatible, complementary system.

1.2 Geographic Scope and Understanding

The Alaska Iways Program applies to the entire State of Alaska, but is focused on the various aspects of Alaska's surface transportation system, and its applicable interfaces with other modes where advanced, integrated transportation systems offer potential to address transportation-related needs and desires. Since the surface transportation system does not simply stop at the State's border, the Program takes into consideration aspects of bordering regions so that ITS development and integration can occur efficiently, and as seamlessly as possible. To this extent, the pertinent ITS related activities of other regions; mostly the Canadian Provinces that border Alaska, as well as the State of Washington, which is connected to Alaska via the Alaska Marine Highway System (an extension of the surface transportation system), were taken into account when developing this Plan.

The State of Alaska has over 5,000 miles of state-maintained highways; over 300 aviation facilities (land- and water-based); numerous ports and harbors; and a marine highway system. Although the state's natural environment presents particular challenges, it is also an asset that attracts a growing number of visitors.

The following factors make travel in Alaska unique:

- **Population Density:** Alaska's population estimated in 2006 was slightly over 670,000. This is only about 0.2% of the U.S. total, but its land mass makes up about 20% of the U.S. As a result, most travel in Alaska occurs in rural areas.
- **Weather Conditions:** Severe winter weather is Alaska's most unique and challenging transportation issue. It affects surface; air and marine travel and can severely impact travel, unlike anywhere else in the U.S. Avalanches, snow, bridge and roadway icing, high winds, flooding, and earthquakes can shut down critical roadway and rail links. Currents and high seas can cancel planned sailings. Visibility problems and storms can make aviation very hazardous.

- **Dependence on Inter-modal Travel:** Although Alaska's population comprises only 0.2% of the total U.S. population, Alaskans utilize 13% of all U.S. commuter airline and air taxi trips. Alaskans use commuter airlines 65 times more frequently than other Americans and also rely heavily on marine travel in their everyday lives.
- **Lack of Connectivity:** Nearly 30% of Alaska's population has no connection by either road or ferry to the continental road network. The sparse and remote nature of Alaska's communities outside of urban areas poses danger for victims of crashes or vehicle malfunctions.
- **Pavement:** As of 2007, roughly 34% (4,892) of Alaska's roads are paved, compared to 91% in the other 49 states.



1.3 Alaska's Transportation Needs and Desired Improvements

Alaska's Iways Program is focused on satisfying, to the extent possible, the transportation needs and desires expressed by participating stakeholders. Stakeholders were interviewed initially when Alaska's Iways Architecture was created in December 2003, and again as part of the project to update the initial architecture. Identified needs and desires were documented and grouped into the following categories:

- ADOT&PF Operations and Management
- Transit Management and Operations
- Rail Operations
- Incident Management and Emergency Response
- Traveler Information
- Traveler Safety & Infrastructure Security
- Data Collection and Archiving
- Statewide Traffic Operations Center and Multi-Agency Coordination
- Network Services and Communication
- Traffic Management and Operations
- Commercial Vehicle Operations
- Institutional Coordination
- Airside Operations
- Port Operations and Security

Chapter 1 (User Needs) of Alaska Iways Architecture identifies and describes in detail the specific needs and desires falling under each of these categories that were expressed by stakeholders.

1.4 Alaska's ITS Program and Vision

Alaska's ITS Program and Long-Range Vision is based upon the full set of transportation needs and desires with the forethought that the complete set of ITS elements will not be in place for many years. Transportation needs and desires were grouped into specific program areas in which ITS related technologies can provide significant benefit. Hypothetical but realistic narratives of how users may encounter and benefit from these technologies are provided at the end of Chapter 3 (Long-Range ITS Vision) to help users envision how ITS related technologies come together to address transportation user needs.



1.4.1 Program Goals

Goals of Alaska's Iways Program are summarized as follows.

- **Enhance Quality of Life** - Travel is a key component of daily life, commerce, and tourism in Alaska. This goal attempts to improve and enhance travel between and on all modes while minimizing the adverse impacts and effects of transportation on the natural environment.
- **Improve Efficiency of ADOT&PF Operations** - ADOT&PF is responsible for maintaining and operating a multi-modal transportation network that covers a vast geographic area. Other challenges, including limited financial and physical resources and harsh climate make it difficult to operate and maintain portions of the State's transportation network. This goal installs systems that promote efficient delivery of services to maximize return on existing resources.
- **Improve Traveler and Staff Safety** - Safety is the foundation of ADOT&PF's mission, and ensuring traveler and staff safety is the principal purpose of Alaska's Iways Program. An important aspect of this goal is emergency and incident response and management.
- **Secure Transportation Assets** - Today governments and agencies within the U.S. have emphasized the security and safety of people and infrastructure. One aspect of this movement involves securing transportation assets in an effort to reduce exposure to acts of terror and other incidents that may damage, or affect the operational status of critical infrastructure.

1.4.2 Program Areas

The strategy to implement the Long-Range Vision consists of the following seven program areas:

- **Snow and Ice Control** - A significant amount of resources are applied to snow and ice control in Alaska. ITS can increase the efficiency of snow and ice operations, creating safer driving conditions. Key components of Snow and Ice Control include; road and pavement sensors, smart snow blowers, and avalanche detections systems.
- **Multi-Modal Information Connections** - Alaska's transportation system consists of air, water, and surface transportation modes, each of which is critical to ensure vital access throughout the state. Connecting these modes through shared information will improve the satisfaction of residents, tourists, and commercial vehicle operators. For instance, information collected by RWIS can provide valuable weather related information for individuals traveling by land or air.
- **Traveler Information and Communication** - Improving communication both to and from travelers is an aspect important to the overall safety of travelers. The detection of and efficient response to emergencies and crashes is a key objective. Technologies in Alaska's Iways Program will gather and disseminate information so a broad range of users can benefit.
- **Internal Operations** - ADOT&PF is committed to using technology to help them do more with the limited resources they have. Technologies such as a Maintenance Management System, automated traffic data collection, and improved crash data reporting, among others will be deployed to improve ADOT&PF operations while minimizing operational costs.
- **Commercial Vehicle Operations** - Commercial Vehicle Operations will evolve to be paperless as ADOT&PF and Alaska State Troopers (AST) deploy roadside and on-board vehicle subsystems. Ports of entry and weigh stations will be upgraded and instrumented to allow trucks to process paperwork and be weighed without stopping. Handheld computers will enable staff to perform additional safety inspections and gather historical safety information on commercial vehicles.
- **Traveler Safety and Infrastructure Security** - Over the last decade governments have emphasized securing the safety of people and infrastructure. ADOT&PF is committed to these efforts and views technology as one method that can be used to meet needs in these areas.
- **Transit Operations** - Promoting the use of transit is key to reducing congestion and its impacts in Alaska's urban areas. Alaska's transit management agencies are primarily interested in ITS to improve their existing operations. By improving operations, agencies hope to improve the efficiency of their operation, strengthen the public's perception of transit and increase ridership.

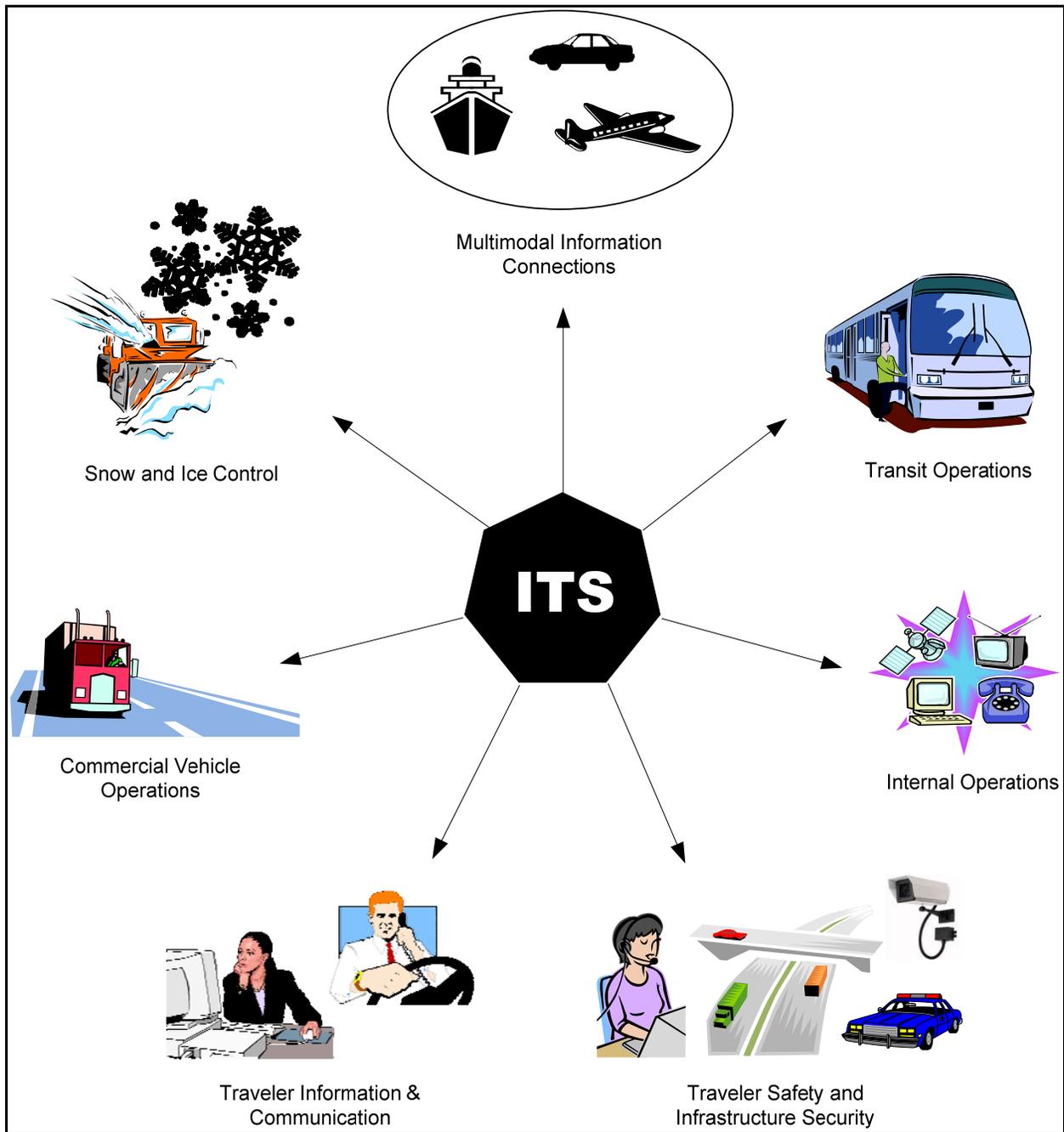


Figure 1:
Alaska ITS Program Areas

Alaska’s Iways Program Areas and Long-Range Vision are described in greater detail in Chapter 3 (ITS Long-Range Vision) of the Alaska Iways Architecture.

1.5 ITS Operational Concept

Alaska’s ITS Operational Concept describes at a high-level how agencies across the state, through the various ITS elements they own and operate, interconnect to form a “system of subsystems”. This includes an understanding of key agency roles and responsibilities for deploying, operating, and maintaining ITS elements, as well as descriptions of the ITS elements themselves. Chapter 4 of Alaska’s Iways Architecture eases understanding of agency roles and responsibilities by breaking them down by applicable National ITS Architecture transportation services areas. These areas are identified within Chapter 4 as mini Operational Concepts. Tables like that of Table 1 below are provided in Chapter 4 for each mini Operational Concept (i.e., transportation service area).

**Table 1:
Example of Stakeholder Roles and Responsibilities (Maintenance and Construction Vehicle and Equipment Tracking)**

| Stakeholder | ITS Elements | Roles and Responsibilities |
|---|--|---|
| ADOT&PF, Regional Maintenance and Operations Divisions, Regional Construction | Maintenance Vehicle Automatic Vehicle Location Sensors | <ul style="list-style-type: none"> • Monitor and maintain AVL units deployed on State owned maintenance/construction vehicles and equipment. • Collect maintenance/construction vehicle location. |
| MOA, Maintenance and Operations , Water & Waste Water Utility, Project Management & Engineering | Maintenance Vehicle Automatic Vehicle Location Sensors | <ul style="list-style-type: none"> • Monitor and maintain AVL units deployed on MOA owned maintenance/construction vehicles and equipment. • Collect maintenance/construction vehicle location. |

The intent of the Operational Concept is not only to describe how Alaska’s various ITS elements will be integrated and how they will be operated, but also to identify possibilities for improved institutional cooperation and coordination, laying the foundation for future agreements and/or memoranda of understanding agreements. These descriptions serve as the high-level framework that fosters statewide ITS integration and improves inter-agency communication, cooperation, coordination and commitment. This reduces confusion and breeds an environment where inter-agency consensus can be achieved.

1.6 Physical Architecture

Alaska’s Physical Architecture furthers the ITS Operational Concept in defining a high-level framework that shows how existing and planned ITS elements across the state interconnect to exchange information and data. It identifies the individual ITS elements that comprise the Alaska Iways Program, the functions these elements perform, and the information and data that are exchanged. It also identifies the agencies that own and operate these elements. The Architecture helps agencies easily visualize where in the “big picture” their ITS elements fit, and with what other elements they communicate, thus promoting understanding and achieving consensus. The architecture is illustrated through a series of diagrams, like the one shown in Figure 2. Diagrams like this show how individual elements connect and the types of information that are exchanged. Through these illustrations, gaps in system implementation can be more easily identified allowing for new ITS projects to be programmed and phased for implementation in a manner that best builds off the existing ITS framework.

obtaining benefits in the near-term while supporting larger, more complex projects with greater benefits in the long-term. It fully considers the resources available for implementing ITS technologies, previous, on-going and planned ITS activity, and the State's existing and planned ITS elements.

1.7.1 Alaska's Major On-going and Influential ITS Projects

The following ITS projects have major influence on project implementation in Alaska. In having this influence it is expected that these projects will guide ITS development and will in themselves provide the foundation for additional ITS projects going forward.

- **511 Travel Information System** - This project provides a web-based platform for sharing information on events such as road closures, restrictions due to maintenance or construction, or even information on extraordinary vehicle movements such as oilfield modules. Weather road condition and construction reports are also displayed. Information from the Road Weather Information System (RWIS) stations and the AMHS vessel tracking system is also available through Alaska's 511 system.
- **Automated Vehicle Identification E-Screening** – This project consists of overhead antennas and roadside cameras, coupled with in-vehicle transponders that automatically check the safety rating and credentials of participating motor carriers and vehicles. If checks come back ok, the system will allow vehicles to proceed down the highway without stopping.
- **Alaska Land Mobile Radio** - The Alaska Land Mobile Radio (ALMR) system is a shared-cost communications system situated along major highways and in communities, and based on trunked radio transmissions between vehicles or base stations. ADOT&PF is working with the statewide ALMR effort to deploy subscriber units to support Maintenance and Operations forces. The ADOT&PF's LMRS will integrate with the ALMR project so that both data and voice move seamless among the various public safety agencies. Once complete, the ALMR will provide a communications backbone along highways and permits data or voice communications between a wide variety of governmental and private sector users.
- **Geographic Information Systems for Transportation** - The Geographic Information Systems for Transportation (GIS-T) links historic and archival data with real-time information. It uses consistent geo-spatial reference to provide a platform capable of displaying all relevant geo-spatial data in a flexible, graphical format. The merged data will enhance planning and operational efficiency and decrease the cost of obtaining information using older paper map and tabular databases. By providing accurate information in a more useful format, GIS-T will help improve traveler safety, increase the efficiency of ADOT&PF operations, and enhance the quality of life in the State of Alaska.
- **Alaska's Road Weather Information System and the Alaska – Canada Highway Road Weather Portal Project** - The AlaskaRWIS network is a collection of environmental sensor stations (ESS) located along Alaska's major roadways. Each sensor station site has several weather and pavement sensors that collect data on pavement conditions, atmospheric conditions and sub-soil temperatures. Additionally, several sites are equipped with digital cameras that show weather and pavement conditions at the site. RWIS data are used to support ADOT&PF internal operations, especially maintenance, and public decision making. RWIS data is also shared with other agencies such as the national weather service and military bases, to support operations of these agencies to build a more robust collection of weather data. The ADOT&PF, in partnership other statewide and Canadian agencies is helping to develop a web application that would provide both travelers and highway maintenance personnel with real-time, quality-checked weather observations for the ALCAN Highway and major connecting routes. This project is serving as one of three regional demonstrations for Phase 1 of the Federal Highway Administration's (FHWA) *Clarus* Initiative.

1.7.2 Projects Approved for Implementation

The Statewide Transportation Improvement Program (STIP) and the Anchorage Transportation Improvement Program (TIP) provide a set of transportation projects slated for implementation over the next several years. Within this set of projects, is a subset of projects that either contain or entirely deploy ITS elements. For this reason, ITS-related projects in the STIP and Anchorage TIP are valid in determining the direction of ITS deployment in Alaska. These proposed and approved projects fill in gaps in ITS deployment and specifically address transportation related needs. Programmed projects essentially serve as the near-term deployment of ITS in that they are either currently being deployed or are slated to be deployed in the next 3 years. These projects while setting the direction for ITS deployment, serve as the foundation from which future ITS deployment will occur. With that said, proposed and approved projects must be considered in recommending future projects, so that ITS deployment can occur in an incremental, phased fashion that builds upon previous efforts.

Statewide Transportation Improvement Program Projects

The following projects listed in the STIP apply to the State Iways Program.

- **Alaska Highway Rehabilitation/WIM Installation** - This project will install a weigh-in-motion system, when the Alaska Highway is resurfaced from MP 1267 to 1314, in the Southeast Fairbanks region.
- **Bridge Scour Monitoring and Retrofit Program** - This project will install monitoring and telemetry and/or construct physical scour countermeasures at State bridges identified as scour critical by the federally mandated Scour Evaluation Program.
- **ARRC Collision Avoidance System** - This project consists of a communication-based train control system that uses data radio communications to improve communications and decision making, while detecting infrastructure failures and operations violations. The project is comprised of a Computer Aided Dispatch (CAD) system, an on-board computer system, VHF packet data radio technology, and GPS locator technology.
- **Computerized Materials and Maintenance Management System** - This project will serve as a tool for the Reliability Excellence Program providing a flexible, cost-effective and automated system to support and manage equipment, facilities maintenance, purchasing and inventory.
- **Geographic Information Systems (GIS) Development** - This project will upgrade ADOT&PF's transportation and GIS capabilities to develop a Highway Analysis System (HAS)-GIS interface. This interface will improve State road data distribution.
- **Weigh-in-Motion Equipment** - This project provides funding to purchase and install weigh-in-motion equipment at sites on National Highway System, as well as maintenance and enhancements at these and existing sites.
- **Highway Data Equipment Acquisition and Installation** - This project provides additional funding to design, construct or rehabilitate traffic data collection sites and develop software for Alaska's federally required Traffic Monitoring System for Highways. ITS elements included in this project are; traffic data counters, cameras, and computer hardware and software for remote data collection and analysis.



- **Wideband Multi-media Mobile Emergency Communications Pilot** - This project deploys a secure 4.9GHz mesh communications network accessible by emergency service providers in the Wasilla area. This network will allow pictures, video, voice and text to be transmitted over a high-speed broadband connection similar to an internet site. This will improve communication between agencies as well as people in the field. Video will also be used during non-incident periods, for traveler information purposes, allowing travelers to make effective decisions and alter driving behavior when incidents do occur or when weather conditions are severe.
- **Glenn Highway Corridor, MP 5 - Parks Highway Interchange ITS Project** - This project provides funding for planning, design, utilities and construction of additional dynamic message signs, low power FM or highway advisory radio, bridge automated de-icing systems, and environmental sensors for the Glenn Highway Corridor (MP 5 – Parks Highway Interchange).
- **Seward Highway Anchorage to Girdwood ITS Project** – This project provides funding for planning, design, and construction for alternatives, which are believed to consist of ITS for providing advanced warning to driver of poor driving conditions, and for supporting additional traffic enforcement.
- **Intelligent Transportation Systems Implementation Plan** - This project provides funding to implement projects recommended in the Alaska Iways Architecture Implementation Plan.
- **Intelligent Transportation Systems Operations and Maintenance** - This project provides for the operation and maintenance of ITS projects that are part of the Alaska Iways Architecture Implementation Plan. Funding is for design, right of way, construction, and utilities.
- **Maintenance Management System** - In 2002, the ADOT&PF began development of the Department’s Maintenance Management System (MMS). To date the system effectively manages ADOT&PF maintenance responsibilities and is able to track and plot assets within a GIS, which can be publicly viewed over the internet. This project provides additional funding to automated time sheet reporting, tracking of budget expenditures, work planning, deferred maintenance tracking, forecast budget requirements, and public service levels.

Anchorage Transportation Improvement Program Projects

The following projects listed in the Anchorage TIP apply to the State Iways Program.

- **Traffic Control Signalization Program** - This project provides for a combination of updated traffic signal timing plans, a new traffic management center, and additional emergency vehicle and low priority transit signal pre-emption.
- **ITS/ Automated Operating System** - This project will implement/operate public transportation ITS projects including; automated ticketing, smart fare boxes, web-based interfaces, and automated telephone system for the para-transit system.
- **Anchorage Integrated Roadnet, Phase2** - This project will result in a multi-agency, single and comprehensive source of GIS information for state and municipal agencies. This project is a continuation of the MOA’s Integrated Roadnet Project, which began in 2002 to integrate road network information into a geodatabase management system.
- **PeopleMover Fleet Improvement and Support Equipment** – This project funds improvements to existing transit and para-transit fleets. Possible projects include: a ticket reader and issue system, security systems, transit/signal improvements for headway enhancements, mobile display terminals, and vehicle communications and location systems.
- **Management Information Systems** - This project funds information systems necessary for efficient management of the public transportation system. Typical projects include: GIS capabilities, upgrades to the automated maintenance system, refueling and inventory system, a new computer aided dispatch system.

1.7.3 Potential ITS Projects (Mid- and Long-Term)

Because ITS cannot be integrated all at once, both existing and new systems should be integrated over time. Potential projects are projects that can be conceptually deployed or integrated in Alaska in the 3-10 year timeframe and that satisfy unaddressed needs and/or further develop existing ITS elements so as to develop a more robust system. Potential ITS projects are classified as being planned for deployment in the mid- (3-5 years) or long-term (5-10 years).



Mid-Term (3-5 Years)

Mid-term projects are those with potential to be implemented within the three to five year timeframe. Within this period, ITS deployments will begin to migrate into an integrated system. Projects recommended for this timeframe will incrementally expand ITS deployment by building upon existing ITS implementation to provide for enhanced functions that support long-term projects. The following projects are considered viable mid-term projects.

- **Expanded Deployment of Closed Circuit Television and Digital Cameras** – This project will enhance coverage of the existing camera network by deploying additional cameras at strategic points along highways, near critical infrastructure, and at major signalized intersections.
- **Expanded Deployment of Dynamic Message Signs** – This project will either deploy additional DMS or relocate existing signs to provide motorists with additional en-route information. Locations where additional information will be valuable or where problems are known to exist will be target for sign deployment
- **Expanded Deployment of Environmental Sensor Stations** – This project will enhance the current network of environmental sensor stations through deployment of additional environmental sensor stations. Additional ESS will begin to fill in gaps that currently are present between existing ESS. In doing so, data from additional ESS can be used to develop a more complete picture of weather conditions leading to improved micro-scale weather forecasts.
- **CVISN Deployment** - By deploying various components of the CVISN architecture, ADOT&PF's MSCVE Division will exchange motor carrier safety and credential administration data with AST and the DMV. Information will be accessible via the Internet.
- **Incident Management Planning** – This project provides specific guidelines and procedures for managing a variety of different types of incidents. Specific emergency scenarios will be detailed and agency roles and responsibilities will be defined for each scenario, leading to improved understanding and coordination among agencies.
- **Assess Feasibility for Public/Private Partnerships** – This project will investigate potential for public/private partnerships in Alaska. Partnerships could lead to significant operational improvements without significant investment and can significantly improve existing operations of both public and private agencies.

Long Term (5-10 Years)

This section describes the level of integration envisioned for ITS deployments in Alaska within the next ten years. Within the ten-year horizon, ITS deployments will reach optimal levels of robustness, in terms of both functionality and integration.

- **Snow and Ice Control Operations** - Data collected from smart snowplows will augment the data collected from RWIS stations. In turn, RWIS station data will be processed and provided to the smart snowplows via mobile data terminals. This information will consist of work assignments (i.e. where materials need to be applied, rates of application, and priority of work locations). Avalanche and landslide detection systems will also foster safety by detecting and alerting emergency management agency personnel of potentially hazardous conditions.

- **HazMat Tracking and Response** - Traveler safety and infrastructure security will be enhanced through better HAZMAT tracking and response. Technologies will be deployed to monitor commercial vehicles carrying HAZMAT goods, and improve response to HAZMAT accidents when they occur. This will mitigate the potential devastating impacts these accidents may produce.
- **Speed Detection and Reporting** – This project will deploy technology to detect vehicle speeds and disseminate speed information to travelers pre-trip and en-route. This information will allow travelers to change their travel plans when vehicles speeds indicate that roadways are congested or impacted by incidents.
- **Transportation Data Archive** - A single, common database shared among the various statewide transportation agencies will improve multi-agency operations, by reducing the level of effort currently expended to collect similar types of data. This archived data will improve transportation planning, by providing additional types of data to participating agencies and enabling these agencies to make improved decisions based on this data.

Beyond 10 years

Potential projects that may be viable beyond the 10 year planning horizon are described below.

- **Integrated Transportation Operations and Communications Center** - The Integrated Transportation Operations and Communications Center (ITOCC) may serve as the focal point for statewide transportation control systems and information dissemination. The information collected and processed at the ITOCC can be used to assist with various functions and operations of the Alaska transportation system. This will enhance both internal and external integration. The ITOCC will likely start as a virtual center that networks existing operations centers. The ITOCC may in part act as a statewide data archive and it will support the collection/dissemination of real-time data to improve transportation operations, traveler safety, and infrastructure security.
- **Variable Speed Limit System** - Due to Alaska's dynamic climate and rough topography, a variable speed limit system may improve highway safety by reducing vehicle speeds before or during adverse conditions. A variable speed limit system for Alaska will not be viable until a robust network of environmental sensors, traffic detectors, and dynamic message signs are first installed.
- **Lane Control Systems** - HOV lanes are identified as a long-range project (2016-2025) in the Anchorage 2025 Long Range Transportation Plan. It is likely that lane control systems will be needed and planned for when HOV lanes construction nears.