

1) Identification of ITS Projects.

An ITS project is a project that acquires technologies or systems of technologies that contribute to one or more ITS user service. A major ITS project typically includes systems that cross jurisdictional boundaries (such as municipal, state, and federal jurisdictional boundaries), is multi modal (includes different modes of transportation such as highways, airports, and ferry terminals), or that includes systems that affect the existing regional combination of ITS elements (this may include actions like combining or adding to existing elements to form a region-wide system, removing elements from systems, or breaking systems apart to form separate systems, etc.).

Table 430-1 lists ITS elements, the associated ITS program areas, and system manager. If a project is federally funded and contains any of the elements listed in Table 430-1, it must be developed as an ITS project. You are encouraged to develop non-federally funded projects that contain any of the elements listed in Table 430-1 as ITS projects also.

Contact the State ITS Coordinator at: iways@dot.state.ak.us if any part of a project may be an ITS element (as presented in the regional ITS architecture) and it is not included in the elements listed in table 430-1.

Identify all ITS projects as such in the scope portion of the Project Management Plan (PMP).

2) Regional Architecture

Develop ITS projects in accordance with the regional architecture that applies at the project location.

3) Systems Engineering Analysis

In consultation with the ITS managers, complete a systems engineering analysis for all ITS projects as part of the Design Study Report (DSR). The systems engineering analysis includes items one through seven listed below. Normally items two through seven may be included in the DSR by reference to the online table provided at:

http://www.dot.state.ak.us/stwddes/dcsprecon/assets/pdf/its/022205_itstable.pdf

The table at the preceding link provides contact information for individual ITS system managers and, as projects are developed, will include normal systems engineering analysis associated with each ITS program area for items two through seven. When conditions dictate, the normally applicable portions of the above referenced table must be altered. Note the variation in the Design Study Report.

1. Identify the ITS elements (and associated program areas) to be installed or improved as part of the proposed project and provide a brief description of the work to be accomplished to complete installation or improvement of those elements.
2. Identify roles, responsibilities, and positions of agencies that will participate in designing, purchasing, installing, operating, maintaining, expanding, or removing the system and what their responsibility will be.

3. Note: If items three through seven are not provided in the online table for an element, contact the system manager for that element and request that the system manager develop those items and provide them to the State ITS Coordinator to add to the table.
4. Identify what is needed to complete each system and how each element must function within the system. This includes all items necessary to complete a fully operational system including hardware, software, installation, training, etc.
5. Evaluate alternatives that will meet systems configuration and technology requirements and determine preferred alternatives.
6. Identify and evaluate procurement options (contractor fabricate and install, purchase proprietary system and contractor install, purchase proprietary system and install with State forces, etc). Identify the preferred option.
7. Identify the applicable standards and testing procedures from the regional ITS architecture standards section that apply to the project's ITS elements.
8. Identify all procedures and resources that are needed to manage, operate, and maintain the project's ITS elements.

An example system engineering analysis form, usable for both major and minor ITS projects, is provided online at:

http://www.dot.state.ak.us/stwddes/dcsprecon/assets/docs/its/022205_seaform.doc

Include the completed ITS Systems Engineering Analysis as an appendix to the Design Study Report.

Definitions

Archived Data Management System: An automated computer system that collects and stores traffic data from roadway sensors or detectors.

Automated Anti-Icing and De-icing System: An automated system that remotely applies anti-icing or de-icing chemicals to the roadway. The system uses atmospheric and pavement sensors to provide early warning of changing conditions. When weather conditions reach certain criteria, the application of chemicals is automatically performed. Technology includes environmental sensors to detect weather conditions, telecommunications to transmit data from the environmental sensor, and computer software to generate criteria and trigger the anti-icing and de-icing system built into roadway infrastructure.

Automated Pedestrian Detection System: Infrared or microwave detection devices or inductive pads that detect pedestrians in crosswalks and alert drivers of pedestrian presence by activating lights imbedded in crosswalks (lighted crosswalks) and flashing lights above the crosswalk.

Automatic Vehicle Location (AVL): Systems such as route guidance, computer-aided dispatch, transit traveler information, commercial vehicle fleet management, mayday or motorist assist technologies, congestion detection, and stolen vehicle recovery systems that incorporate positioning technologies, mapping and communications. AVL allows the location of a vehicle to be determined and tracked using Global Positioning Systems (GPS), radio frequency triangulation, proximity beacons, and cellular telephone systems.

Automated Work Zone Safety System: System of dynamic message signs, low-power FM radio, Highway Advisory Radio, and cameras used to relay real-time information to travelers about traffic delays and assist highway agencies in reduction of the time needed to identify and clear incidents.

Closed Circuit Television (CCTV): Video cameras used for freeway video surveillance. CCTV uses a chip, rather than a tube, to pick up the video image. CCTV also requires telecommunications to relay the CCTV video back to a central computer system. CCTV is an integral part of many ITS services such as Transportation Infrastructure Monitoring System, Traffic Management System, Traffic Operations Center, etc.

Crash Data Reporting System: A computer-based system using software that allows for the electronic transfer of crash data from incident/accident response agencies to transportation agencies who collect, store and review the data.

Credentials Administration System: An Internet site that allows commercial vehicle operators to apply for and receive credentials online.

Digital/Analog Video Cameras: Video cameras with analog or digital transmission used for traffic surveillance. Analog signals move along telephone lines as electromagnetic waves. Instead of waves, digital signals are transmitted in the form of binary bits.

Dynamic Message Signs: Signs that electronically vary the visual word, number or symbolic display through the use of computer software as traffic conditions warrant.

Electronic Screening: A system of:

- vehicles equipped with transponders
- roadside readers to receive messages from the vehicle transponders and to send messages to vehicle transponders

- electronic data interchange used to transmit safety and credentials history data from the information infrastructure to the roadside systems.

Emergency/Incident Mgt. System: A system using traffic sensors and detectors, cameras, telecommunications, computers, dynamic message signs, low-power FM and Highway Advisory Radio to help restore the full capacity of a highway as soon as possible after an incident occurs.

Environmental Sensors: A system used by transportation agencies to make winter maintenance decisions and to provide traveler information to the public, consisting of:

- Surface sensors, which monitor pavement temperature and surface conditions including presence of ice, frost, water, and snow
- Atmospheric-condition sensors, which monitor air temperature, dew point, relative humidity, precipitation, wind direction, wind speed, and visibility
- Remote processing units, which collect and transmit the surface and atmospheric data from the sensors to a central processing unit
- Central processing units that contain data for graphic presentation and transmit data to remote terminals.

Freight Management System: The application of automated vehicle location systems using GPS, telecommunications, computer-based information systems, and mobile communications. to reduce costs, minimize transport time, improve reliability of shipping schedules, eliminate shipment errors, improve the ease of doing business for customers, improve flexibility in providing specialized service, improve driver work conditions and performance, and improve safety.

Fleet Management System: The application of automated vehicle location using GPS, telecommunications, computer-based information systems, and automated vehicle detection system (sensors on the vehicle that detect diagnostics and maintenance) to improve the efficiency, reliability and safety of transit systems, thus making them more attractive to prospective riders, transit operators and the areas they serve.

Highway Advisory Radio (HAR): Radio transmission based traffic advisory system consisting of a communications system using antennas or buried cable and live messages, preselected taped messages or synthesized messages based on information from a traveler information database. Information is transmitted to motorists within range of the cable or antenna.

Infrared Inspection System: Infrared camera and computer-based system used at commercial vehicle weigh stations to detect malfunctioning brakes.

Intelligent Specialty Vehicle System: A system of differential GPS, telecommunications, computers, radar detectors, heads-up video monitor display (“smart snowplow/snow blower” or “driver-assistive systems technology”) in the cab of maintenance vehicles to provide drivers with information under difficult driving conditions, such as low visibility, severe weather, and narrow and congested roadways. Main purpose is to keep drivers inline with the road during low-visibility conditions.

Intelligent Transportation System (ITS): Electronics, communications, or information processing used singly or in combination to improve the efficiency or safety of a surface transportation system.

ITS Telecommunication Projects: Telecommunication technology such as digital subscriber lines, wireless, ethernet, sonnet, etc. used in intelligent transportation systems.

ITS Project: Any project that in whole or in part funds the acquisition of technologies or systems of technologies that provide or significantly contribute to the provision of one or more ITS user services as defined in the National ITS Architecture.

ITS System Manager: The individual position responsible for the ongoing operation of specific ITS components.

Land Mobile Radio System: High-frequency, two-way radios that allow both voice and data transmission to communicate with other emergency service agencies and access data from other intelligent transportation systems, such as road weather information systems, maintenance management systems, etc.

Low Power FM Radio: A motorist advisory communications system using antennas or buried cable and broadcasting live messages, preselected taped messages or synthesized messages based on information from a traveler information database. Motorists within range of the cable or antenna receive information. This system is similar to Highway Advisory Radio, but provides a stronger signal, less interference and uses non-commercial radio frequencies (not requiring FCC licensing).

Maintenance Decision Support System: A computer-based system that collects information from various weather databases and disseminates it electronically to transportation related agencies with the intent of improving road weather forecasting.

Maintenance Management Systems: A computer-based system that allows transportation agencies to manage and monitor maintenance activities electronically by collecting information in the field using laptops and transmitting the information to a central computer system where the data is stored and retrieved for analysis.

Multi-Modal Real Time Schedule and Reservation System: Internet based information storage and distribution system that provides online schedule and reservations for more than one mode (i.e. rail, air, and marine) and that allows travelers to plan their connections between modes in real-time, either before or during a trip.

Onboard Safety and Security System: A commercial vehicle system that uses automated sensors on the vehicle to collect and process on board vehicle and driver safety and security information for detection of unsafe equipment or load conditions.

Overheight Vehicle Detection: An infrared sender/receiver system with a transmitter that activates blankout signs, static signs with flashers, and audible warning devices to warn overheight vehicles approaching overpasses, tunnels, parking garages, etc.

Parking Management System: Computer-based electronic parking information and guidance system. The system typically uses sensors and transmitters to provide data to a processor with parking management software that automatically operates variable message signs showing a continuously updated inventory of available parking spaces, allowing motorists to select the most convenient parking space without searching.

Roadway Signal Priority: Siren, light, or infrared activated system of signal priority control at intersections. The system is typically used to reduce transit or emergency vehicle delay. Signal priority systems may be tied with a transit scheduling system to help keep buses on time.

Safety Information Exchange: An automated data system using electronic data transfer software, computers, and the internet to enable roadside collection and exchange of interstate/intrastate commercial vehicle safety information.

Smart Call Boxes: Call boxes that, in addition to serving as a motorist aid telephone, gather traffic data by video, speed, or traffic counts and serve as a telemetry device to relay the traffic information back to a central station.

Traffic Management System: A system of

- ramp metering
- ramp closures
- lane control
- variable speed control
- priority control for high-occupancy vehicles
- vehicle detectors
- call boxes
- weather and environmental detections
- overheight vehicle detection
- automatic truck warning system
- closed circuit television (CCTV)
- dynamic message signs
- lane-use control signals
- highway advisory radio (HAR)
- in-vehicle systems
- highway/railway intersection control
- communications (including real-time communications received from police and maintenance personnel, as well as cellular telephone reports called in from drivers) used to monitor, control, and manage traffic more effectively.

A Traffic Management System includes a Traffic Management Center and links to other ITS components in a metropolitan area.

Traffic Operations Center (TOC): A central facility for the control, monitoring and management of traffic signal, freeway and corridor control systems within its jurisdiction. A TOC consists of an operations room, computer and communications to access data from various sources, maintenance room, CCTV, large screen map displays and workstations.

Traffic Signal Control System: Signal systems that react to changing traffic conditions by receiving real-time inputs from traffic sensors (inductive loops, video cameras, etc). The system coordinates operation of adjacent signals to maximize the road network traffic throughput.

Transportation Infrastructure Monitoring System: A security system used to monitor strategic transportation infrastructure, such as major bridge crossings. Technologies include video or CCTV cameras and telecommunications to relay images back to a central server.

Traveler Reporting System: (Also referred to as Traveler Information System.) A system of computers that centralizes information from various databases, traffic sensors and detectors, environmental sensors, cameras, etc. and disseminates the data in the form of information such as road conditions, traffic advisory reports, weather advisories, etc. to the traveling public via internet or telephone (511) systems.

Vehicle Detection System: Loop, radar, video or audio-based detection system used to indicate the presence or passage of a vehicle, providing volume, speed, and occupancy data.

Vehicle Detection Systems include weigh in motion systems, traffic recorders, classifier detectors, and other similar items.

Vehicle Warning System: A system that incorporates vehicle detection systems such as overheight warning systems, lane departure warning systems or collision avoidance warning systems that use flashing lights and variable message signs to warn drivers of possible hazards.

**Table 430-1
ITS Elements**

ITS ELEMENT	ITS PROGRAM AREA*	ITS SYSTEM MANAGER
Animal/Vehicle Warning System	Traveler Safety and Infrastructure Security	Regional Traffic and Safety Engineer
Archived Data Management System	Traveler Communications	Regional Traffic Data Manager
	Internal Operations	
Avalanche Detection System	Snow and Ice Control	Regional Chief of Maintenance and Operations
Automated Anti Icing System	Snow and Ice Control	Regional Chief of Maintenance and Operations
Automated Pedestrian Detection System	Traveler Safety and Infrastructure Security	Regional Traffic and Safety Engineer
Automated Work Zone Safety System	Traveler Safety and Infrastructure Security	Regional Construction Chief
Automatic Vehicle Location	Commercial Vehicle Operations	MS&CVE ITS Coordinator
Bridge Scour Detection Systems	Internal Operations	Regional Chief of Maintenance and Operations
CCTV Cameras & Video Imaging	Internal Operations	State Hydraulics Engineer
	Internal Operations	Regional Traffic and Safety Engineer
	Traveler Communications	Regional Traffic and Safety Engineer
Crash Data Reporting System	Traveler Safety and Infrastructure Security	Regional Traffic and Safety Engineer
Crash Data Administration System	Internal Operations	Regional Traffic Data Manager
Dynamic Message Signs	Commercial Vehicle Operations	MS&CVE ITS Coordinator
Electronic Screening	Commercial Vehicle Operations	MS&CVE ITS Coordinator
	Snow and Ice Control	Regional Traffic and Safety Engineer
Emergency/Incident Mgt. System	Traveler Communications	Regional Traffic and Safety Engineer
Environmental Sensors	Commercial Vehicle Operations	MS&CVE ITS Coordinator
	Traveler Safety and Infrastructure Security	Regional Traffic and Safety Engineer
	Internal Operations	Regional Chief of Maintenance and Operations
Environmental Sensors	Snow and Ice Control	Regional Chief of Maintenance and Operations
	Traveler Communications	Regional Chief of Maintenance and Operations

Table 430-1 (Continued)
ITS Elements

ITS ELEMENT	ITS PROGRAM AREA*	ITS SYSTEM MANAGER
Freight Management System	Commercial Vehicle Operations	MS&CVE ITS Coordinator
Fleet Management System	Internal Operations	Regional Chief of Maintenance and Operations
Freeway Ramp Metering System	Traveler Safety and Infrastructure Security	Regional Traffic and Safety Engineer
Grade Crossing Warning Systems	Traveler Safety and Infrastructure Security	Regional Traffic and Safety Engineer
Highway Advisory Radio	Traveler Communications	Regional Traffic and Safety Engineer
Infrared Inspection System	Commercial Vehicle Operations	MS&CVE ITS Coordinator
Intelligent Specialty Vehicle System	Snow and Ice Control	Regional Chief of Maintenance and Operations
Interconnecting Traffic Signals	Traveler Safety and Infrastructure Security	Regional Traffic and Safety Engineer
Intersection Collision Warning System	Traveler Safety and Infrastructure Security	Regional Traffic and Safety Engineer
Land Mobile Radio System	Internal Operations	State M&O ITS Coordinator
Low Power FM Radio	Traveler Communications	Regional Traffic and Safety Engineer
Maintenance Decision Support System	Internal Operations	State M&O ITS Coordinator
Maintenance Management Systems	Internal Operations	State M&O ITS Coordinator
Major Communications Projects (DSL, Fiber, Satellite, etc.)	Other	State Information Technology Director
Multi-Modal Real Time Schedule and Reservation System	Multi-modal Information Connection	State ITS Coordinator
Onboard Safety and Security System	Commercial Vehicle Operations	MS&CVE ITS Coordinator
Over Height Warning Systems	Traveler Safety and Infrastructure Security	Regional Traffic and Safety Engineer
Parking Management System	Commercial Vehicle Operations	MS&CVE ITS Coordinator
Roadway Signal Priority	Traveler Communications	Regional Traffic and Safety Engineer
	Traveler Safety and Infrastructure Security	Regional Traffic and Safety Engineer

Table 430-1 (Continued)
ITS Elements

ITS ELEMENT	ITS PROGRAM AREA*	ITS SYSTEM MANAGER
Safety Information Exchange	Commercial Vehicle Operations	MS&CVE ITS Coordinator
Signal Control System	Traveler Safety and Infrastructure Security	Regional Traffic and Safety Engineer
Signal Preemption System	Traveler Safety and Infrastructure Security	Regional Traffic and Safety Engineer
Smart Call Boxes	Traveler Communications	Regional Traffic and Safety Engineer
Temperature Data Probe	Traveler Safety and Infrastructure Security	Regional Traffic and Safety Engineer
Traffic Detectors/Sensors	Snow and Ice Control	Regional Traffic Data Manager
Traffic Management System	Traveler Safety and Infrastructure Security	Regional Traffic and Safety Engineer
Trans. Infrastructure Monitoring System	Traveler Safety and Infrastructure Security	Regional Traffic and Safety Engineer
Traveler Reporting System	Traveler Communications	Regional Traffic and Safety Engineer
Vehicle Detection System	Traveler Communications	State ITS Coordinator
Vehicle Warning System	Commercial Vehicle Operations	MS&CVE ITS Coordinator
Weigh in Motion	Traveler Safety and Infrastructure Security	Regional Traffic and Safety Engineer
	Commercial Vehicle Operations	MS&CVE ITS Coordinator
	Internal Operations	State HPMS Coordinator

*ITS elements may be associated with more than one project area.