Appendix A - Glossary

INTRODUCTION

Common terms are necessary for all stakeholders to understand one another as we develop the Statewide ITS Strategic Plan and update the Statewide and Regional ITS Architectures, with the overall goal of improving the management and operations of the transportation networks – including expressways, arterials, rail, buses, ferries, and non-motorized modes – throughout the Garden State. Without a universal understanding, it is not possible for stakeholders, including those in adjacent states, to quickly and efficiently work together.

This glossary is based on the TRB "Glossary of Regional Transportation Systems Management and Operations Terms" (TRR Circular E-C133), and has been updated and expanded to meet the specific needs of the ""New Jersey Intelligent Transportation Systems Architecture Update." For example, the Glossary has been divide into three separate sections representing the major project activities, including:

- **Planning-**related terms (e.g., mainstreaming ITS into the planning process and performance management in Task 2; strategic vision, goals, and objectives in Task 4).
- **Transportation Systems Management and Operation (TSMO)**-related terms and the supporting ITS technologies (e.g., gap assessment and integration needs in Task 3; cost estimating methodology in Task 6)
- **ITS Architecture**-related terms (e.g., updating the regional and statewide ITS architectures in Task 5; developing a process for maintaining ITS architectures in Task 7).

The definitions herein are, to the greatest extent possible, based on existing definitions and descriptions identified in law or regulation, or in various documents developed and published by national transportation organizations (e.g., U.S. Department of Transportation, Transportation Research Board, Institute of Transportation Engineers). Pictures and graphics have been included in this glossary to help further promote understanding of the terms herein.

PLANNING TERMS

3-C Process: Continuing, cooperative and comprehensive planning process to encourage and promote the development of a multimodal transportation system that ensures safe and efficient movement of people and goods while balancing environmental and community needs. Statewide and metropolitan transportation planning processes are governed by Federal law and applicable State and local laws

Access Management: The systematic control of the location, spacing, design, and operation of driveways, median openings, interchanges, and street connections to a roadway, as well as roadway design applications that affect access, such as median treatments and auxiliary lanes, and the appropriate separation of traffic signals

Accessibility. The ease of reaching valued destinations, such as jobs, shops, schools, entertainment, and recreation

Adaptation: Strategies and organizational responses to protect or adapt systems so as to reduce the risks and moderate the potential harm from, and exploit the beneficial opportunities of, the impacts of climate change. Climate scientists have identified five climate changes of particular importance to transportation, including increases in very hot days and heat waves, increases in Arctic temperatures, rising sea levels, increases in intense precipitation events, and increases in hurricane intensity.

Attainment Area: Any geographic area in which levels of a given criteria air pollutant (e.g., ozone, monoxide, PM10, PM2.5, and nitrogen dioxide) meet the health-based National Ambient Air Quality Standards (NAAQS) for that pollutant. (See also "Nonattainment Area")

Average Annual Daily Traffic (AADT): Average daily traffic on a roadway link for all days of the week during a period of one year, expressed in vpd (vehicles per day)

Average Daily Traffic (ADT): The total traffic volume during a given time period, ranging from 2 to 364 consecutive days, divided by the number of days in that time period, and expressed in vpd (vehicles per day)

Capacity: A transportation facility's ability to accommodate a moving stream of people or vehicles in a given time period, under prevailing conditions (e.g., infrastructure, traffic, control)

Collaboration: Any cooperative effort between and among governmental entities (as well as with private partners) through which the partners work together to achieve common goals. Such collaboration can range from very informal, ad hoc activities to more planned, organized and formalized ways of working together.

Concept of Operations. A formal document that provides a user-oriented view of a proposed new system (or regional operations program). Also refer to "Operational Concept"

The Concept of Operations documents the total environment and use of the system to be developed in a non-technical and easy-to-understand manner; presents this information from multiple viewpoints; and provides a bridge from the problem space and stakeholder needs to the system level requirements. The Concept of Operations document results from a stakeholder view of the operations of the system being developed. These stakeholders include operators, users, owners, developers, maintenance, and management. This document can be easily reviewed by the stakeholders to get their agreement on the system description. It also provides the basis for user requirements."

Conformity: A Clean Air Act (42 U.S.C. 7506(c)) requirement that ensures that Federal funding and approval are given to transportation plans, programs and projects that are consistent with the air quality goals established by a State Implementation Plan (SIP).

Conformity, for the purpose of the SIP, means that transportation activities will not cause new air quality violations, worsen existing violations, or delay timely attainment of the NAAQS. The transportation conformity rule (40 CFR part 93) sets forth policy, criteria, and procedures for demonstrating and assuring conformity of transportation activities.

Complete Streets: Streets designed and operated to enable safe access and mobility for transportation system users of all ages and abilities, including pedestrians, bicyclists, motorists, and public transportation users.

Congestion. Congestion is travel time or delay in excess of that normally incurred under light or free-flow travel conditions. Congestion is often classified as either recurrent or non-recurrent. The type of congestion depends on whether the capacity or the demand factor is out of balance.

- **Recurrent** congestion occurs when demand increases beyond the available capacity. It usually is associated with the morning and afternoon work commutes, when demand reaches such a level that the freeway is overwhelmed and traffic flow deteriorates to unstable stop-and-go conditions.
- **Non-recurrent** congestion results from a decrease in capacity, while the demand remains the same. This kind of congestion usually results when one or more lanes are temporarily blocked due to a crash, disabled vehicle, weather events, etc.

Congestion Management Process (CMP). A systematic and regionally-accepted approach for managing congestion that provides accurate, up-to-date information on transportation system performance and assesses alternative strategies for congestion management that meet state and local needs. The CMP is intended to move these congestion management strategies into the funding and implementation stages. This results in a **Congestion Management Plan (CMP)**

Congestion Management Plan (CMP). A systematic approach, collaboratively developed and implemented throughout a metropolitan region, that provides for the safe and effective management and operation of new and existing transportation facilities through the use of demand reduction and operational management strategies.

Congestion Management System (CMS): A systematic and regionally accepted approach for managing congestion that provides accurate, up-to-date information on transportation system operations and performance and assesses alternative strategies for congestion management that meet State and local needs. (Note – Through SAFETEA-LU, the congestion management system has been replaced by the congestion management process. According to SAFETEA-LU, under certain conditions the congestion management system may constitute the congestion management process.

Connectivity Index: Used to quantify how well a roadway network connects destinations. Indices can be measured separately for motorized and nonmotorized travel, taking into account nonmotorized shortcuts, such as paths that connect cul-de-sacs, and barriers such highways and roads that lack sidewalks.

Context Sensitive Solutions (CSS): A collaborative, interdisciplinary, and holistic approach to the development of transportation projects. It is both process and product, characterized by a number of attributes. It involves all stakeholders, including community members, elected officials, interest groups, and affected local, state, and federal agencies. It puts project needs and both agency and community values on a level playing field and considers all trade-–offs in decision making**.**

Corridor: A broad geographical band that follows a general directional flow connecting major sources of trips that may contain a number of streets, highways and transit route alignments.

Designing for Operations: The combination of policies, procedures, and strategies that support the needs of transportation management and operations within transportation project design and development processes. Designing for Operations supports the mainstreaming of operational considerations in infrastructure design and maintenance activities and complements Planning for Operations by institutionalizing management and operations further in the project development process and providing additional emphasis on the day-to-day requirements of transportation system operators.

Financially Constrained or Fiscal Constraint: The metropolitan transportation plan, TIP, and STIP includes sufficient financial information for demonstrating that projects in the metropolitan transportation plan, TIP, and STIP can be implemented using committed, available, or reasonably available revenue sources, with reasonable assurance that the federally supported transportation system is being adequately operated and maintained.

Goals: Generalized statements that broadly relate the future of the physical environment and the condition of the system to values. Goals also provide the framework for developing objectives. (Refer to "Objectives" herein)

Greenhouse Gases (GHG): Gases in the atmosphere that trap the earth's heat. The most prevalent greenhouse gases are carbon dioxide (CO2) and water vapor. Other GHGs include methane (CH4), nitrous oxide (N2O), hydrofluorocarbons, and sulfur hexafluoride. GHGs vary in their effectiveness at trapping the earth's heat—also known as their global warming potential.

Institutional Architecture: The organizational characteristics (i.e., organizational structure, policy / mission, leadership / staff / resources/ technology) as well as the prevailing culture and values, legal framework, and partnering relationships – both formal and informal – among organizations.

Intermodal: The ability to connect, and the connections between, modes of transportation.

Level of Service (LOS): A qualitative measure describing operational conditions within a traffic stream, based on service measures such as speed and travel time, freedom to maneuver, traffic interruptions, comfort, and convenience**.**

Livability: Using the quality, location, and type of transportation facilities and services available to help achieve broader community goals. Livability in transportation helps to achieve those goals by leveraging financial resources and using the transportation planning process to advance supportive projects, policies, or decisions. Livability directly benefits people who live in, work in, or visit an area - whether in an urban, suburban, or rural context.

Livable Communities: Places where transportation, housing, and commercial development investments are coordinated to better serve the people living in those communities.

Long Range Transportation Plan (LRTP): A document resulting from regional or statewide collaboration and consensus on a region or state's transportation system, and serving as the defining vision for the region's or state's transportation systems and services. Sometimes referred to as Long Range Plan (LRP), Constrained Long Range Plan (CLRP), or Regional Transportation Plan.

Mainstreaming: Integrating operations and the supporting technologies into the institutional architecture of an agency, by which they become an formal activity (i.e., program) with an appropriate level of structure, management and support; consistent with the other regular state DOT "programs" such as project development or maintenance.

Maintenance: The preservation (scheduled and corrective) of infrastructure

Maintenance of Traffic (MOT): The work necessary to advise the public of changes to normal traffic flow and to indicate planned detours and alternate routes to closed roads. Use solely as advisory information to the public.

Metropolitan Planning Area. The geographic area in which the metropolitan transportation planning process required by 23 U.S.C. 134 and Section 8 of the Federal Transit Act (49 U.S.C. app. 1607) must be carried out.

Metropolitan Planning Organization (MPO): The forum for cooperative transportation decision making for the metropolitan transportation planning area. A Regional planning body, required in urbanized areas with a population over 50,000, and designated by local officials and the governor of the state. Responsible, in cooperation with the state and other transportation providers, for carrying out the metropolitan transportation planning requirements of federal highway and transit legislation. Formed in cooperation with the state, develops transportation plans and programs for the metropolitan area. For each urbanized area, a Metropolitan Planning Organization (MPO) must be designated by agreement between the governor and local units of government representing 75% of the affected population (in the metropolitan area), including the central city or cities as defined by the Bureau of Census.

Metropolitan Transportation Plan (MTP): The official multimodal transportation plan addressing no less than a 20-year planning horizon that is developed, adopted, and updated by the MPO through the metropolitan transportation planning process. The following factors shall be explicitly considered, analyzed as appropriate, and reflected in the metropolitan transportation plan:

- Preservation of existing transportation facilities and, where practical, ways to meet transportation needs by using existing transportation facilities more efficiently;
- Consistency of transportation planning with applicable Federal, State, and local energy conservation programs, goals, and objectives;
- The need to relieve congestion and prevent congestion from occurring where it does not yet occur;
- The likely effect of transportation policy decisions on land use and development and the consistency of transportation plans and programs with the provisions of all applicable short- and long-term land use and development plans;
- Programming of expenditures for transportation enhancement activities;
- The effects of all transportation projects to be undertaken within the metropolitan planning area, without regard to the source of funding;
- International border crossings and access to ports, airports, intermodal transportation facilities, major freight distribution routes, national parks, recreation areas, monuments and historic sites, and military installations;
- Connectivity of roads within metropolitan planning areas with roads outside of those areas;
- Transportation needs identified through the use of the management systems;
- Preservation of rights-of-way for construction of future transportation projects, including future transportation corridors;

- Enhancement of the efficient movement of freight;
- The use of life-cycle costs in the design and engineering of bridges, tunnels, or pavement (operating and maintenance costs must be considered in analyzing transportation alternatives)
- The overall social, economic, energy, and environmental effects of transportation decisions;
- Expansion, enhancement, and increased use of transit services;
- Capital investments that would result in increased security in transit systems; and
- Recreational travel and tourism.

Mobility: The ability to move or be moved from place to place, using one or more different modes.

Multimodal: The availability of transportation options using different modes within a system or corridor.

Objectives: Specific, measurable statements related to the attainment of goals.

Operational Concept: The roles and responsibilities of the primary stakeholders and the systems they operate. (Also refer to Concept of Operations) The purposes of an Occupational Concept Document (OCD) are to:

- Describe the system characteristics from an operational perspective
- Facilitate understanding of the overall system goals with users, buyer, implementers, architects, testers, and managers
- Form an overall basis for long range operations planning and provide guidance for development of subsequent system definition documents such as system specification and interface specifications
- Describe the users organization and mission from and integrated user / system point of view

A good OCD should tell a story; that is, it should be a narrative, pictorial description of the system's intended use. This is accomplished by describing the What, Where, When, Who, Why, and How of the system operations.

Peak Hour Volume (PHV): The traffic volume that occurs during the peak hour, expressed in vehicles per hour (vph). Peak hour volumes are typically 10 to 15 percent of daily volumes.

Performance Measurement: A process of assessing progress toward achieving predetermined objectives. Performance measurement supports the decision making process by generating indicators of how well the transportation system is achieving the desired or expected outcomes.

Performance Measures: Indicators that provide the basis for evaluating the transportation system operating conditions and identifying the location and severity of congestion and other problems.

Performance measures provide the basis for evaluating the transportation system operating conditions and identifying the location and severity of congestion and other problems. The performance measures provide the mechanism for quantifying the operation of the network, and should also be used to evaluate the effectiveness of implemented transportation management strategies and to identify additional improvements.

Performance measures are often as described as follows:

- *Input measures* look at the resources dedicated to a program;
- *Output measures* look at the products produced;
- O*utcome measures* look at the impact of the products on the goals and objectives of the agency / region.

Placemaking: A multi-faceted approach to the planning, design and management of public spaces. It involves looking at, listening to, and asking questions of the people who live, work and play in a particular space, to discover their needs and aspirations. This information is then used to create a common vision for that place.

Planning Factors: A set of broad objectives defined in Federal legislation to be considered in both the metropolitan and statewide planning process. Planning factors are a set of broad objectives defined in Federal legislation to be considered in both the metropolitan and statewide planning process.

Planning for Operations: A set of activities that takes place within the context of an agency, jurisdiction, and/or regional entity with the intent of establishing and carrying out plans, policies, and procedures that enable and improve the management and operation of transportation systems. Planning for Operations is a joint effort between operations and planning that encompasses the important institutional underpinnings needed for effective Regional Transportation Systems Management and Operations.

Planning for Operations includes three important aspects:

1. Regional transportation operations collaboration and coordination activity that facilitates Regional Transportation Systems Management and Operations,
2. Management and operations considerations within the context of the ongoing regional transportation planning and investment process, and
3. The opportunities for linkage between regional operations collaboration and regional planning.

Program: A coordinated, inter-related set of strategies, procedures, and activities, all intended to meet the goals and objectives articulated in vision statements and policies. A program has a long – term temporal view, whereas individual projects (refer to definition below) generally have a shorter implementation period. Managing a program involves trade-offs between budget and timing, and determinations as to appropriate sequence and scope of the associated projects.

Project: Well-defined, individual actions and activities that make up a program. The implementation of projects is how the program is realized.

Region: Metropolitan or any other multi-jurisdictional area

Regional Concept for Transportation Operations (RCTO): A framework that guides collaborative efforts to improve system performance through management and operations strategies. The RCTO is a management tool to assist in planning and implementing these strategies (within a region) in a collaborative and sustained manner

Regional Planning Organization (RPO): An organization that performs planning for multi-jurisdictional areas. MPOs, regional councils, economic development associations, rural transportation associations are examples of RPOs

Reliability: The degree of certainty and predictability in travel times on the transportation system. Reliable transportation systems offer some assurance of attaining a given destination within a reasonable range of an expected time. An unreliable transportation system is subject to unexpected delays, increasing costs for system users

A related performance measure is that of "travel time reliability", defined as the consistency or dependability in travel times, as measured from day-to-day and/or across different times of the day.

Road Diet: Removing travel lanes from a roadway and utilizing the space for other uses and travel modes.

SHRP 2 (Strategic Highway Research Program): The second SHRP focuses on four research areas, including safety, renewal, reliability, and capacity. The Reliability area is developing basic analytical techniques, design procedures, and institutional approaches to address the events—such as crashes, work zones, special events, and inclement weather—that result in the unpredictable congestion that makes travel times unreliable.

Stakeholder: Person or group affected by a transportation plan, program or project. Person or group believing that they are affected by a transportation plan, program or project. Residents of affected geographical areas

Stakeholders include any person or group with a direct interest (a "stake" as it were) in the integrated operation of the corridor / region and the associated networks and cross- network linkages. Stakeholders are sources of the corridor / regional vision, goals and objectives, operational approaches and strategies, and requirements.

State Transportation Improvement Program (STIP): A statewide prioritized listing/program of transportation projects covering a period of four years. It must be consistent with the long-range statewide transportation plan, MPO plans, and TIPs.

Statewide Transportation Plan: The official statewide multimodal, long-range transportation plan addressing no less than a 20-year planning horizon that is developed, adopted and updated by the state DOT through the statewide transportation planning process.

Sustainable Transportation (Sustainability): Meeting, and sometimes re-defining, the mobility needs of the present without compromising the ability of future generations to meet their needs. There are several attributes associated with a sustainable transportation network – a three-dimensional framework consisting of economic, social and environmental considerations.

- *Economic* - Transportation has long been recognized as essential to economic development. Efficient and reliable movement of people and goods – that is, mobility – improves productivity and can spur economic growth.
- *Social* - People, who are economically, socially, or physically disadvantaged, need transportation options and choices to give them opportunities to work, learn, and participate in society. Related societal issues include the security and the safety of the transportation network.
- *Environmental* - On a global scale, the looming threat of climate change has focused attention on the environmental impacts of the transportation sector, which contributes more than 25 percent of our nation's greenhouse gas (GHG) emissions.

Sustainability must be viewed as a collective process where decision making and actions carefully evaluate and balance the potential impacts of this "triple bottom line".

Throughput: Productivity of a machine, procedure, process, or system over a unit period, expressed in a figure-of-merit or a term meaningful in the given context.

Traffic Calming: Removing travel lanes from a roadway and utilizing the space for other uses and travel modes

Transportation Asset Management (TAM): A strategic and systematic process of operating, maintaining, upgrading, and expanding physical assets effectively through their life cycle. It focuses on business and engineering practices for resource allocation and utilization, with the objective of better decision making based upon quality information and well defined objectives.

The goal of a TAM program is to minimize the life-cycle costs for managing and maintaining transportation assets, including roads, bridges, tunnels, rails, and roadside features. TAM principles and techniques should be applied throughout the planning process, from initial goal setting and long-range planning to development of a Transportation Improvement Program and Statewide Transportation Improvement Program and then through to operations, preservation, and maintenance.

Transportation Demand Management (TDM): Programs designed to reduce vehicle demand on the transportation system during the peak hours through various means, such as the use of transit and of alternative work hours.

In the broadest sense, transportation demand management (TDM) is any action or set of actions intended to influence the intensity, timing, and spatial distribution of transportation demand for the purpose of reducing the impact of traffic or enhancing mobility options.

Transportation Improvement Program (TIP): A prioritized listing/program of transportation projects covering a period of four years that is developed and formally adopted by an MPO as part of the metropolitan transportation planning process. It must be consistent with the metropolitan transportation plan.

Transportation Management Area (TMA): An urbanized area with a population over 200,000, as defined by the Bureau of Census and designated by the Secretary of Transportation, or any additional area where TMA designation is requested by the Governor and the MPO and designated by the Secretary of Transportation.

Transportation Management Association (TMA): Non-profit, member-controlled organizations that provide transportation services in a particular area, such as a commercial district, mall, medical center or industrial park. They are generally public-private partnerships, consisting primarily of area businesses with local government support. TMAs provide an institutional framework for TDM programs and services. TMAs allow small employers to provide commute trip reduction services comparable to those offered by large companies. They avoid problems that may be associated with government-run TDM programs, since they are controlled by members.

Transportation Management Plan (TMP): A program of activities for alleviating or minimizing work-related traffic delays by the effective application of traditional traffic handling practices and an innovative combination of various strategies. These strategies encompass public awareness campaigns, motorist information, demand management, incident management, system management, construction methods and staging, and alternate route planning. Depending on the complexity of the work or magnitude of anticipated traffic impacts, a TMP may provide lane requirement charts, Standard Special Provisions for maintaining traffic, and for a major project, a separate comprehensive report.

Transportation Planning Process: The process of examining travel and transportation issues and needs in an area. It includes a demographic analysis of the community in question, an examination of travel patterns and trends as well as an analysis of alternatives to meet projected future demands and for providing a transportation system that meets the community's goals and objectives. Transportation planning is a cooperative process designed to foster involvement by all users of the system. Transportation planning process is required to be organized and directed for urbanized areas by a metropolitan planning organization (MPO) and for the state by the State Department of Transportation (DOT).

Unified Planning Work Program (UPWP). A statement of work identifying the planning priorities and activities to be carried out within a metropolitan planning area. At a minimum, the UPWP includes a description of the planning work and resulting products, who will perform the work, time frames for completing the work, the cost of the work, and the source(s) of funds.

Vision: An agreed statement of the overall aims of a transportation plan. In the context of regional transportation, a vision is the regionally-agreed statement of the overall aims of the regional transportation plan; describes the target end-state.

The purpose of a vision statement is to portray the future system and its operation for a specific time horizon, providing a platform for establishing goals and objectives. The vision statement must also be simple, easy to read and accessible to a wide audience.

Work Zone: An area of highway or transit line with construction, maintenance, or utility work activities .A work zone is typically marked by signs, channelizing devices, barriers, pavement markings, and/or work vehicles.

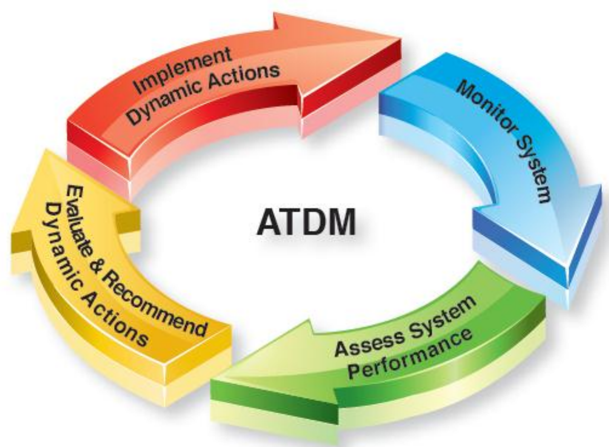
TRANSPORTATION SYSTEMS MANAGEMENT AND OPERATIONS

(Strategies and Supporting Components / Technologies)

Active Traffic Management (ATM). The ability to dynamically manage recurrent and non-recurrent congestion on the mainline based on prevailing traffic conditions. Focusing on trip reliability, it maximizes the effectiveness and efficiency of the facility. It increases throughput and safety through the use of integrated systems with new technology, including the automation of dynamic deployment to optimize performance quickly and without delay that occurs when operators must deploy operational strategies manually.

ATM strategies include speed harmonization / variable speed displays, dynamic lane assignment, hard shoulder running, junction control, and queue warning (refer to Figure1.)

Active Transportation and Demand Management (ATDM). The dynamic management, control, and influence of travel demand, traffic demand, and traffic flow of transportation facilities. Through the use of available tools and assets, traffic flow is managed and traveler behavior is influenced in real-time to achieve operational objectives, such as preventing or delaying breakdown conditions, improving safety, promoting sustainable travel modes, reducing emissions, or maximizing system efficiency.

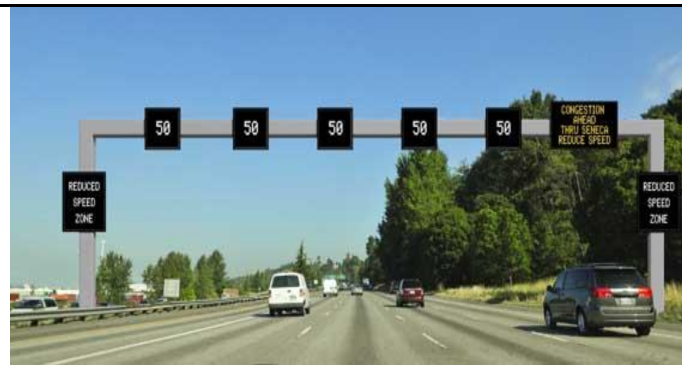


Adaptive Signal Control: A signal control concept where vehicular traffic in a network is detected at a point upstream and/or downstream and an algorithm is used to predict when and where traffic will be and to make signal adjustments at downstream intersections based on those predictions.

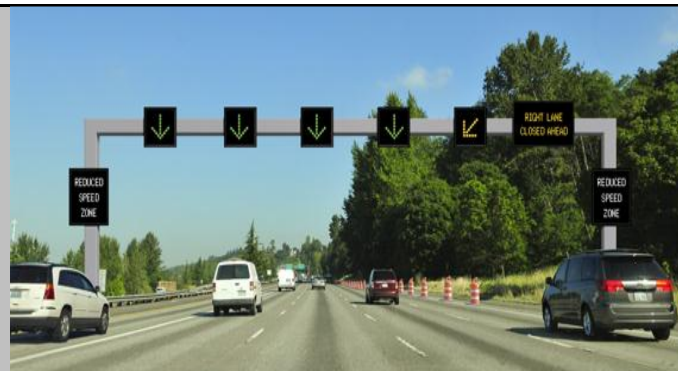
Advanced Transportation Management Systems (ATMS): Systems which seek to reduce, or at least contain, traffic congestion in urban environments by improving the efficiency of utilization of existing infrastructures.

Figure 1 – ATM Strategies

Speed harmonization utilizes **variable speed displays** – that are set (and varied) according to prevalent roadway and operating conditions, including visibility, weather, lane constraints (e.g., work zones), incidents, and real-time traffic flows / congestion levels. This helps minimize the differences between the lowest and highest vehicle speeds. Variable speed displays may be advisory or regulatory (i.e., variable speed limits / VSL).



Dynamic lane assignment (DLA) utilizes lane control signals – often installed in conjunction with variable speed displays – to provide advance notice that a lane(s) is closed ahead and to start the merge process into the available lanes well in advance of the actual closure. DLA also supports the ATM strategies of hard shoulder running and junction control.



Hard shoulder running (HSR) is the temporary use of the outside or inside paved shoulder as a travel lane. HSR is often limited to the morning and/or evening peak periods when recurrent congestion most often occurs, increasing available capacity during these periods. HSR may also be a means to improve traffic flow during incidents and special events. HSR is frequently implemented in conjunction with VSL and DLA. It may also be used as a managed lane (e.g., opening the shoulder as temporary HOT lane)

Interchange (junction) control dynamically changes lane allocation at interchanges based on mainline and entering or exiting ramp volumes. Through the use of signs (and sometime lighted pavement markings), mainline lanes can be closed, shoulders can be opened up, etc to accommodate entering or exiting traffic.

All Electronic Tolling (AET). Tolling system in which customers pay electronically without slowing down or stopping at tollbooths (Figure 2). Also known as **Open Road Tolling**.

Figure 2 - All Electronic Tolling

Bus Rapid Transit (BRT): A bus system that operates on bus lanes or other transit ways in order to combine the flexibility of buses with the efficiency of rail. This may include:

- A *bus lane* is a traffic lane on a surface street reserved for the exclusive use of buses (Figure 2)
- A *busway* is a special roadway designed for the exclusive use of buses. A busway can be in its own right-of-way, or in a railway or highway right-of-way.

BRT is an innovative, high capacity, lower cost public transit solution that can significantly improve urban mobility. BRT systems can easily be customized to community needs and incorporate state-of-the-art, low-cost technologies that result in more passengers and less congestion.

Figure 3 – Diagram of bus lane-based BRT

Clarus :A research and development initiative – established by the Federal Highway Administration (FHWA) Road Weather Management Program, in conjunction with ITS Joint Program Office – to reduce the impact of adverse weather conditions on surface transportation users. The goal of Clarus (Latin for “clear”) is to demonstrate and evaluate the value of “Anytime, Anywhere Road Weather Information” that is provided by both public agencies and the private weather enterprise to the breadth of transportation users and operators.

Congestion Pricing: A system of surcharging users of a roadway network during periods of peak demand to reduce congestion.

Connected Vehicle. A research program – sponsored by the USDOT Research and Innovative Technology Administration (RITA) and others – focusing on the development and deployment of a fully connected transportation system that makes the most of multi-modal, transformational applications addressing safety, mobility, and the environment. Connected vehicle applications include:

- Safety applications are designed to increase situational awareness and reduce or eliminate crashes through vehicle-to-vehicle (V2V) and vehicle-to-infrastructure (V2I) data transmission that supports driver advisories, driver warnings, and vehicle and/or infrastructure controls.
- Mobility applications captures real-time data from equipment located on-board vehicles (automobiles, trucks, and buses) and within the infrastructure. The data are transmitted wirelessly and are used by transportation managers in a wide range of *dynamic, multi-modal applications* to manage the transportation system for optimum performance.
- Environmental applications (AERIS - Applications for the Environment: Real-Time Information Systems) both generate and capture environmentally relevant real-time transportation data and use this data to create actionable information to support and facilitate "green" transportation choices.

Data Archiving: The systematic retention and re-use of transportation data that is typically collected to fulfill real-time transportation operation and management needs. Data archiving is also referred to as data warehousing or operations data archiving. Transportation operations and their respective sensors and detectors, and other data collection processes, are a potentially rich and detailed source of data about transportation system performance and characteristics.

Decision Support System (DSS): A form of expert system that continuously monitors data and other performance parameters collected from other system components, and then implements or recommends the most appropriate response.

Dynamic Lane Assignment (DLA): The use of lane control signals to provide advance notice that a lane(s) is closed ahead and to start the merge process into the available lanes well in advance of the actual closure. (Refer to previous Figure 1)

Dynamic Rerouting: The use of variable destination signing to make better use of available roadway capacity by directing motorists to less congested facilities.

Emergency Management: Also known as Emergency Transportation Operations (ETO). The process of preventing, preparing, responding, and recovering from an emergency; where an emergency is an unexpected, or "no-notice," large-scale, damaging event.

Event: An occurrence, which includes all types of incidents, emergencies and disasters (natural or human caused), that affects the transportation system, and requires actions to maintain the safety and mobility of the system.

Express Toll Lanes (ETL): A lane pricing strategy similar HOT lanes, except that all vehicles are charged a toll to use the lane. These facilities are essentially access restricted tollroads with limited access implemented within the freeway right-of-way and that are actively managed to preserve free-flow operating conditions.

First Responder: a person who is certified to provide medical care in emergencies before more highly trained medical personnel arrive on the scene.

Fusion Center" A mechanism (generally a facility) to exchange information and intelligence, maximize resources, streamline operations, and improve the ability to fight crime and terrorism by merging data from a variety of sources.

Hard Shoulder Running: The temporary use of the outside or inside paved shoulder as a travel lane. (Refer to previous Figure 1).

High Occupancy Toll (HOT) Lanes: A strategy allowing vehicles that do not meet occupancy restrictions established for a HOV lane to use it through payment of a toll. The toll is set to ensure that the lane remains free flowing. In this way, HOT lanes give drivers the option to pay for reliable and time-saving travel or to continue to travel on the general purpose freeway lanes.

Incident (also known as Traffic Incident). An unplanned randomly occurring traffic event that adversely effects normal traffic operations.

> [This definition is based on the Traffic Management Data Dictionary (TMDD) as published by ITE and AASHTO. The TMDD distinguishes traffic incident conditions from planned activities such as roadwork or maintenance activities.]

Incident Command System (ICS). A systematic tool used for the command, control, and coordination of emergency response. ICS allows agencies to work together using common terminology and operating procedures controlling personnel, facilities, equipment, and communications at a single incident scene. It facilitates a consistent response to any incident by employing a common organizational structure that can be expanded and contracted in a logical manner based on the level of required response. ICS is typically considered part of the broader National Incident Management System (NIMS). ICS refers to the command and control protocol at the highway incident scene.

Incident Management (also known as Traffic Incident Management): The systematic, planned, and coordinated use of human, institutional, electrical, mechanical, and technical resources to reduce the duration and impact of incidents, and improve the safety of motorists, crash victims, and incident responders. These resources are also used to increase the operating efficiency, safety, and mobility of the surface transportation network by systematically reducing the time to detect and verify an incident occurrence; implementing the appropriate response; and safely clearing the incident, while managing the affected flow until full capacity is restored. (See also "Incident" and "Incident Command System").

Integration: To make into a whole by bringing all parts together; unite (From American Heritage Dictionary, 4th Edition)

In the context of operations, integration is a term that is used to describe a bridging function between all of the various components, activities, and related attributes that comprise and impact the surface transportation network. The goal of integration is to bring the management and operation of the surface transportation network into a unified whole, thereby making the various transportation modes and facilities perform better and work together. (Note – Refer to Institutional Integration, Operational Integration, and Technical Integration, herein and Figure 4).

Figure 3 – Layers of Integration

Institutional Integration: Coordination among various agencies and jurisdictions to achieve seamless operations and/or interoperability. In order to achieve effective institutional integration of systems, agencies and jurisdictions must agree on the benefits of ITS and the value of being part of an integrated system. They must agree on roles, responsibilities, and shared operational strategies. Finally, they must agree on standards and, in some cases, technologies and operating procedures to ensure interoperability. The transportation agencies must also coordinate with agencies for which transportation is a key, but not a primary part of their business, such as, emergency management and law enforcement agencies.

Integrated Corridor Management (ICM): ICM consists of the operational coordination of multiple transportation networks and cross-network connections comprising a corridor, and the coordination of institutions responsible for corridor mobility. The goal of ICM is to improve mobility, safety, and other transportation objectives for travelers and goods.

Integrated Transportation Management System (ITMS): Provides for the automated, real-time sharing of information among ITS-based systems and the coordination of management activities among agencies.

Intelligent Transportation System (ITS): The application of advanced electronics, computers, communications, and sensor technologies – in an integrated manner – to increase the efficiency and safety of the surface transportation network. (From the ITS America 10-Year Vision)

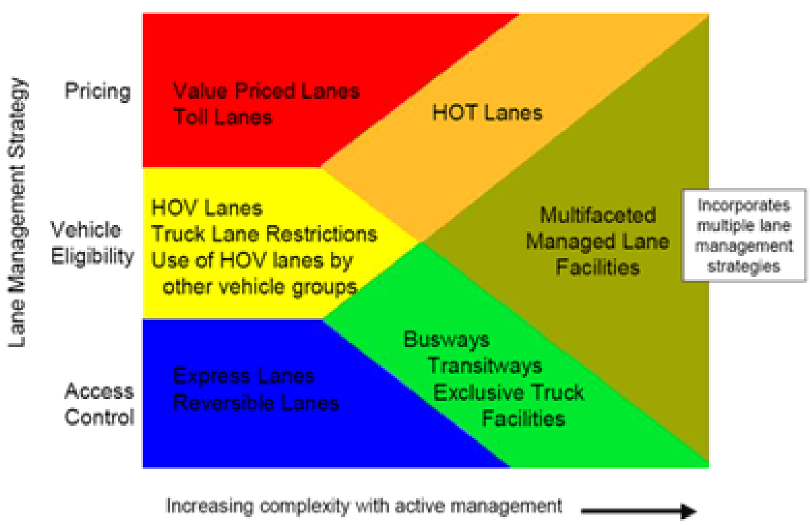
The electronics, communications or information processing in transportation infrastructure and in vehicles used singly or integrated to improve transportation safety and mobility and enhance productivity. Intelligent transportation systems (ITS) encompass a broad range of wireless and wire line communications-based information and electronics technologies.

As noted in the USDOT document "Applying a Regional ITS Architecture to Support Planning for Operations: A Primer", **ITS is the enabling technology for operations.**

Junction Control: Also known as **"interchange control",** A strategy that dynamically changes lane allocation at interchanges based on mainline and entering or exiting ramp volumes. Junction control is useful for situations with a varying relationship between mainline demand and ramp demand. (Refer to previous Figure 1) .

Managed Lanes: Highway facilities or a set of lanes where operational strategies are proactively implemented and actively managed to optimize traffic flow and vehicular throughput. The principal management strategies can be categorized into three groups: pricing, vehicle eligibility, and access control as shown in Figure 4.

Figure 4 – Lane Management Strategies



Management and Operations: Refer to "Transportation Systems Management and Operations."

Mileage Based User Fee (MBUF): A fixed fee levied on each mile driven per-vehicle within an implementing jurisdiction**.** Note – Also known as **Road Usage Charge (RUC)** and **Vehicle Mileage Tax (VMT)**

National Incident Management System (NIMS): A unified national framework for incident management, providing a consistent nationwide approach for Federal, state, local, and tribal governments; the private sector; and non-governmental organizations to work effectively and efficiently together to prepare for, respond to, and recover from domestic incidents, regardless of cause, size, or complexity. NIMS includes a core set of concepts, principles and terminology, identified as the Incident Command System (ICS as defined herein); multi-agency coordination systems; training; identification and management of resources; qualification and certification; and the collection, tracking, and reporting of incident information and incident resources.

Next Generation 9-1-1 (NexGen911): A research and development project to help define the system architecture and develop a transition plan to establish a digital, Internet Protocol (IP)-based foundation for the delivery of multimedia 9-1-1 "calls.

Operational Integration: The implementation of multi-agency transportation management strategies, often in real-time, that promote information sharing and cross-network coordination and operations among the various transportation networks in the corridor / regions, and facilitate management of the total capacity and demand of the corridor / region.

Operations: All decision making and actions necessary for the proper functioning of a system, such as information gathering (from a variety of sources), synthesis and processing, and dissemination and distribution of the decisions and information to traffic control equipment, other agencies and decision makers (including those associated with maintenance activities), and the public. (Also see Transportation Systems Management and Operations.)

Parking Management: A variety of strategies, including variable parking pricing, that encourage more efficient use of existing parking facilities, improve the quality of service provided to parking facility users and improve parking facility design.

Planned Special Event: A public activity with a scheduled time, location, and duration that may impact the normal operation of the surface transportation system due to increased travel demand and / or reduced capacity because of event staging.

Planned Special Event Management: Developing and implementing a transportation management plan that contains operations and service strategies specific to managing traffic, transit, and travel demand for a planned special event. The goals of planned special event management include achieving predictability (e.g., define the area and transportation system components impacted, conduct analyses of parking demand and traffic demand), ensuring safety (e.g., minimize pedestrian/vehicular conflicts, provide unimpeded access routes for emergency services), and maximizing efficiency (e.g., use all available resources and excess transportation system capacity, including road and transit capacity).

Queue Warning: The use of technologies (e.g., warning signs, flashing lights, in-vehicle devices) to alert motorists of downstream queues. Queue warning goals include effectively utilizing available roadway capacity and reducing the likelihood of collisions related to queuing. In some applications, the cause of the queue (crash, maintenance activities, other congestion) is also displayed on Dynamic Message Signs.

Ramp Management. The application of control devices, such as traffic signals, signing, and gates to regulate the number of vehicles entering or leaving the freeway, or to smooth out the rate at which vehicles enter and exit the freeway. Ramp management is implemented to achieve operational objectives such as: improved safety, improved mobility, improved perception of transportation management agencies and staff, and reduced environmental impacts. Ramp management typically encompasses the following strategies:

- Ramp metering – The use of a traffic signal(s) deployed on a ramp to control the rate at which vehicles enter a freeway. By controlling the rate at which vehicles are allowed to enter a freeway, the flow of traffic onto the freeway becomes more consistent, smoothing the flow of traffic on the mainline and allowing more efficient use of existing freeway capacity.
- Ramp closure
- Special use treatments – Giving "special" consideration to a vehicle class or classes to improve safety, improve traffic conditions, and/or encourage specific types of driving behavior. Examples include HOV bypass lanes and HOV exclusive ramps.
- Ramp terminal treatments. Typically, ramp terminal treatments focus on managing queues that form on the ramp that spill back onto an adjacent arterial or the freeway facility. Examples include ramp widening to provide additional storage or special purpose lanes, signal timing and turn restrictions upstream of the ramp, and signing and pavement marking improvements.

Regional Transportation System Management and Operations (RTSMO): An integrated program to optimize the performance of the existing infrastructure though implementation of multi-modal and inter-modal, cross-jurisdictional systems, services, and projects designed to preserve capacity and improve security, safety, and reliability of transportation systems. Examples of programs and project areas where RTSMO can be implemented include (but not limited to) active transportation and demand management (ATDM) and the associated strategies, emergency management, incident management, road weather management, special events management, managed lanes, work zone management, demand management, congestion pricing, and integrated corridor management (Refer to definitions herein).

RTSMO requires "regional transportation operations collaboration and coordination' – a deliberate, continuous, and sustained activity that takes place when transportation agency managers and officials responsible for day-to-day operations (i.e., stakeholders) work together at a regional level to solve operational problems, improve system performance, and communicate better with one another.

Road Pricing: A fee related to the use of a roadway facility. Road pricing may impose a price on a vehicle's use of the road based on time of day, location, type of vehicle, number of occupants, or other factors.

Road Weather Management: Mitigation strategies employed in response to various weather threats including fog, high winds, snow, rain, ice, flooding, tornadoes, hurricanes, and avalanches. Three types of road weather management strategies may be employed in response to environmental threats:

- Advisory strategies provide information on prevailing and predicted conditions to both transportation managers and motorists.

- Control strategies alter the state of roadway devices to permit or restrict traffic flow and regulate roadway capacity.
- Treatment strategies supply resources to roadways to minimize or eliminate weather impacts. Many treatment strategies involve coordination of traffic, maintenance, and emergency management agencies.

Technical Integration. Provides the means (e.g., communication links between agencies, system interfaces, and the associated standards) by which information and system operations and control functions can be effectively shared and distributed among networks and their respective transportation management systems, and by which the impacts of operational decisions can be immediately viewed and evaluated by the affected agencies.

Traffic Management Channel (TMC): A specific application of the FM Radio Data System (RDS) used for broadcasting real-time traffic and weather information. In North America, TMC location codes are assigned and maintained through a collaborative effort between map publishers - NAVTEQ and TeleAtlas. The network segments used by most information service providers in the United States are based on these TMC codes in order to standardize the reporting of traffic events on major roadways under a unique set of geographical references. TMC codes are typically assigned at significant decision points and intersections.

Traffic Signal Management. The planning, design, integration, maintenance, and proactive management of a traffic signal system in order to achieve policy based objectives to improve the efficiency, consistency, safety, and reliability of the traffic signal system. Traffic Signal Management includes the design and maintenance of timing parameters for the traffic conditions as well as the maintenance of the equipment. Traffic signal systems include a wide variety of subsystems, such as traffic signal displays, traffic signal controllers, detection systems, data-collection and archiving, surveillance and monitoring, and telecommunications. By extending this across jurisdictional boundaries and cooperating amongst agencies (i.e., Regional Traffic Signal Management), there can be effective collaboration to improve service quality by sharing experiences and planning to address future needs.

Transit Connection Protection: Holding one transit service (e.g., at a transit hub) for the arrival of another transit service, thereby allowing passengers to transfer between services.

Transit Signal Priority (TSP): An operational strategy that facilitates the movement of transit vehicles, either buses or streetcars, through traffic-signal controlled intersections. Objectives of TSP include improved schedule adherence and improved transit travel time efficiency while minimizing impacts to normal traffic operations e trips by providing travelers with choices relative to route, time, and mode.

Transportation Management Center (TMC): The hub of a transportation management and control system. The TMC brings together human and technological components from various agencies to perform a variety of functions. TMCs may deal with freeway traffic management, surface street traffic management, transit management or some combination of these functions. (Figure 5 is a picture of the John A. Cifelli Statewide Traffic Management Center (STMC) in Woodbridge, NJ – housing the traffic management systems and staff for NJ Turnpike (including the Garden State Parkway), NJ DOT, and the NJ State Police.

Figure 5 – NJ STMC

Transportation Systems Management and Operations (TSMO): As defined in MAP 21 – Integrated strategies to optimize the performance of existing infrastructure through the implementation of multimodal and intermodal, cross-jurisdictional systems, services, and projects designed to preserve capacity and improve security, safety, and reliability of the transportation system. The term includes"

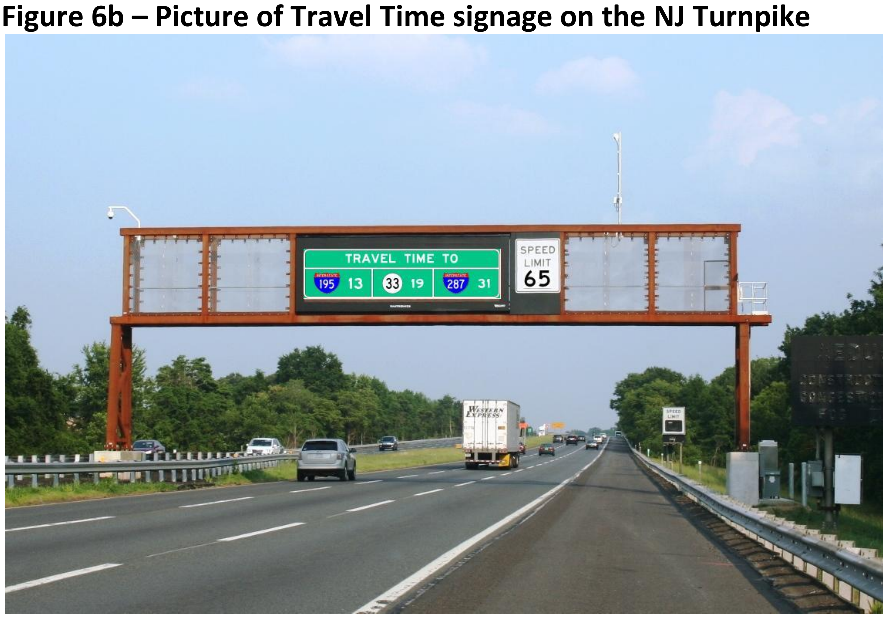
- Actions such as traffic detection and surveillance, corridor management, freeway management, arterial management, active transportation and demand management, work zone management, emergency management, traveler information services, congestion pricing, parking management, automated enforcement, traffic control, commercial vehicle operations, freight management, and coordination of highway, rail, transit, bicycle, and pedestrian operations; and
- Coordination of the implementation of regional transportation system management and operations investments (such as traffic incident management, traveler information services, emergency management, roadway weather management, intelligent transportation systems, communication networks, and information sharing systems) requiring agreements, integration, and interoperability to achieve targeted system performance, reliability, safety, and customer service levels.

Travel Demand Management: Managing both the growth of and periodic shifts in traffic demand in a manner that optimizes transportation system performance for commute and non-commute trips by providing travelers with choices relative to route, time, and mode. Managing demand can no longer stop at encouraging travelers to change their travel mode from driving alone to choosing a carpool, vanpool, public transit vehicle, or other commuter alternative. Managing demand today is about providing all travelers, regardless of whether they drive alone, with choices of location, route, and time, not just mode of travel. Real-time information systems can now let travelers make better decisions about how they travel (mode), when they travel (time), where and whether they travel (location), and which route they travel (path). (Also refer to “ATDM” and “Travel Time Signing and Dynamic Rerouting”).

Travel Time Signing: An approach that uses specially designed variable message signs to display estimated travel time information to drivers of a roadway facility. (Figure 6a and 6b)

Figure 6a – Picture of Travel Time signage on I-95 in the Philadelphia area

Figure 6b – Picture of Travel Time signage on the NJ Turnpike



Variable Speed Displays: Variable speed displays are set (and varied) according to prevalent roadway and operating conditions, including visibility, weather, lane constraints (e.g., work zones), incidents, and real-time traffic flows / congestion levels. This helps minimize the differences between the lowest and highest vehicle speeds. The deployment of this ATM strategy is proactive and automated to optimize its benefits. Refer to previous Figure 1)

Work Zone Management. Strategies implemented for managing traffic during construction as necessary to minimize traffic delays, maintain or improve motorist and worker safety, complete roadwork in a timely manner, and maintain access for businesses and residents. Transportation management strategies for a work zone include temporary traffic control measures and devices, public information and outreach, and operational strategies such as travel demand management, signal retiming, and traffic incident management.

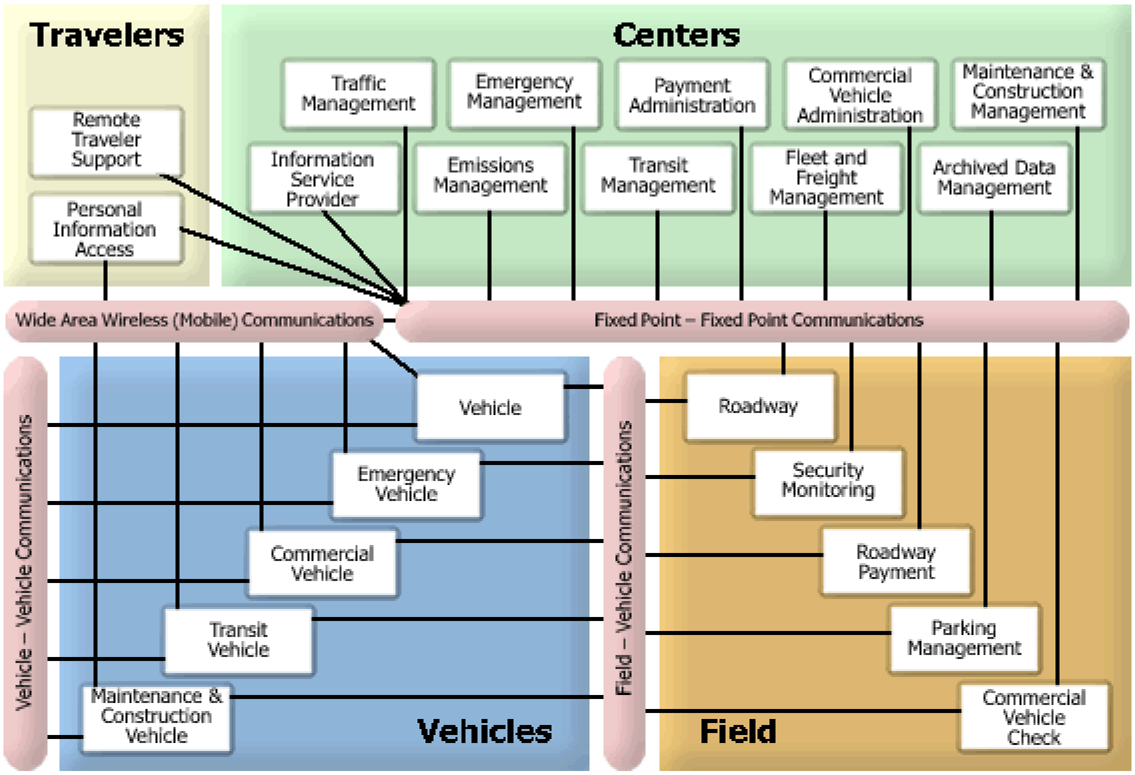
ITS ARCHITECTURE

(All terms and definitions taken from the National ITS Architecture website, except as noted – http://www.iteris.com/itsarch/html/glossary/glossary-z.htm)

Architecture: A framework within which a system can be built. An architecture functionally defines what the pieces of the system are and the information that is exchanged between them. An architecture is functionally oriented and not technology-specific. It defines "what must be done," not "how it will be done."

Architecture Flow: Information that is exchanged between subsystems in the physical architecture (Figure 7) of the National ITS Architecture. Architecture flows are the primary tool that is used to define interfaces in regional and project ITS architectures. The terms “information flow” and "architecture flow" are used interchangeably. (Note – Figure 7 is also known as the “sausage diagram”).

Figure 7 – Physical Architecture of the National ITS Architecture



Architecture Interconnect: Communications paths that carry information between subsystems in the physical architecture of the National ITS Architecture. Several different types of interconnects are defined in the National ITS Architecture to reflect the range of interface requirements in ITS. The majority of the interconnects are various types of communications links, including fixed point – fixed point, wide area wireless (mobile), field-vehicle, and vehicle-vehicle.

Center Subsystem: One of four general subsystem classes defined in the National ITS Architecture, Center Subsystems provide management, administrative, and support functions for the transportation system. The center subsystems each communicate with other centers to enable coordination between modes and across jurisdictions. Some examples of center subsystems are Traffic Management, Transit Management, Commercial Vehicle Administration, Archived Data Management, Emissions Management, Toll Administration, Emergency Management, Information Service Provider, and Fleet and Freight Management. (Also refer to Field Subsystem, Traveler Subsystem, and Vehicle Subsystem, as shown in Figure 7.)

Data Flow: Representations of data flowing between processes in the logical architecture of the National ITS Architecture. Data flows are aggregated together to form high-level architecture flows in the physical architecture.

Interoperability: The ability of two or more systems or components to exchange information and to use the information that has been exchanged.

Element: An ITS system or a piece of a system named as the name used by stakeholders. Elements are the basic building blocks of regional ITS architectures and project ITS architectures.

Equipment Package: The building blocks of the subsystems of the physical architecture subsystems. Equipment packages group similar processes of a particular subsystem together into an "implementable" package.

Field Subsystems: One of four general subsystem classes defined in the National ITS Architecture, Field Subsystems consist of intelligent infrastructure distributed along the transportation network which performs surveillance, information provision, and plan execution control functions and whose operation is governed by center subsystems. Field subsystems also directly interface to vehicle subsystems.

Logical Architecture: The part of the National ITS Architecture that defines what has to be done to support the ITS user services. It defines the processes that perform ITS functions and the information or data flows that are shared between these processes.

National ITS Architecture: A common, established framework for developing integrated transportation systems. The US National ITS Architecture is comprised of the physical architecture and the logical architecture that satisfy a defined set of user service requirements. It is maintained by US DOT.

Physical Architecture: The part of the National ITS Architecture that provides agencies with a physical representation (though not a detailed design) of the important ITS interfaces and major system components. The principal elements in the physical architecture are the subsystems and architecture flows that connect these subsystems into an overall structure. (Refer to figure 7)

Regional ITS Architecture: A specific, tailored framework for ensuring institutional agreement and technical integration for the implementation of ITS projects or groups of projects in a particular region. It functionally defines what pieces of the system are linked to others and what information is exchanged.

Per FHWA's Rule 940 – which required the development of regional ITS architectures and the subsequent adherence of all ITS projects to that regional ITS architecture –the regional ITS architecture shall include, at a minimum, the following: (1) A description of the region; (2) Identification of participating agencies and other stakeholders; (3) An operational concept that identifies the roles and responsibilities of participating agencies and stakeholders in the operation and implementation of the systems included in the regional ITS architecture; (4) Any agreements (existing or new) required for operations, including at a minimum those affecting ITS project interoperability, utilization of ITS related standards, and the operation of the projects identified in the regional ITS architecture; (5) System functional requirements; (6) Interface requirements and information exchanges with planned and existing systems and subsystems (for example, subsystems and architecture flows as defined in the National ITS Architecture); (7) Identification of ITS standards supporting regional and national interoperability; and (8) The sequence of projects required for implementation.

Development of the regional ITS architecture should be consistent with the transportation planning process for Statewide and Metropolitan Transportation Planning.

Service Package: Service packages, formerly known as **market packages**, provide an accessible, service-oriented perspective to the National ITS Architecture. They are tailored to fit, separately or in combination, real world transportation problems and needs. They identify the pieces of the physical architecture that are required to implement a particular ITS service. Service packages are implemented through projects (or groups of projects / programs), and are directly related to ITS strategies used to meet regional goals and objectives.

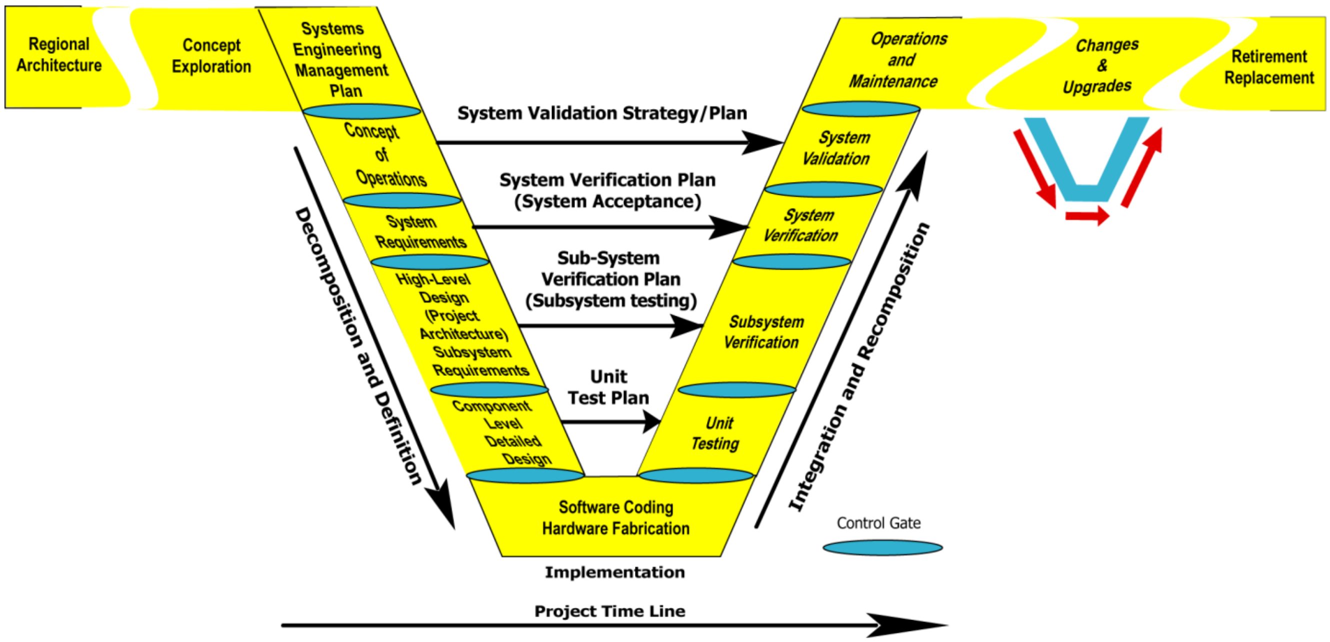
Subsystem: The principle structural element of the physical architecture (Refer to Figure 2). Subsystems are individual pieces of the Intelligent Transportation System defined by the National ITS Architecture. Subsystems are grouped into four classes: Centers, Field, Vehicles, and Travelers. Example subsystems are the Traffic Management Subsystem, the Vehicle Subsystem, and the Roadway Subsystem. These correspond to the physical world: respectively traffic operations centers, automobiles and transit vehicles, and roadside / transit way devices and controllers.

Subsystem Diagram: A diagram which depicts all subsystems in the National ITS Architecture and the basic communication channels between these subsystems. The subsystem diagram is a top-level architecture interconnect diagram. Variations of the subsystem diagram are sometimes used to depict regional and project ITS architectures at a high level.

Systems Engineering: A process incorporating a set of management and technical tools to analyze problems and provide structure to projects involving system development; a requirements-driven process in which user requirements are the overriding determinant of system design, component selection and implementation.

The systems engineering process is often shown as a “V” (Figure 8) as a way of relating the different stages in the system life cycle to one another. A key feature of the “V” model is how it explicitly shows the relationship between work done on each side of the “V” – for example, the testing activities on the right side of the V are based on the results (e.g., needs, goals and objectives, performance measures, concept of operations, requirements) from the corresponding steps on the left side of the V.

Figure 8: Systems Engineering "V" Diagram



System Inventory: The list of all ITS-related elements in a regional ITS architecture or a project ITS architecture.

Traveler Subsystems: One of four general subsystem classes defined in the National ITS Architecture , Traveler Subsystems consist of equipment used by travelers to access ITS services pre-trip and en-route. This includes equipment that are owned and operated by the traveler as well as equipment that are owned by transportation and information providers.

Turbo Architecture: An automated software tool used to input and manage system inventory, service packages, architecture flows and interconnects of a regional ITS architecture.

User Services: User services document what ITS should do from the user's perspective. A broad range of users are considered, including the traveling public as well as many different types of system operators. The concept of user services allows system or project definition to begin by establishing the high level services that will be provided to address identified problems and needs.

User Services Bundle: A logical grouping of user services that provides a convenient way to discuss the range of requirements in a broad stakeholder area. User services are grouped into eight bundles: Travel and Traffic Management, Public Transportation Management, Electronic Payment, Commercial Vehicle Operations, Emergency Management, Advanced Vehicle Safety Systems, Information Management, and Maintenance and Construction Operations.

Vehicle Subsystems: One of four general subsystem classes defined in the National ITS Architecture Vehicle Subsystems cover ITS related elements on vehicle platforms. This includes general driver information and safety systems applicable to all vehicle types. Four fleet vehicle subsystems

(Transit, Emergency, Commercial and Maintenance and Construction Vehicles) add ITS capabilities unique to these special vehicle types.