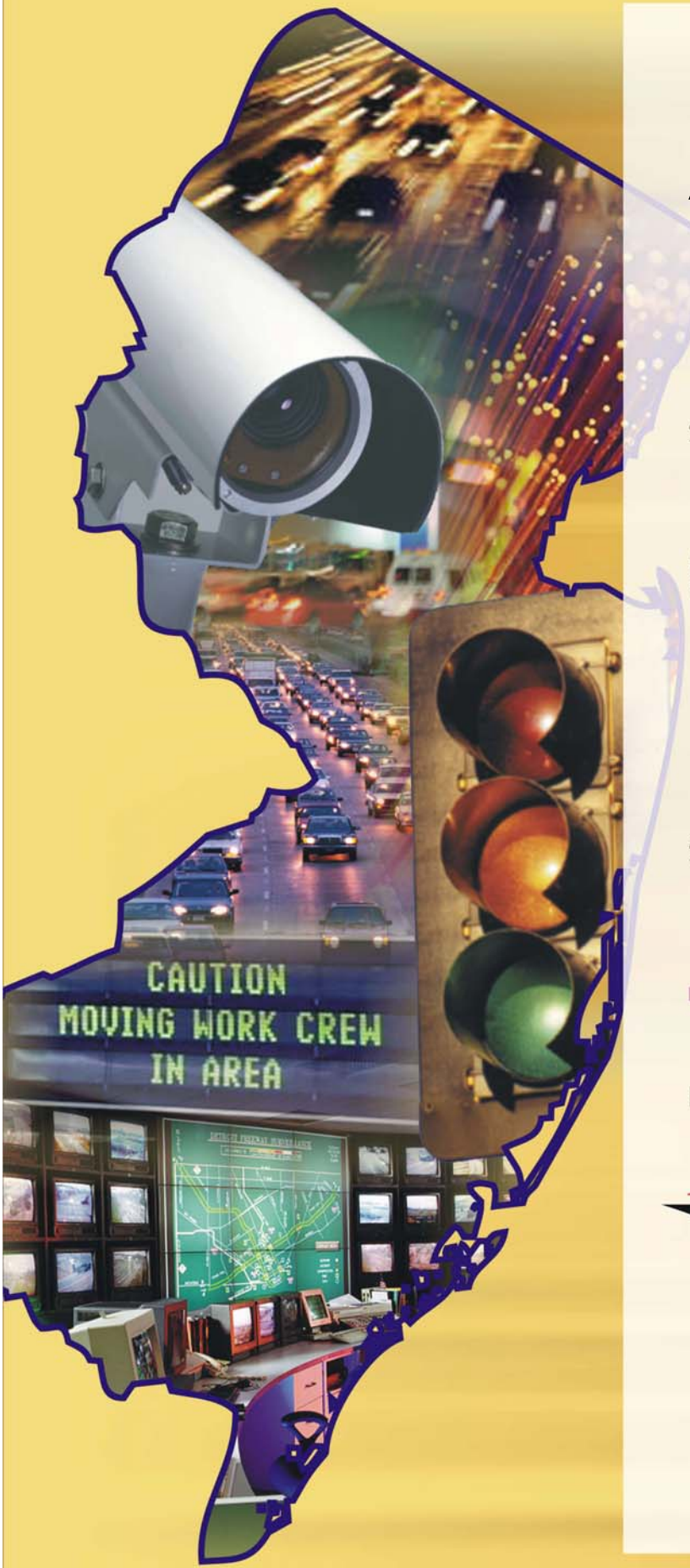

NJTPA Regional ITS Architecture and Deployment Plan – Executive Summary

Submitted to:

North Jersey Transportation Planning Authority

Submitted by:

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In association with:

ITERIS

TRANSCORE

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Executive Summary

The "Development of Statewide/Regional Intelligent Transportation Systems (ITS) Architectures and Deployment Plans" project has created two regional ITS architectures (North Jersey Transportation Planning Authority (NJTPA) and South Jersey Transportation Planning Organization (SJTPO) New Jersey ITS Architectures) as well as a statewide ITS architecture (the New Jersey Statewide ITS Architecture). These two regional and one statewide ITS architectures are roadmaps for transportation systems integration in the State of New Jersey over the next 15 to 20 years. These architectures have been developed through a cooperative and consensus based effort by the region's transportation agencies, covering all modes and all roads in the region. These architectures represent a shared vision of how each agency's systems work together currently or will work together in the future, sharing information and resources to provide a safer, more efficient, and more effective transportation system for travelers in the region.

Purpose

The two Regional ITS Architectures and the Statewide ITS Architecture represent a consensus blueprint for ITS Investments in the state. Why develop these ITS architectures? First and foremost the architectures define integration opportunities between agencies within the state and identify how cooperation between the agencies in the deployment of ITS systems can be used to satisfy transportation needs. By defining what currently exists in the area of ITS deployments, the ITS architectures can be used to identify gaps in needed ITS services and can identify how these gaps might be addressed.

The architectures can be used to efficiently structure implementations of ITS technologies. By creating a long range plan for the implementation of these systems and technologies, agencies can:

- Prepare for future expansion
- Leverage funding
- Identify standard interfaces

Finally, development of the three architectures allows New Jersey to comply with the FHWA Rule/FTA Policy on Architecture and Standards. The FHWA Final Rule (and corresponding FTA policy) to implement Section 5206(e) of the TEA-21 requires that Intelligent Transportation Systems (ITS) projects funded through the Highway Trust Fund conform to the National ITS Architecture and applicable standards. The Rule/Policy requires that the National ITS Architecture be used to develop a local

implementation of the National ITS Architecture, which is referred to as a "Regional ITS Architecture." The federal deadline for conformance to this Final Rule/Policy is April 8, 2005. The development of the three architectures will make most of New Jersey fully compliant with this Rule/Policy, which will facilitate the approval of federal funds to support ITS projects in the state. (Note that four counties which are part of the DVRPC MPO (Delaware Valley Regional Planning Commission) region participate directly in the DVRPC Regional ITS Architecture. The DVRPC plans to update their architecture to be consistent with the New Jersey and Pennsylvania architectures in the near future.)

A core group of agency representatives affected by the development of the ITS architectures was created to lead this federally mandated effort. This core group, known as the New Jersey Intelligent Transportation Committee (NJITAC), at the time of this report is made up of representatives from NJDOT, NJ Transit, NJTPA, SJTPO, DVRPC, TRANSCOM, the NJ Turnpike Authority, and the Federal Highway Administration.

Major Findings and Highlights

The development of regional and statewide ITS architectures is being done to support transportation planning at the state and regional level. As such the architectures are ultimately an expression of ITS services that can be implemented to meet transportation needs. What makes up a regional or statewide ITS architecture? The following are the key aspects of each architecture:

- **Scope.** A definition of the geographic scope, timeframe, and range of services covered by each ITS architecture.
- **Stakeholders.** These are the agencies or organizations involved in surface transportation.
- **Inventory.** A set of "elements" that represent the systems (or parts of systems) owned, managed, or maintained by the stakeholders.
- **ITS Services.** These represent how the ITS elements will share information to provide services that satisfy transportation needs. Each architecture defines a set of customized services, referred to as "Customized Market Packages" (after the name given in the National ITS Architecture to represent how ITS provides specific surface transportation services).
- **Interfaces and Information Flows**. The interfaces and information flows between the elements are the details that make up the customized market packages.
- **Functional Requirements.** Each major element in the architectures has functional requirements that it must meet to provide the functionality implied by the market packages in which it participates.

- **Agreements.** The definition of interfaces between the elements of different agencies identifies the possible need for formal or informal agreements between these agencies.
- **Standards.** The definition of interfaces and information flows provides a pointer to ITS standards that may be applicable in the regional or statewide deployments.
- **Project Sequencing.** Projects are the high level definition of how one or more customized market packages defined by the architectures will be implemented. While the architecture represents a long range vision for transportation in the state or individual region, projects will be implemented in some sequence or time order (short term to long term) depending on a variety of factors including agency priorities, funding, technical issues, and institutional issues.
- **Integration Strategy.** The definition of how the ITS architectures will be used to support both transportation planning and project development.

The architecture outputs described above were developed with extensive, consensus stakeholder review. The next section will highlight the stakeholders and their review.

Scope

The geographic scope of the Northern New Jersey Regional ITS Architecture, also referred to as the NJTPA Regional ITS Architecture, is the 13 counties that make up the North Jersey Transportation Planning Authority (NJTPA). These counties are shown in blue in Figure 1. The geographic scope of the Southern New Jersey Regional ITS Architecture, also referred to as the SJTPO Regional ITS Architecture, is the 4 counties that make up the South Jersey Transportation Planning Organization (SJTPO). These counties are shown in red in Figure 1. The counties in white in Figure 1 are covered by the Delaware Valley Regional Planning Commission, which several years ago developed a regional ITS architecture for their region (the DVRPC architecture covers Philadelphia and four adjacent counties in Pennsylvania in addition to four counties in New Jersey). The Statewide ITS Architecture naturally covers the entire state. For all three architectures a timeframe of 20 years into the future was chosen for the architecture development. Regarding scope of services, the Statewide ITS architecture covered those services that are statewide in nature (e.g. Commercial Vehicle Operations or Electronic Toll Payment) as well as services of statewide agencies such as New Jersey Transit. For each regional ITS architecture, services in the areas of Traffic Management, Traveler Information, Emergency Management, Transit Management, Archive Data Management, and Maintenance Management that were regional in nature were covered.

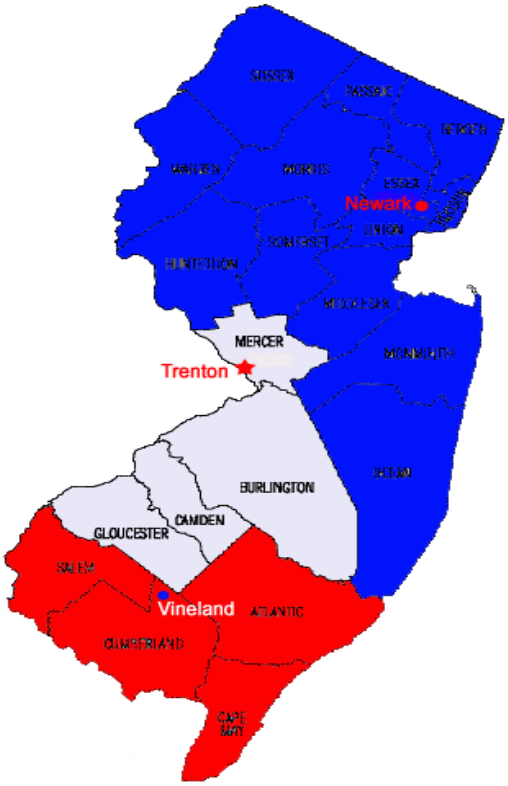

Figure 1. Planning Regions For New Jersey

Stakeholders

Stakeholder coordination and involvement is one of the keys to the development of an ITS architecture. Who are the stakeholders? Any organization or agency that has a vested interest in transportation systems with a region. Throughout the course of this project, the stakeholders of the region have been brought together to develop, review, and comment on key aspects of the architectures. These stakeholder meetings (of which there have been 42 in total), included training courses (3), functional area meetings (18 for the architecture and 18 for the deployment plan), and final integration review meetings (3). These meetings helped aid in the development of each regional architecture, helped the architecture team and other stakeholders develop an understanding of systematic problems within each region, and allowed for open discussions between stakeholders to begin the process of developing institutional agreements between agencies. A total of 165 stakeholders from 46 agencies or organizations participated in the meetings or the review of the project outputs. The stakeholders came from a wide array of state, county, and local agencies representing public safety, transportation operations, transit operations, transportation planning, as well as the private sector.

Table 1 summarizes the organizational participation at the 36 functional area workshops. The first column indicates the agency/organization the stakeholder represented. The

second column indicates the number of different individuals from that organization that attended workshops, while the third column indicates that total number of meetings where the organization was represented.

Organization	Representation	Stakeholder Participation in 42 Meetings
Atlantic County	2	2
BISTATE	1	1
City of Atlantic City	2	2
City of Newark	4	4
City of Vineland	1	1
County of Salem	1	2
Cross County Connection TMA	1	9
Cumberland County	3	10
Delaware River Joint Toll Bridge Commission	3	15
Delaware River Port Authority	2	9
Delaware Valley Regional Planning Commission	3	22
Federal Highway Administration	3	25
Hudson County	1	2
Hudson County TMA	3	2
Keep Middlesex Moving	2	5
Meadowlink	4	11
Middlesex County	1	4
Monmouth County	2	5
National Association of Industrial and Office Properties	1	1
New Jersey Association of Counties	1	1
New Jersey Department of Transportation	28	38
New Jersey Institute of Technology	2	2
New Jersey League of Municipalities	1	1
New Jersey State Police	4	9
New Jersey Transit	2	10
New Jersey Turnpike Authority - Parkway	7	8
New Jersey Turnpike Authority - Turnpike	14	17
North Jersey Transportation Planning Authority	4	18
Ocean City Police Dept.	1	1
Port Authority of NY & NJ	4	4
Port Authority Transportation Corporation	1	4
Ridewise	1	5
Rutgers University	3	2
Somerset County	1	1
South Jersey Transportation Authority	11	19
South Jersey Transportation Planning Authority	4	12
Sussex County	1	1
TRANSCOM	5	21
TransOptions	1	2
UMDNJ-EMS	1	1
Union County	2	2

Table 1. Stakeholder Participation at Functional Area Workshops

Inventory

Each of the three ITS architectures is defined by a set of ITS elements called the Inventory. An ITS element is defined as the name used by the stakeholder to describe an ITS system. Some examples of ITS elements (and their stakeholders) are:

- NJDOT TOC North (New Jersey DOT)
- NJT Bus Operations North (New Jersey Transit)
- NJSP Dispatch - Troop A, B, C (New Jersey State Police)

In some cases the ITS elements represent parts of a system (rather than the complete system). Some examples of this are:

- NJDOT North ITS Field Equipment (which represents field equipment such as dynamic message signs, CCTV, etc.)
- E-ZPass Tag

In addition ITS elements may represent other non-ITS systems that interface with ITS systems. Some examples of this type of element are:

- Print and Broadcast Media
- Regional Hospitals

All told, there are 441 different ITS elements defined in the three architectures. For each ITS element the Inventory contains a definition, assignment to stakeholder, and a mapping to entity of the National ITS Architecture. This last aspect of the inventory is used to connect the regional (or statewide) ITS architecture to the National ITS Architecture so that the services, interfaces, and information flows defined in the national effort can be used for the regional (or statewide) architectures. The National ITS Architecture defines 22 subsystems (the major “players” in providing ITS services) and 73 Terminators (the “players” who are on the edge of the architecture. The subsystems exchange information with these peripheral players). The 22 subsystems of the National ITS architecture can be shown on a single diagram called the “sausage diagram” given in Figure 2.

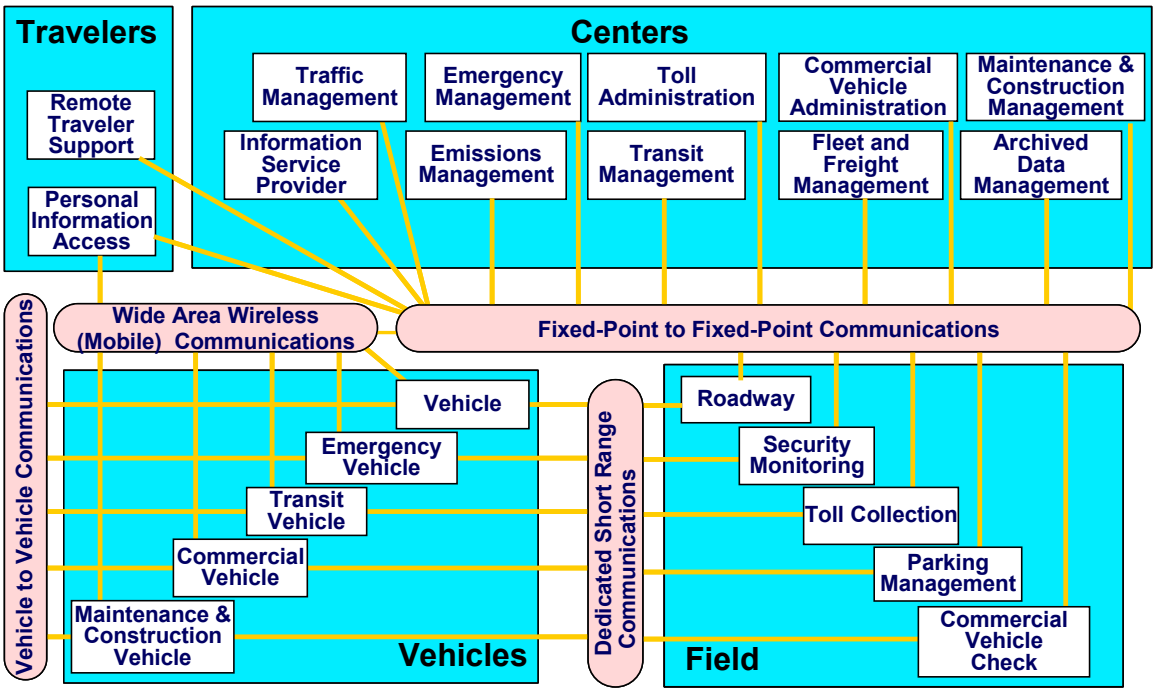

Figure 2. National ITS Architecture Sausage Diagram

A brief analysis of the mapping of the ITS elements to the National ITS Architecture yields the following summary statistics. These statistics are derived from the "combined" architectures database and provide an indication of the number and types of ITS elements included in the New Jersey ITS Architectures.

Subsystem	Number of Existing Elements Mapped to Subsystem	Number of Planned Elements Mapped to Subsystem
Archived Data Management Subsystem	17	18
Commercial Vehicle Administration	15	3
Commercial Vehicle Check	4	2
Commercial Vehicle Subsystem	1	0
Emergency Management Subsystem	40	11
Emergency Vehicle Subsystem	12	0
Emissions Management	2	0
Fleet and Freight Management	3	0
Information Service Provider	29	18
Maintenance and Construction Management	37	4
Maintenance and Construction Vehicle	10	0

Subsystem	Number of Existing Elements Mapped to Subsystem	Number of Planned Elements Mapped to Subsystem
Parking Management	4	2
Personal Information Access	2	0
Remote Traveler Support	18	7
Roadway Subsystem	25	4
Security Monitoring Subsystem	2	5
Toll Administration	2	1
Toll Collection	10	0
Traffic Management	38	14
Transit Management	54	9
Transit Vehicle Subsystem	17	5
Vehicle	3	3

Table 2. ITS Inventory Summary Statistics

Needs and Services

User needs were identified during a series of ITS functional area meetings early in the development of the New Jersey ITS Architectures. The user needs were then allocated amongst one or more of approximately 80 specific ITS service categories identified in the National ITS Architecture. These service categories are called Market Packages in the National ITS Architecture. Market packages collect together two or more system elements (from the same or multiple stakeholders) that can work together to deliver a given transportation service and the architecture flows that connect them. External systems on the boundary of ITS are also included. In other words, Market Packages identify the ITS system elements required to implement a particular transportation service. Market packages included in the New Jersey ITS Architectures were tailored to fit, separately or in combination, real-world transportation problems and needs.

Customized market packages represent the stakeholder consensus requirements for information that may be exchanged between specific ITS elements to effect specific sets of ITS services. As such, they collectively represent the *concept of operations* for a region. The customized market package for the New Jersey ITS Architectures have been organized by transportation functional area as follows:

- Archived Data Management Systems (AD)
- Advanced Public Transportation Systems (APTS)
- Advanced Traveler Information Systems (ATIS)
- Advanced Traffic Management Systems (ATMS)

- Commercial Vehicle Operations (CVO)
- Emergency Management (EM)
- Maintenance and Construction (MC)

The New Jersey ITS Architectures contain 461 separate customized market package diagrams. An analysis of the customized market packages by functional area reflects the following summary statistics. (Please note that because a customized market package diagram may be allocated to both the NJTPA and SJTPO architectures, the "All" column count does not equal the sum of the counts from the other 3 columns.)

Functional Area	Statewide	NJTPA	SJTPO	All
Advanced Traffic Management Systems	40	58	40	131
Maintenance and Construction	24	36	27	82
Advanced Public Transportation Systems	36	48	38	115
Advanced Traveler Information Systems	8	14	8	26
Commercial Vehicle Operations	10	14	6	25
Emergency Management	26	16	14	545
Archived Data	15	7	6	27
Totals	**159**	**193**	**139**	**463**

Table 3. Number of Customized Market Package Diagrams by Functional Area and ITS Architecture

Operational Concepts and Agreements

An operational concept defines the roles and responsibilities of stakeholder ITS elements in providing ITS services. For this project the roles and responsibilities have been defined at a market package level. For each customized market package that is short-term in its implementation a description of stakeholder roles and responsibilities was defined. As an example for the NJTPA Regional ITS Architecture 37 different market packages operational concepts are described.

In addition, for each of these customized market packages that involved interfaces that crossed institutional boundaries, the potential needed agency agreements were identified.

Functional Requirements

An ITS Architecture is a functional architecture. The information exchanged between ITS elements in the architecture is driven by functions resident in each of the ITS elements defined in the architecture. The functions describe the tasks or activities performed by the ITS elements and "what" is done with the information received by the

ITS element. To define projects that implement various portions of the ITS Architecture, functional requirements must be derived from which to translate the functional descriptions into designs (which make for example technology choices) to be built.

Interconnects and Interfaces

Interconnects and Interfaces define the details of how the different ITS elements in the architecture are connected. A system interconnect answers the question, "What ITS elements are connected?" A system interface answers the question, "What information and control exchanges (existing and planned) occur between ITS Elements?" Architecture flows represent these information and control exchanges between ITS elements in the architecture.

System interfaces were refined through the process of editing the customized market package diagrams. Where stakeholders defined a need for an information or control exchange, an architecture flow was placed between system elements. Where no need was identified, the architecture flows were removed. And, where new local requirements were identified, outside of the scope of the National ITS Architecture, new architecture flows were created and documented.

The New Jersey ITS Architectures contain 2424 interconnects (separate connections between systems) and 10,016 architecture flows. An analysis of the architecture database reflects the following summary statistics.

Interconnect/Interface	Statewide	NJTPA	SJTPO	All
Interconnects	1072	903	849	2424
Architecture Flows	4346	3366	2931	10016

Table 4. Number of Interconnects and Interfaces by ITS Architecture

The focus of the ITS Architecture is on *external* interfaces between ITS elements. (*External* in the sense that architecture flows that connect different stakeholder ITS elements are "external" to either of the stakeholders.) This focus on external interfaces acknowledges that usually the most difficult and time consuming barrier to deployment of interoperable ITS elements in a region or state is achieving the institutional agreement between stakeholders to exchange specific information between specific ITS elements. An objective of the New Jersey ITS Architectures is to specifically identify these information exchange requirements very early in the process of deployment, so that the time consuming process of achieving prerequisite institutional agreements can proceed as early as possible.

Moreover, identification of common interfaces of systems in a region provides opportunities for standardization of these interfaces resulting in improved interoperability of systems within the region.

Projects

The incorporation of the ITS Architecture in the planning process will ultimately yield projects that are linked to the ITS Architecture. Through the deployment of projects produced from the planning process, the ITS services supported in the ITS Architecture will be implemented and made a reality in the transportation system. Project implementation completes the evolution from transportation needs to services, to functional description in the ITS Architecture, to project identification in the planning process, to project definition and deployment. The overarching goal of the ITS Architecture development process is that this evolution take place with the maximum amount of integration that is reasonable so as to efficiently and economically implement the systems required to serve the transportation community and users.

Projects were identified for the NJTPA region, for the SJTPO region and for a statewide focus. The projects were identified through a review of the three architectures (to identify services that met identified needs) and through a review of the statewide and regional planning documents such as the Statewide Transportation Improvement Program (TIP) Fiscal Year 2005 – 2007. The ITS Projects identified for each region (or the state) were mapped to market packages of the three architectures. Then the projects were organized into the following functional areas (using the market package mapping):

- Commercial Vehicle Operations & Ports
- Electronic Toll/Parking Management Fare Payment
- Information Archive Management
- Public Safety/Emergency Management/Homeland Security
- Public Transportation Management
- Traveler Information/Traffic Management/Maintenance Management

The list of projects was further refined to establish which projects were allocated to the short term (5 years), medium term (5 to 10 years), and long term (over 10 years). This provided a priority for the list of projects denoting a general order for project implementation.

Finally, the team obtained stakeholder feedback on the proposed ITS projects and their prioritization. Obtaining stakeholder feedback was necessary for the following reasons:

- Ensure an ITS Project was consistent with stakeholder needs.
- Confirm estimated timeline or priority for ITS Project deployment.
- Understand the relationship and traceability between ITS projects and the Statewide New Jersey ITS Architecture.

The stakeholder feedback was accomplished through a series of stakeholder workshops where the information was presented and input from the stakeholders was incorporated into the material. The complete list of projects is presented in Chapter 10 of the full documentation.

A small subset of these projects, called *Regionally Significant Projects*, are highlighted below. A Regionally Significant Project is one with a short timeframe, AND affecting multiple institutions AND/OR having regional or extra-regional impact. The Regionally Significant Projects for all three architectures are shown in Table 5.

Project	Architecture	Description	Market Package Diagrams
NJDOT STOC - Statewide Transportation Operations Center	Statewide	Where multiple regions or institutional facilities are affected, the STOC coordinates: • incident/emergency planning and response; • timing of maintenance, construction and workzones • statewide early warning, disaster response and recovery, and evacuation.	ATMS07-07, ATMS08-01, EM01-1, EM01-2, EM01-3, EM07-1, EM07-2, EM08-1, EM08-2, EM09-2, EM09-3, MC08-1, MC08-2
Statewide Evacuation and Coordination Program	Statewide	STOC coordination with the NJ State Office of Emergency Management and major traffic Management centers; major public safety dispatch centers and major transit management centers.	EM09-1
Transit Smart Card	Statewide	A single payment instrument enabling payment reciprocity between the offering agencies coordinated under DVRPC, NJTPA and SJTPO Fare Reciprocity Networks which will include all transit properties operating in New Jersey.	APTS4-2
NJDOT Traveler Information System (includes 511)	Statewide	Enables the dissemination of traffic information between traffic management centers, including NJDOT TOC North/South/Central and potential travelers. Traveler information Includes roadway network conditions, roadway construction, and transit information.	ATIS2-02
NJDOT TOC Central/North/South Regional Traffic Control and Coordination	Statewide	Exchange of traffic information and control between NJDOT TOC North/South/Central. Also, information exchange between these Traffic Management centers with the I-95 Corridor Coalition Information Exchange Network, TRANSCOM and RIMIS IEN.	ATMS07-01, ATMS07-02, ATMS07-03
PANYNJ Port Commerce Electronic Clearance and Processing System	NJTPA	PANYNJ Port Commerce Operations Centers coordinating electronic clearance with Private Commercial Vehicle Fleet Dispatch, Terminal Access Equipment at PANYNJ Ports (that communicate with private commercial vehicles, and PANYNJ Port Commerce Credentialing Back Office (SEALINK). Also includes NJ CVIEW and NJDOT CVO Administration coordination with the NJ CVO Electronic Permitting System and Private Commercial Vehicle and Fleet dispatch.	CVO03-4, CVO04-1

Project	Architecture	Description	Market Package Diagrams
North Jersey County EOCs Evacuation and Re-entry Management	NJTPA	Connects NJTPA County EOCs (Emergency Operations Centers) to coordinate resources with the • NJ State Police • Transit agency dispatches • Local traffic operations centers as well as the NJTA Parkway and Turnpike TOCs • Local and statewide roadway maintenance agency dispatches	EM09-1, EM09-2
North New Jersey County EOCs Disaster and Response Management	NJTPA	Enables County EOCs to coordinate emergency management functions with NJSP, NJTPA regional public safety dispatch, traffic management centers, maintenance agency dispatches and transit agencies.	EM08-1, EM08-2
NJT Rail Operations Transit Security	NJTPA	Provides security systems for Rail infrastructure, including within rail stations, rail cars and maintenance yards. Security systems include CCTV surveillance systems, access systems, threat detection sensors, and transit operator and users activated alarms.	APTS5-02
TRANSCOM Regional Architecture Expansion	NJTPA	Expands the existing network, enabling the sharing of traffic information between the additional transportation and emergency management agencies, including status of traffic devices (e.g., messages on dynamic message signs), traffic incident reports and status, construction notices, and road network conditions.	APTS7-2
TRANSCOM Regional Transportation Information (TRIPS123)	NJTPA	Continued support and expansion of TRIPS123 to provide tailored information in response to a traveler request. Includes a subscriber system which "pushes" traveler information to a traveler based on a submitted profile. Personal devices supported include phones, personal digital assistants (PDAs), and kiosks.	APTS8-08
PANYNJ Airports/Port Commerce Arterial Surveillance and Traffic Monitoring System	NJTPA	Provides traffic monitoring and control capabilities on airport and port facilities. The project includes the hardware, software, field equipment such as traffic signals, lane control signals, and communications infrastructure.	ATMS01-5, ATMS01-6, ATMS03-4, ATMS05-1, ATMS06-03
NJDOT and NJT Bus Operations South Transit Information Exchange	SJTPO	Facilitates the sharing of transit information and transit service coordination between transit agencies in the region. Supports the sharing of transit information such as including real-time schedules, incident information and other transit traveler information.	APTS7-6, APTS7-8
South New Jersey County EOCs Disaster and Response Management	SJTPO	Enables County EOCs to coordinate emergency management functions with NJSP, SJTPO regional public safety dispatch, traffic management centers, maintenance agency dispatches and transit agencies.	EM08-1, EM08-2

Project	Architecture	Description	Market Package Diagrams
NJDOT Maintenance and NJDOT TOC South Road Weather Data Collection, Management and Integration	SJTPO	Enables the collection, processing, sharing, and storage of environmental and road weather information. Information includes atmospheric information and pavement conditions. The system provides real-time and historical information to users.	MC03-1, MC06-1

Table 5. Regionally Significant Projects

Integration Strategy

The Integration Strategy presents the approach for integrating the ITS Architectures developed for the New Jersey Statewide, the NJTPA Region, and the SJTPO Region into the transportation planning process and leveraging the ITS Architectures in project definition. The approach facilitates and provides a mechanism for the projects identified in the Implementation Plan to be planned and deployed in an orderly and integrated fashion.

One of the most important outcomes of the New Jersey Statewide, NJTPA Regional, and SJTPO Regional ITS Architectures is that they will be used to plan and deploy ITS across the state and the regions involved. To do this, the ITS Architectures must be integrated into their respective planning processes. As a result of integrating the ITS Architectures into the planning processes, the architectures will link the objectives and needs of the regions with the ITS deployments in the field.

Figure 3 reflects a generic planning process with which all organizations can identify and on which they can base their more detailed process modifications. The right-side of the figure (MPO Planning Process) refers to federally funded projects and the left-side (Other Agency Planning Process) refers to projects being funded through other means (e.g., local funding). All regions use both processes to fund their planning efforts. A primary goal of the planning process is to make quality, informed decisions on the investment of funds for regional transportation systems and services.

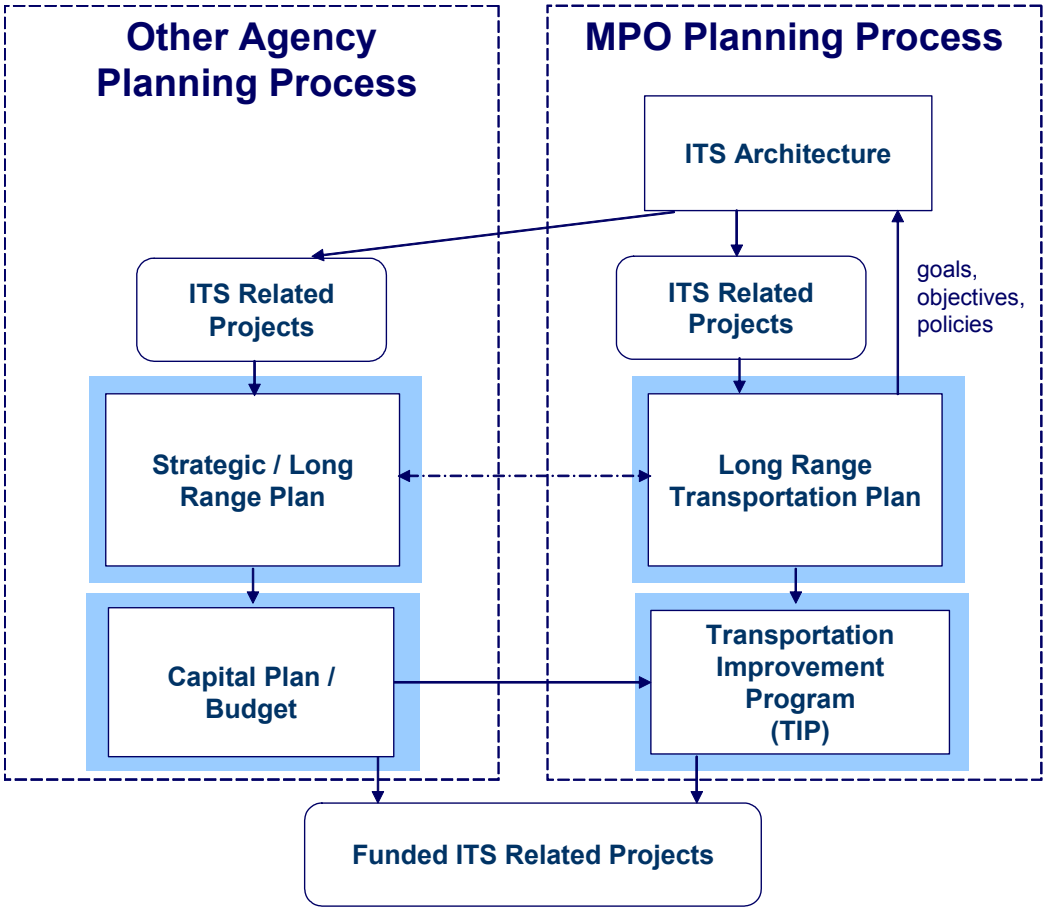

Figure 3. New Jersey ITS Architecture in the Transportation Planning Process

As shown in the figure, the ITS Architectures support the prioritization of ITS related projects that feeds into the respective planning documents.

Projects that emerge from the planning process can benefit from the use of the ITS Architecture in their definition and development. Project implementation should follow the systems engineering process. The ITS Architecture is most effective in the early phases of the systems engineering process. Figure 4 shows a generic project implementation process for deploying ITS projects.

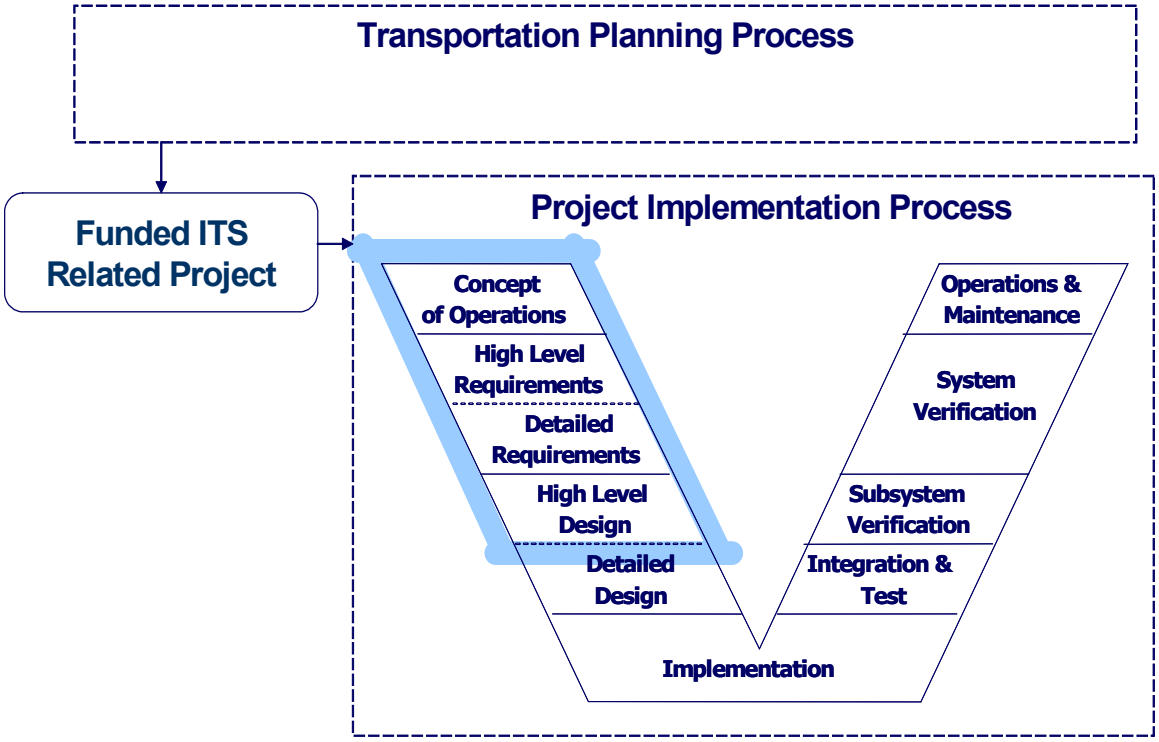

Figure 4. New Jersey ITS Architecture in the Project Implementation Process

The project implementation process shown in Figure 4 is a systems engineering process. It is a process that can be used to systematically deploy ITS that reduces risk. The Systems Engineering process is more than just steps in systems design and implementation; it is a life-cycle process. The process recognizes that many projects are deployed incrementally and expand over time. US DOT Rule 940 requires that the systems engineering process be used for ITS projects that are funded with federal funds. The New Jersey DOT's project development process is similar to the systems engineering process shown in Figure 4, however the details of the NJDOT process is discussed in Section 11.4.

Documentation of ITS Architectures

The ITS Architectures are documented in three forms. The first is this document, which provides an overview of the architectures and summary information about many of the aspects of the architecture. The second form of documentation is the Turbo Architecture database. This FHWA developed software tool captures the details of the architectures including definition of stakeholders, inventory, market packages, interconnects, interfaces, functional requirements, and standards. An example of the the tools capture of interconnects (for the element ACESP Dispatch - which is the dispatch function for the Atlantic City Expressway State Police) is shown in Figure 5.

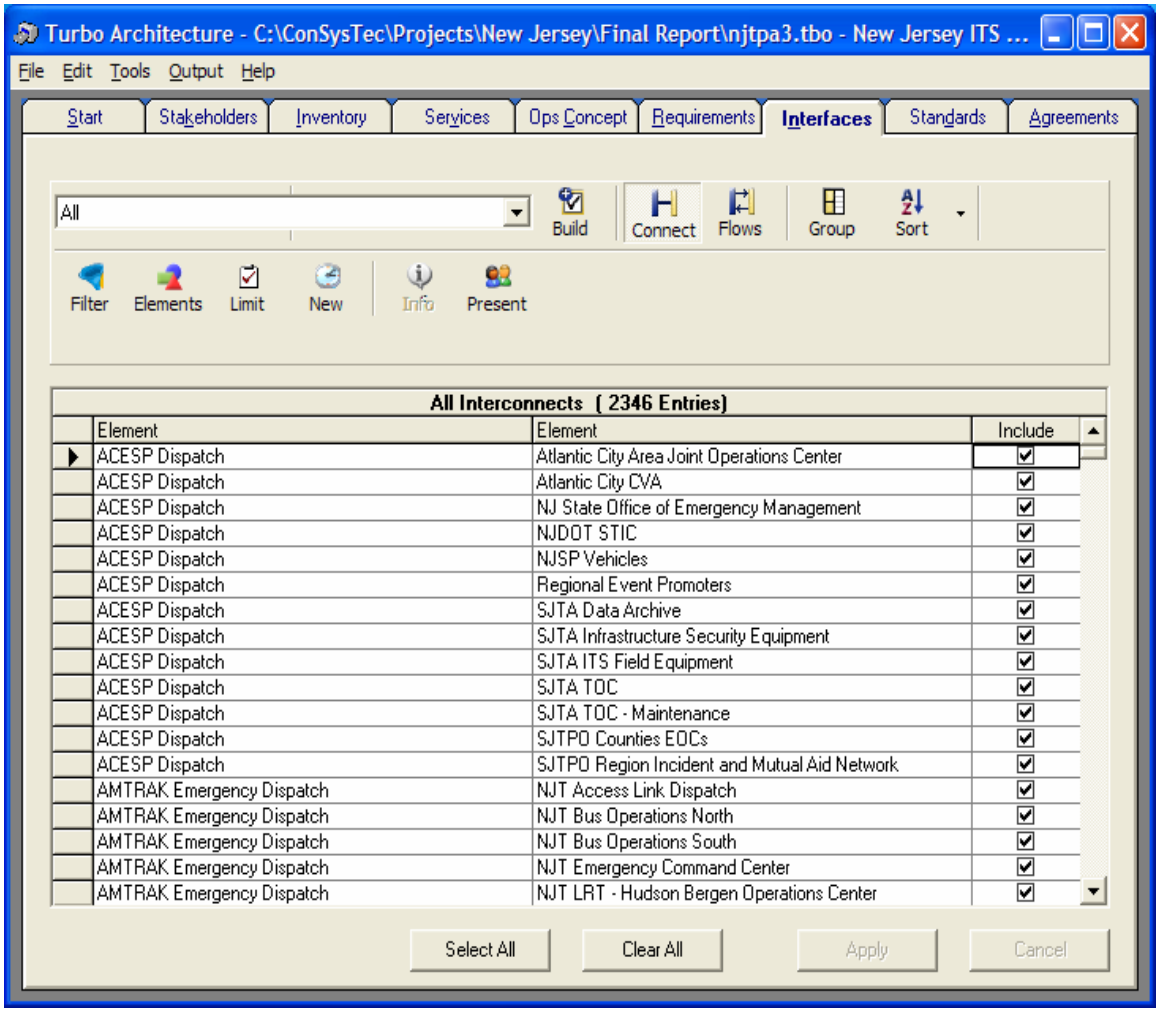

Figure 5. Sample Turbo Architecture Screen Capturing Interconnect Information

The third form of documentation of the architectures is the New Jersey Statewide and Regional ITS Architecture website. ConSysTec Corporation has developed, posted and hosted the temporary hyper-linked website where all project architectures, deployment plans, and relative documentation (i.e. meeting minutes, other draft architectures, stakeholder comments, etc.). The website currently resides at http://www.consystec.com/newjersey/default.htm. It is the intent of ConSysTec to host this site for at least three years after the conclusion of the project, or until NJITAC chooses an alternative site to utilize as a host for the documentation. In addition to hosting the website for NJITAC, an html image of the website (which can be used to directly load a web server with the developed website for all three ITS architectures and deployments plans) will be delivered to NJITAC on CD-ROM.

The website provides in an easy to access hyperlinked format the same detailed descriptions of stakeholders, elements, interfaces, and functional requirements found in

the Turbo Architecture database. An example of the details for the element NJDOT Accident Reporting System is shown in Figure 6.

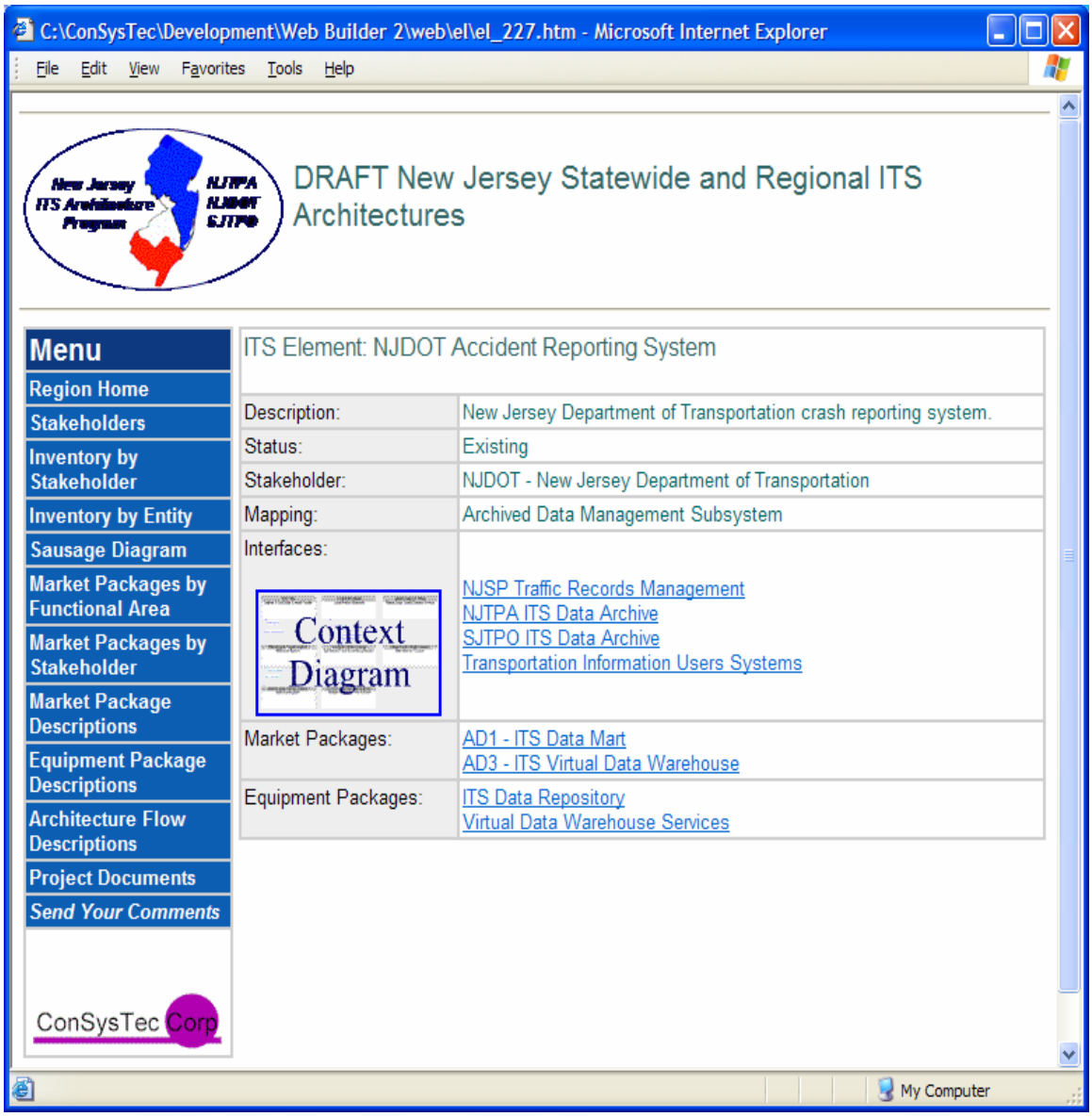

Figure 6. Example Element Definition on Hyperlinked Website