Maryland Statewide ITS Architecture

TRAINING

6/16/2025

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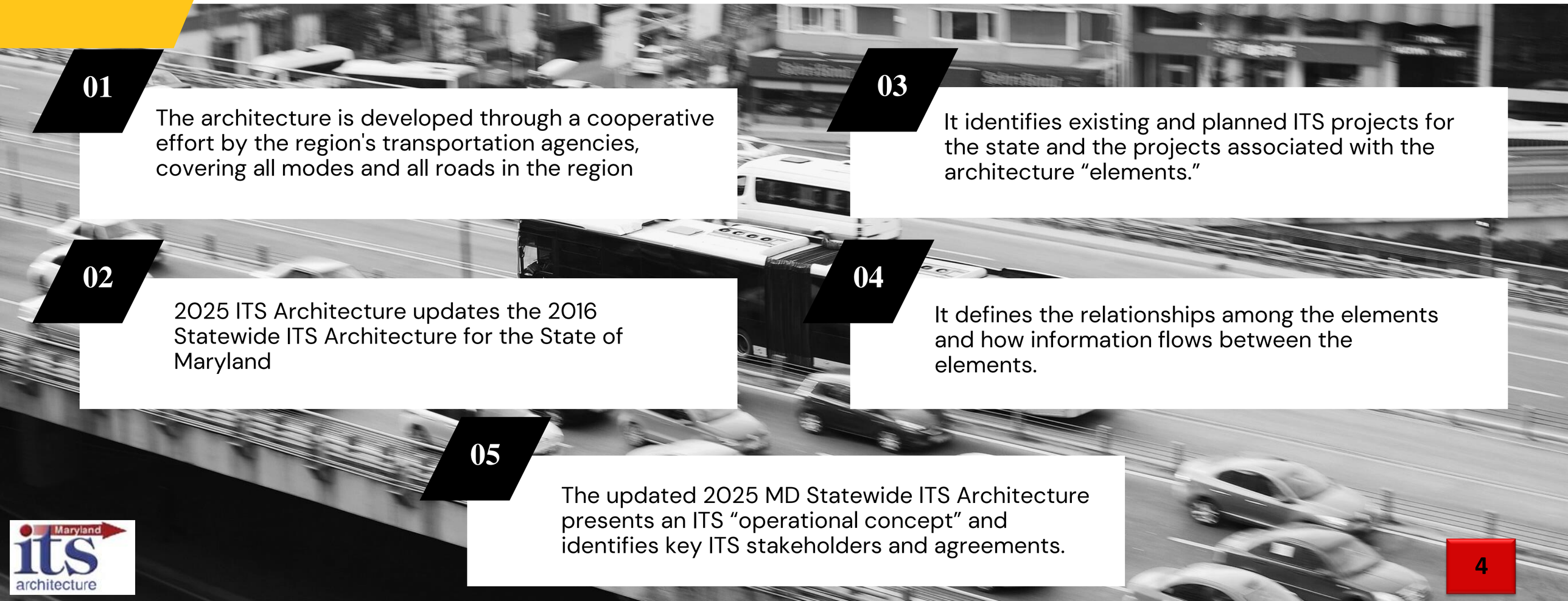
What is Maryland's Statewide ITS Architecture?

The Maryland's Statewide ITS Architecture is a roadmap for transportation systems integration for the state.

Maryland's Statewide ITS Architecture



01

The architecture is developed through a cooperative effort by the region's transportation agencies, covering all modes and all roads in the region

02

2025 ITS Architecture updates the 2016 Statewide ITS Architecture for the State of Maryland

03

It identifies existing and planned ITS projects for the state and the projects associated with the architecture "elements."

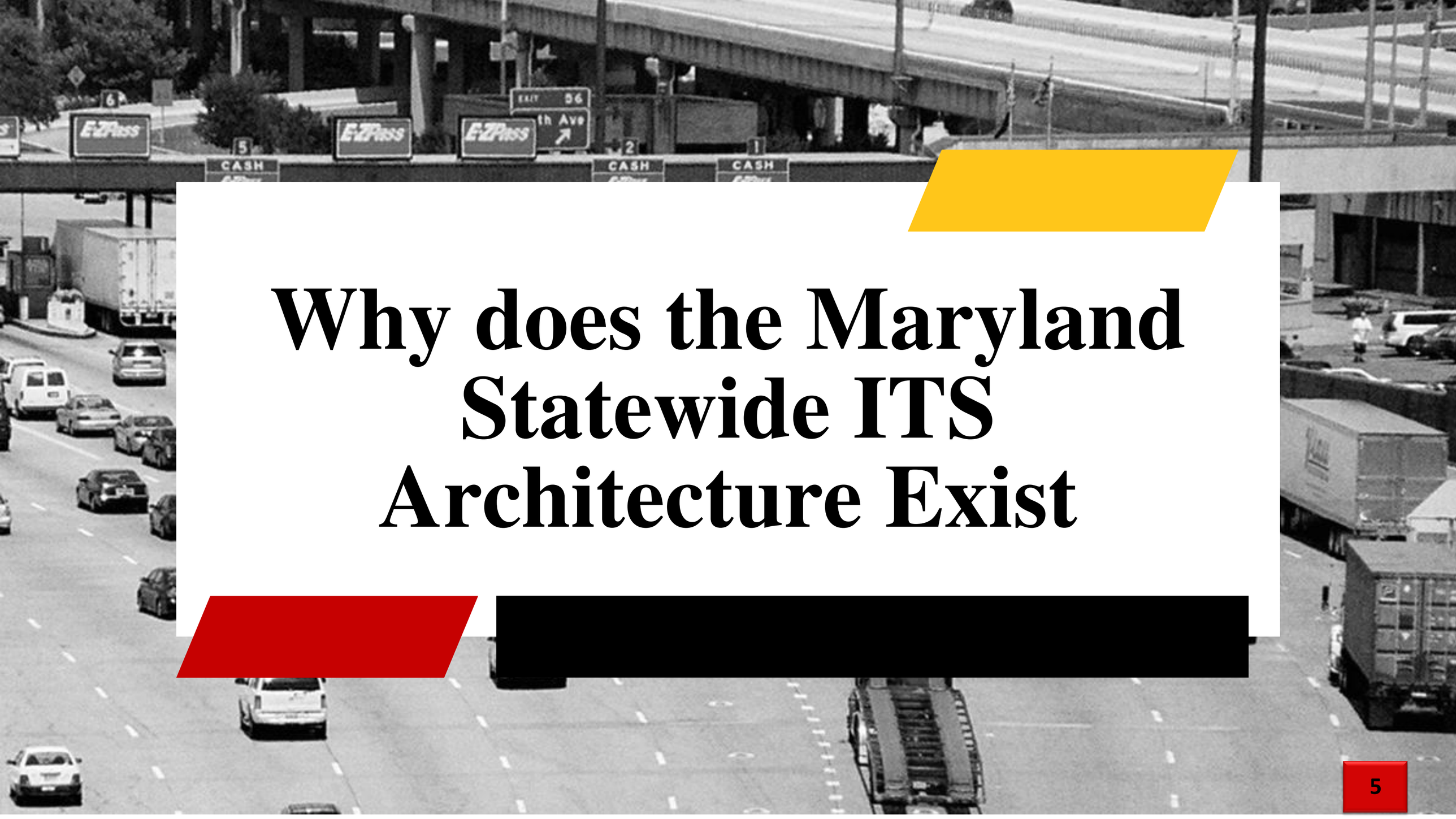
04

It defines the relationships among the elements and how information flows between the elements.

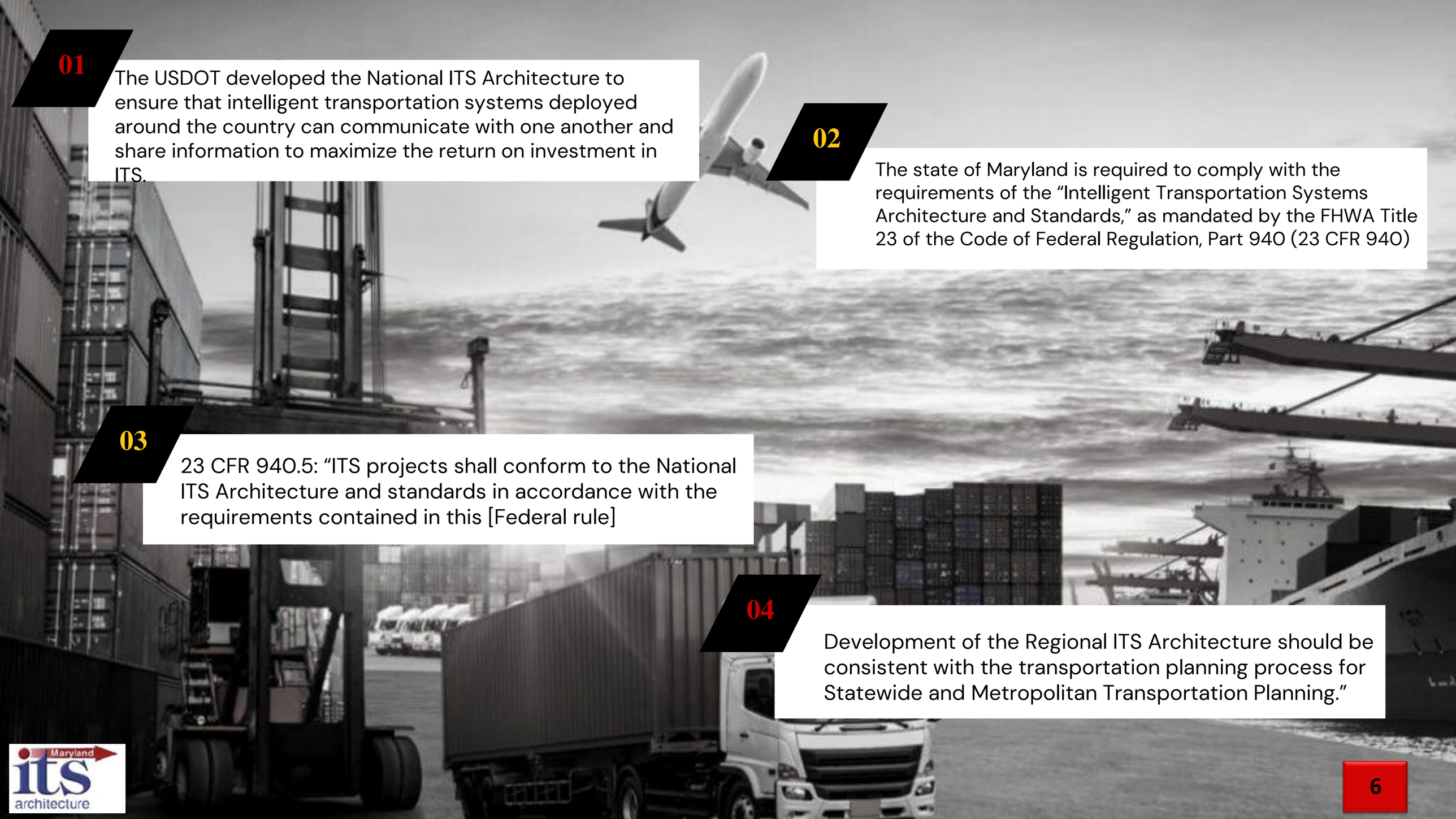
05

The updated 2025 MD Statewide ITS Architecture presents an ITS "operational concept" and identifies key ITS stakeholders and agreements.

Maryland its architecture



Why does the Maryland Statewide ITS Architecture Exist



01

The USDOT developed the National ITS Architecture to ensure that intelligent transportation systems deployed around the country can communicate with one another and share information to maximize the return on investment in ITS.

02

The state of Maryland is required to comply with the requirements of the "Intelligent Transportation Systems Architecture and Standards," as mandated by the FHWA Title 23 of the Code of Federal Regulation, Part 940 (23 CFR 940)

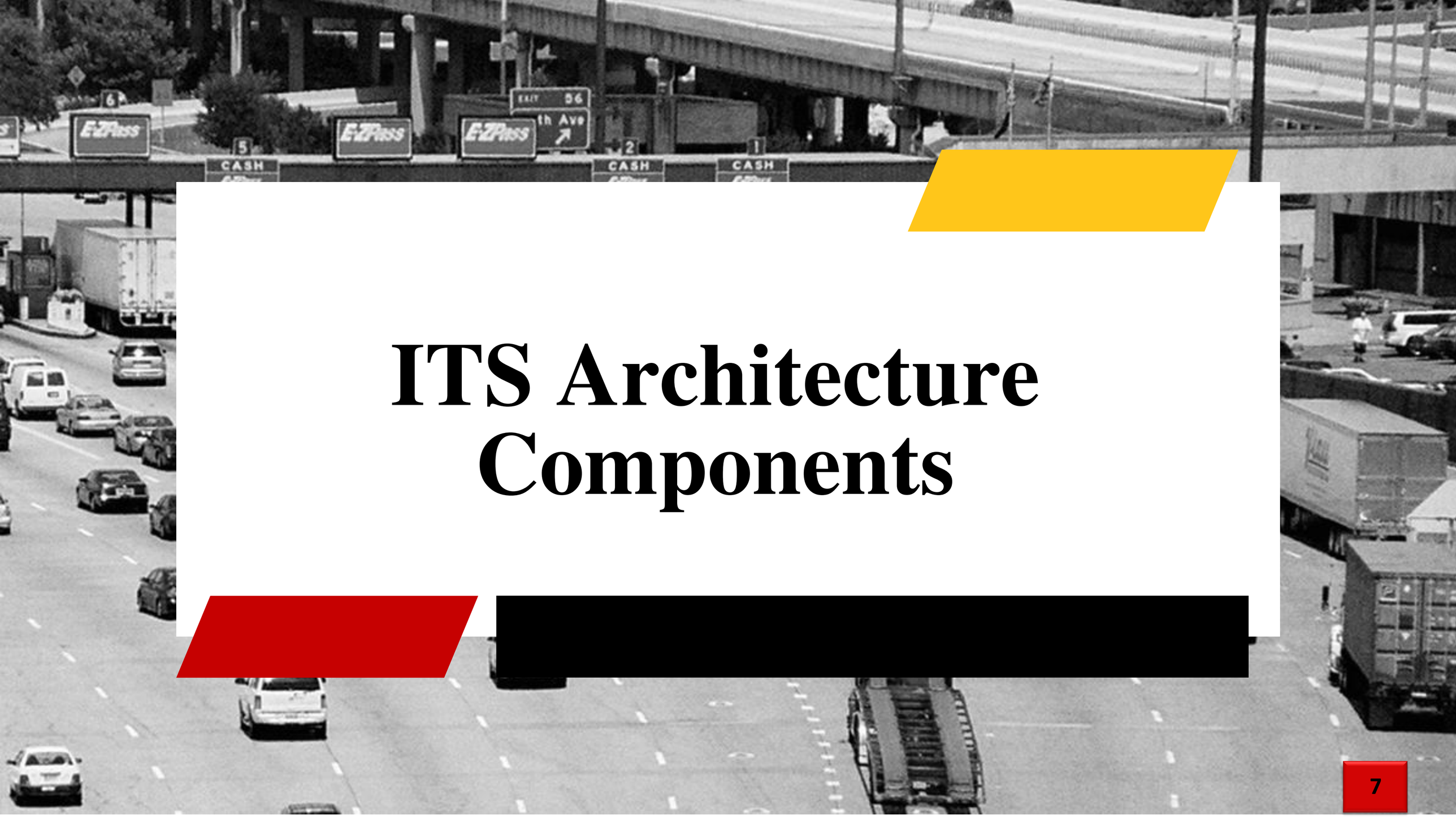
03

23 CFR 940.5: "ITS projects shall conform to the National ITS Architecture and standards in accordance with the requirements contained in this [Federal rule]

04

Development of the Regional ITS Architecture should be consistent with the transportation planning process for Statewide and Metropolitan Transportation Planning."

Maryland its architecture



ITS Architecture Components

ITS Architecture Components

Section 1	ITS Architecture Conformity Statement
Section 2	Introduction
Section 3	Architecture Scope
Section 4	Architecture Components
Section 5	Statewide ITS Architecture

ITS Architecture Conformity

Section 1
ITS Architecture Conformity Statement

The State of Maryland meets the USDOT standards for a conforming ITS Architecture

When do I submit a project?

When your agency has an ITS project that is requesting Federal Funding, the ITS Conformity form and Conformity Package should be submitted to Maryland ITS Architecture Advisory Panel (IAAP) as **soon** as possible in the planning process.

Conformity Form and Conformity Packet Location
Maryland ITS Architecture – ITS Maryland

Rule 940 Requirements and Conformity Process

FHWA Rule 940 provides policies and procedures for implementing Section 5206(e) of the Transportation Equity Act for the 21st Century (TEA–21), Public Law 105–178, 112 Stat. 457, pertaining to conformance with the National ITS Architecture and Standards.

The rule states, in part, that the **final design of all ITS projects** funded with Highway Trust Funds must accommodate the interface requirements and information exchanges as specified in the Regional ITS Architecture. The **Maryland Statewide Regional ITS Architecture** is a specific application of the framework specified in the National ITS Architecture, tailored to the needs of the transportation stakeholders statewide.

Who is Required to Submit a Conformity Form

Any agency or agencies developing an ITS project should submit a Conformity Form.

The Conformity Form is REQUIRED for any project seeking federal, or state funding.

Conformity Form

The **Conformity Form** is designed to help ensure that your ITS project conforms to the most recent Maryland Statewide ITS Architecture requirements.

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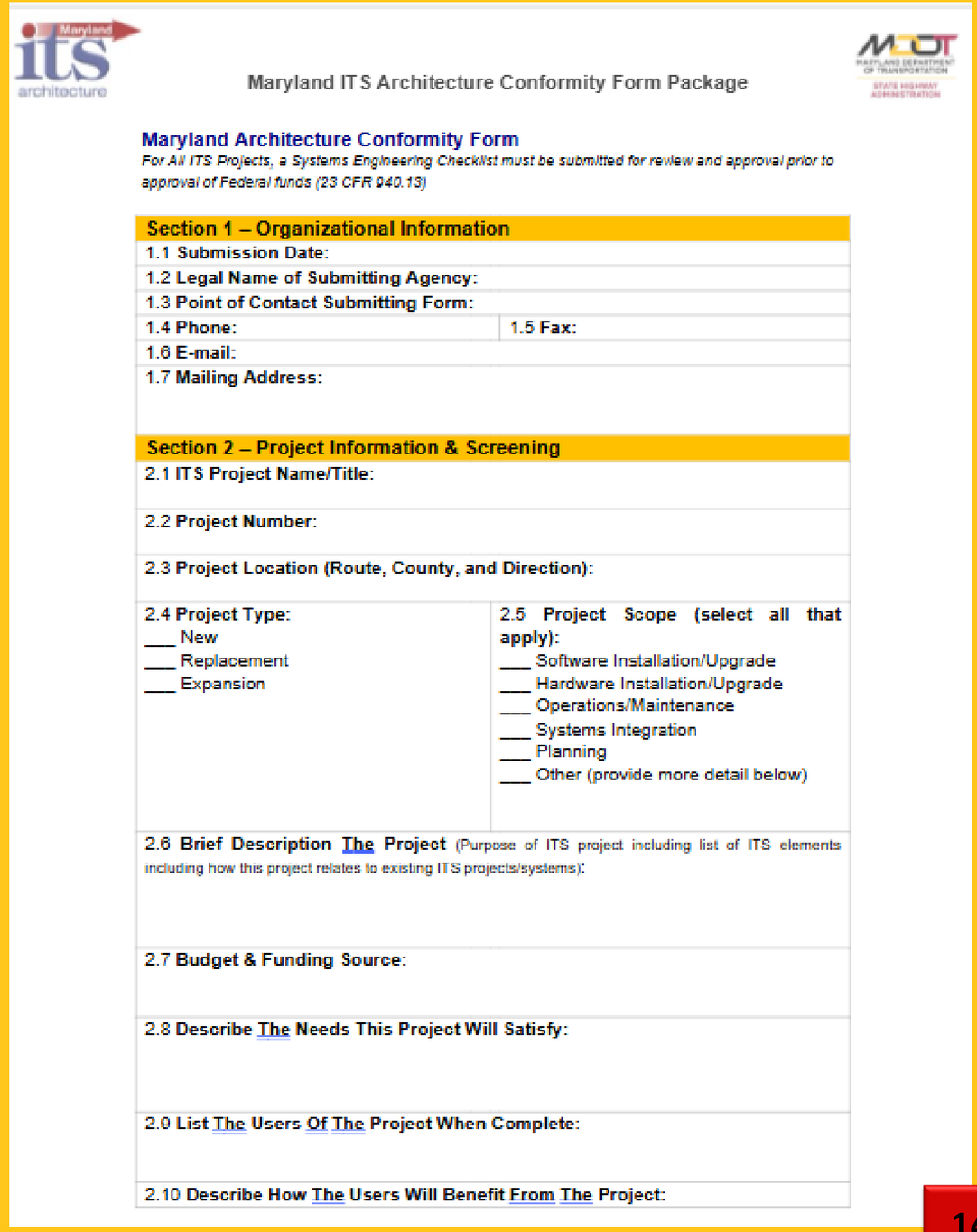
If you are seeking federal funding, this form is required and should be submitted be submitted to the IAAP



Maryland ITS Architecture Conformity Form Package

Maryland Architecture Conformity Form

For All ITS Projects, a Systems Engineering Checklist must be submitted for review and approval prior to approval of Federal funds (23 CFR 940.13)

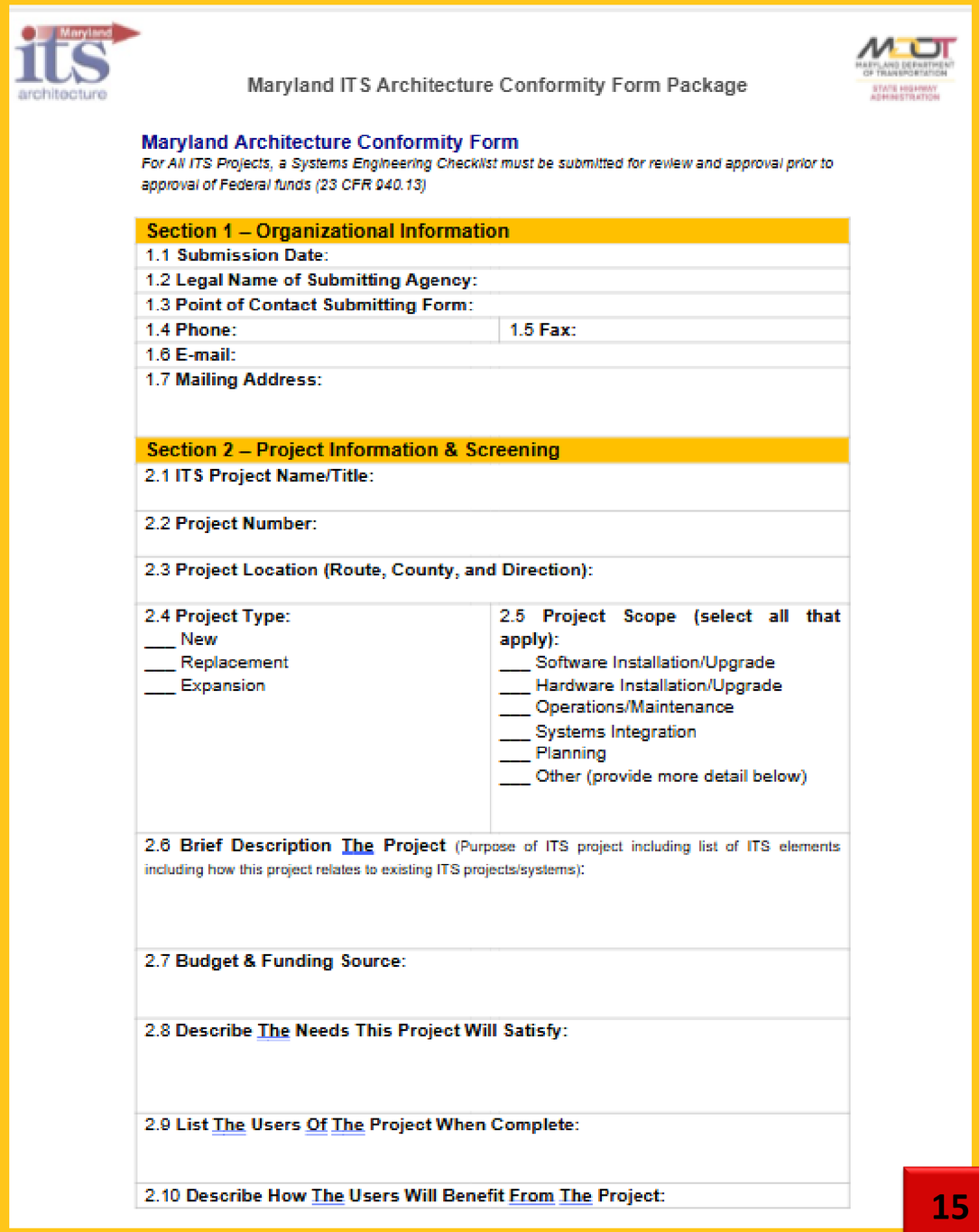
Section 1 – Organizational Information	
1.1 **Submission Date:**	
1.2 **Legal Name of Submitting Agency:**	
1.3 **Point of Contact Submitting Form:**	
1.4 **Phone:**	1.5 **Fax:**
1.6 **E-mail:**	
1.7 **Mailing Address:**	

Section 2 – Project Information & Screening	
2.1 **ITS Project Name/Title:**	
2.2 **Project Number:**	
2.3 **Project Location (Route, County, and Direction):**	
2.4 **Project Type:** ___ New ___ Replacement ___ Expansion	2.5 **Project Scope (select all that apply):** ___ Software Installation/Upgrade ___ Hardware Installation/Upgrade ___ Operations/Maintenance ___ Systems Integration ___ Planning ___ Other (provide more detail below)
2.6 **Brief Description The Project** (Purpose of ITS project including list of ITS elements including how this project relates to existing ITS projects/systems):	
2.7 **Budget & Funding Source:**	
2.8 **Describe The Needs This Project Will Satisfy:**	
2.9 **List The Users Of The Project When Complete:**	
2.10 **Describe How The Users Will Benefit From The Project:**	

Conformity Form Benefits

Conformity with the Maryland Statewide ITS Architecture will:

- Expedite the development and deployment of ITS PROJECTS
- Promote interoperability and reduce system incompatibilities
- Encourage efficient investment and reduce duplication
- Promote use of optimal rather than dead-end technologies
- Enable more effective planning and programming
- Give credibility to conforming ITS projects
- Provide enhanced transportation services for ALL OF Maryland



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2.9 **List The Users Of The Project When Complete:**	
2.10 **Describe How The Users Will Benefit From The Project:**	

When to Submit a Conformity Form ?

The Conformity form should be submitted at a point in your ITS project planning process when the information requested on the form can be reasonably provided but, preferably, **before** or at the same time funding is sought from federal or state sources.

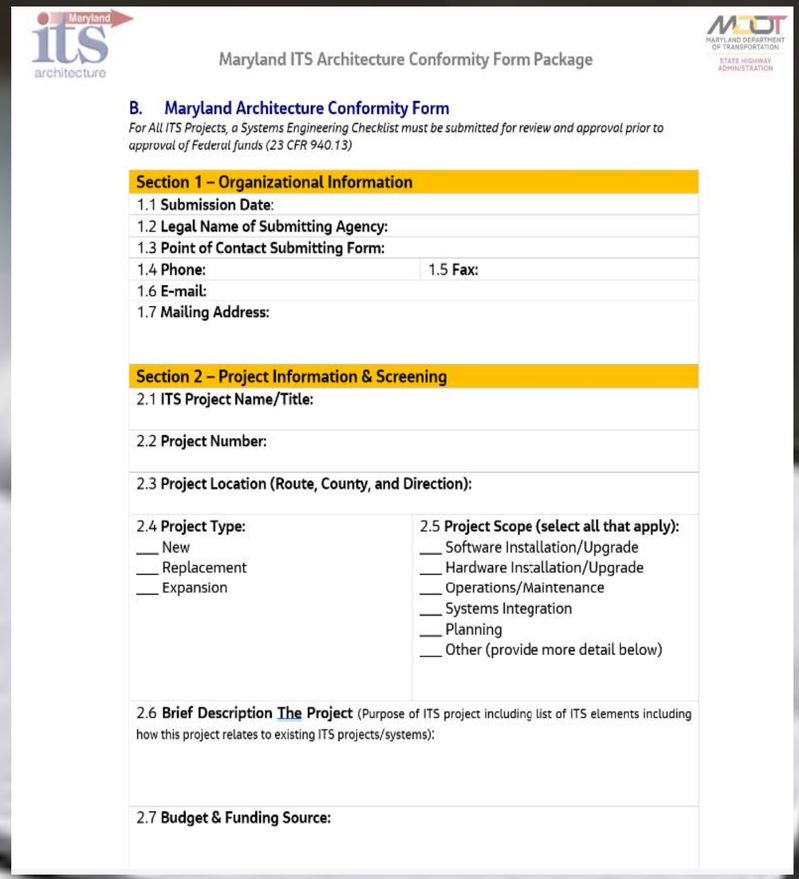
How will the IAAP Review the Conformity Forms

Once a Conformity Form is submitted to the IAAP, the panel will determine whether the prospective project conforms to the Maryland Architecture. In the course of making this determination, the IAAP may do the following:

- Request additional information from the submitter,
- Determine that modifications or additions to the Maryland Architecture are required, and/or
- Provide specialized feedback to the submitter.

An affirmative finding that an ITS project conforms to the Maryland Architecture will be acknowledged in writing by the IAAP and forwarded to the Submitting Agency contact listed on the Form

Where to Go for Further Information!



Maryland ITS Architecture Conformity Form Package

B. Maryland Architecture Conformity Form

For All ITS Projects, a Systems Engineering Checklist must be submitted for review and approval prior to approval of Federal funds (23 CFR 940.13)

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2.7 **Budget & Funding Source:**	

For more information:

Mr. Warren Henry, MDOT SHA,

email: whenry@MDOT.maryland.gov

Section 2- Introduction

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The introduction includes background information and establishes the context for the Maryland Statewide ITS Architecture effort.

Included are sections on:

- Physical/Logical Architecture
- How to use the Architecture documentation
- The history of the Maryland ITS Architecture
- A summary on the approach to revising the Maryland ITS Architecture
- How to access the Maryland ITS Architecture
- Maintaining and updating Maryland ITS Architecture
- The strategic implementation and systems engineering approach
- Requirements for FHWA rule 940 and the Conformity process

How to use the Architecture Document

Use the ITS Architecture to **inform metropolitan and statewide long-range transportation planning** by identifying key ITS projects and stakeholders.

Reference the ITS Architecture during the **programming and budgeting of projects** to ensure alignment with regional and statewide ITS priorities.

Apply the ITS architecture to **guide ITS project development** by providing necessary context and a foundation for the systems engineering process.

Use the ITS architecture to **demonstrate compliance with FHWA/FTA requirements**, particularly those related to ITS architecture consistency and systems engineering.

History of ITS Document

1999	*Development begins.* Oversight by Maryland ITS Working Group (MITS-WG)
2001	*Baseline ITS Architecture completed.* Generic structure used. Aided planning and project-level conformity.
Late 2004	*Need for update identified.* Driven by new federal rules and evolving regional architectures (e.g., MWCOG).
Early 2005	*Update initiated.* SHA enlists Kapsch TrafficCom. IAAP formed to guide the update

Maryland its architecture

History of ITS Document

March 2005	*Updated architecture completed.* First fully USDOT-compliant statewide architecture.
2009	*Stakeholder validation finalized.* Included review sessions and updates from regional sources.
2016	*Intermediate update completed.* Focused on current projects and inputs from key stakeholders (e.g., CHART, MTA, MDTA).
2025	*The 2025 Maryland Statewide ITS Architecture revision approach was to start by reviewing the 2016 document to identify any gaps or areas for improvement that may exist in the 2016 document to be addressed in the newly revised document.*

Updates in the 2025 ITS Architecture

- *Improved engagement with the stakeholders*
- *Updates to the Agreement List*
- *Updates to the Project Inventory*
- *Migrated to ARC-IT 9.3 and RAD-IT 9.3*
- *Updated Service Packages and Standards*
- *Inclusion of CAVs*

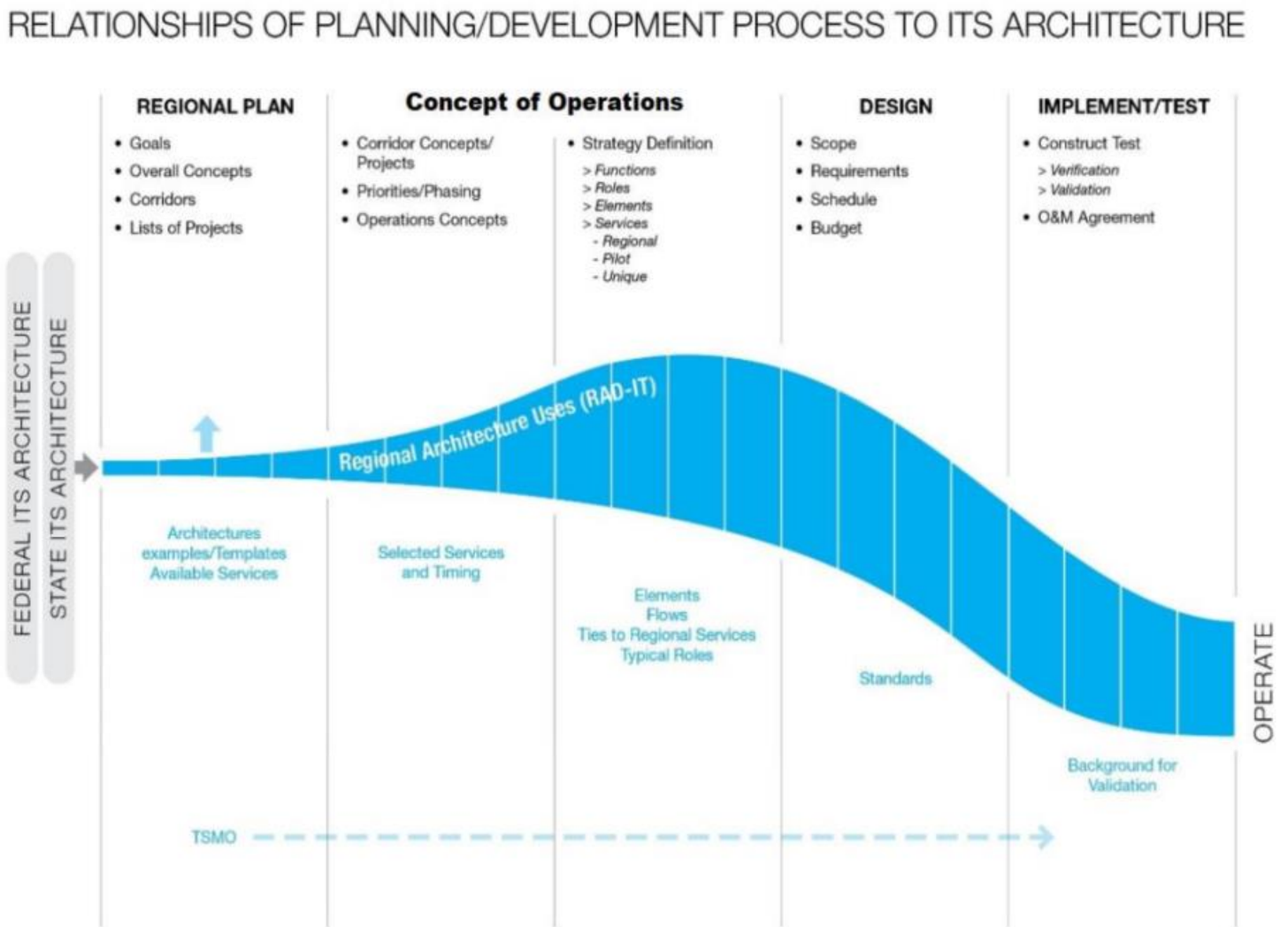
How to Access the Maryland Statewide ITS Architecture?

An electronic version of the Maryland Statewide ITS Architecture document can be found on the ITS Maryland website (www.itsmd.org) under the resources tab.

Maintaining and Updating

- Maryland SHA will lead the architecture maintenance activities, like all other statewide planning activities,
- ITS architecture maintenance will require close coordination between numerous stakeholder agencies,
- Maryland SHA will need to coordinate with major stakeholders in the state to maintain and keep the architecture updated.

Strategic Implementation and Systems Engineering approach



ITS Projects Timeframes

The 2025 Statewide Maryland ITS Architecture includes a long list of potential projects. Implementation timeframe and sequencing explain the general criteria and process of defining the future ITS initiatives and project concepts.

The project timeframe represents the status and defines the time window to implement the ITS project and associated services. Three timeframe categories are used:

Category	Timeframe
Short Term	0 – 5 years
Medium Term	6 – 10 years
Long Term	Beyond 10 years

Section 3 – Architecture Scope

The architecture scope will summarize the effort, including a description of the region with emphasis on characteristics that may affect transportation activities and performance.

List of Stakeholders

Maryland State Agencies	Maryland Aviation Administration
	Maryland Coordination and Analysis Center
	Maryland Department of Emergency Management
	Maryland Department of the Environment
	Maryland Department of Transportation (MDOT)
	Maryland Institute for Emergency Medical Services Systems
	Maryland Motor Vehicle Administration
	Maryland Port Administration
	Maryland State Highway Administration District Offices
	Maryland State Highway Administration Motor Carrier Division
	Maryland State Highway Administration Office of Communications
	Maryland State Highway Administration Office of Maintenance
	Maryland State Highway Administration Office of Traffic and Safety
	Maryland State Highway Administration Office of Transportation Mobility and Operations (CHART)
	Maryland State Highway Administration Traffic Operations Division
	Maryland State Police
	Maryland Transit Administration
	Maryland Transportation Authority

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Additional Stakeholders include:

- Local Government Agencies
- MPO's
- Other State DOTs and Agencies
- Federal Agencies
- Partners
- Universities
- Private Sector Traveler Information and Transportation Companies
- Media Partners

Agreements

Types of Agreements:

- Handshake Agreements
- Memorandum of Understandings
- Interagency Agreements
- Inter-government Agreements
- Operational Agreements
- Funding Agreements
- Master Agreements

Title	Status	Type of Agreement	Agencies	Description	Exp. Date
Police for the Liaison Officer					
Amendment I - Interagency Agreement Between MDOT SHA & MD Department of State Police for the Liaison Officer	Existing	Interagency Agreement	SHA & MSP	Agreement for the State Police Liaison Officer assigned to the SOC.	Agreement Term: FY 21 through FY 25
Cooperative Agreement by and between FHWA USDOT & MDOT	Existing	Intergovernmental Agreement	SHA & Federal Highway Administration (FHWA)	Rural Opportunities to Use Traffic Technology Enhancements (ROUTE) on US 50 Project)	Agreement Term: 1/11/24 – 4/11/30
BWI Electronic Sign Replacement Project MOA	Planned	Interagency Agreement	SHA & Maryland Aviation Administration	Planned project agreement for the replacement of Electronic Signs around the BWI airport.	Agreement Term: N/A
MOU Communications Tower and Shelter Shared Usage	Existing	Memorandum of Understanding	SHA & MSP	Agreement for the shared use of communications towers and shelters.	Agreement Term: 11/27/19 - 11/27/29
MOU for Coordination of Traffic Incident Management on Roadways Maintained by the SHA	Existing	Memorandum of Understanding	SHA & MSP	Terms under which MSP will provide tower and shelter space for SHA's CCTV video cameras and ITS devices on MSP premises.	Agreement Term: Indefinite (effective date – 8/13/15)
For Coordination of Traffic Incident Management on Roadways Maintained by the Maryland State	Existing	Memorandum of Understanding	SHA & MSP	Endorsement of the MD/MSP Clear the Road Policy, Delineation of Incident Scene Roles and Responsibilities, Establishment of	Initiated: July 31, 2015

If you know of any pertinent agreements that are not listed here, please let us know and we will add them.

What's considered an ITS project?

Intelligent Transportation Systems (ITS) is defined as "electronics, communications, or information processing used singly or in combination to improve the efficiency or safety of a surface transportation system."

An ITS project is any project that in whole or in part, funds the acquisition of technologies or systems of technologies that provide an ITS service.

Maryland its architecture

List ITS project

Title	Type	Stakeholders	Description
2016 Not Marked Completed			
CHART Area-wide DMS Deployment Phase 5	Existing	SHA	Installation upgrade/replacement of DMS at selected locations.
CHART Arterial Cameras	Existing	SHA	Installation of CCTV cameras along US 1 between MD 100 and MD 32.
Connected/Autonomous Vehicles (CAV) Testbeds in Maryland	In Progress	MDOT	This project will facilitate the testing of private and commercial-type vehicles through CAV Testbeds in Maryland.
Deployment of Real-Time Parking Availability Information Systems at Key Metrorail or Other Publicly Owned Park-and-Ride Facilities	Planned	MDOT, WMATA	Following up on a WMATA study completed in 2009, deploy electronic systems that keep track of parking availability at key facilities and make this information available to commuters in a timely fashion. Estimated funding needed: $1million. This pilot project would follow up on the WMATA real time parking information study to perform real-time parking management at selected Metro stations by taking the parking lot information and identifying how many parking spaces are available at various locations. This information is then distributed to the public via Variable Message Signs (DMS) and traveler information outlets.
Deployment of Roadside Infrastructure to Support In-Vehicle Highway Hazard Alert	In Progress	SHA	LRSD Project 3.9.6.1. This project would include installation of roadside detectors, and short-range radio transmitters and antennas to detect hazardous traveling conditions and alert traveling vehicles via radio. Three (3) pilot sites at various locations, statewide (assume total number of 50 vehicles for all three pilot sites. Each site will require three side-fire detectors spaced at ¼ mile each, wireless communications, and vehicle-equipped radio hazard alert system.
Deployment of Roadside Infrastructure to Support In-Vehicle Highway Signage Systems	Planned	SHA	LSRDP Project 3.9.7.1. This project will include installation of short (medium and high frequencies between 1,800 and 30,000 kHz) and long-range (low frequency between 30-300kHz) radio transmitters along the sides of the highway to broadcast encoded radio signals to in-vehicle sign display systems in order to allow CHART to alert and advise motorists of upcoming roadway and traffic signage and conditions.
Deployment of Integrated Corridor Management	In Progress	SHA	Develop regional and corridor based multi-agency systems to share real-time traffic operations data with bus transit providers and real-time bus transit

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Title	Type	Stakeholders	Description
Technologies on Significant Regional Corridors			information with traffic management entities supporting regional dat exchange to achieve coordinated management of key roadway corridor Estimated funding needed: $7 million.
Develop multi-jurisdictional Computer-Aided Dispatch (CAD) Operations Software to Integrate CAD and Incident Information from 911 and In-Vehicle System Centers through RITIS	In Progress	SHA/UMD CATT Lab	LRSDP 2.16.1.1. This project would develop a multi-jurisdictional CA Operations Software that can send, receive, and interpret dispatch requests an incident information sent through RITIS from internal and externa organizations (such as 911 Dispatch Centers) deployed to a incident/emergency location. CAD requests from external organizations will b sent to RITIS, which will subsequently and automatically create an externa event within the CHART system for incident responders to act. The CAD modul will use the Incident Management module (Project 1.16.3.4 in the 2008 NCDF to automatically exchange dispatch information with internal and externa organizations.
Develop Software for In-Vehicle Traveler Information	In Progress	SHA	LRSDP 3.16.2.2 Develop software to send traveler information to in-vehicl traveler information systems. The Traveler In formation module will generat information for the in-vehicle traveler information system tailored to th location of the vehicle. Device drivers will be added to the CHART system t program the transmitters needed to communicate with the in-vehicle travele information systems.
Eastern Shore DMS	In Progress	SHA	Installation of DMS along Lower Eastern Shore of Ocean City.
Enhance Regional Integrated Transportation Information System (RITIS) Capabilities for Intermodal Transportation Operations Data Sharing	Existing	SHA, UMD, WMATA, & Local Transit	Develop a regional system to share real-time traffic operations data with bu transit providers and real-time bus transit information with traffic managemer entities to achieve coordinated and synergistic transportation management c key roadway corridors. Activities include systems engineering for multi-mode coordination data sharing, and real time export of bus data (includin automated vehicle location data) from WMATA and local transit buses for us in overall traffic management. Estimated funding needed $1 million. Implement real-time export of automated vehicle location (AVL) data from (A WMATA buses, and (B) local transit buses via transit management centers t the necessary traffic management center(s)
I-270 Advance Traffic Management	In Progress	SHA	Proposed installation of lane controls, hard running shoulders, or ramp metering, etc., to improve mobility on I 270.

Currently 249 of planned ITS Projects

Maryland its architecture

Maryland's ITS Inventory

	DMS	HAR	SHAZAM	Traffic Sensors	CCTV
Allegany County	5	1	2	-	10
Anne Arundel County	42	3	-	26	75
Baltimore City	65	-	-	13	178
Baltimore County	51	-	-	69	105
Calvert County	-	-	-	-	2
Caroline County	2	-	-	1	2
Carroll County	-	-	-	-	0
Cecil County	13	2	1	-	25
Charles County	2	1	-	-	13
Dorchester County	-	1	1	-	2
Frederick County	6	-	-	13	15
Garrett County	2	-	-	-	8
Harford County	14	1	1	-	27
Howard County	21	-	-	25	39
Kent County	-	-	-	1	1
Montgomery County	38	4	3	72	239
Prince George's County	33	1	2	103	73
Queen Anne's County	9	3	4	20	23
St Mary's County	-	-	-	-	6
Somerset County	-	-	-	-	1
Talbot County	1	-	1	1	5
Washington County	3	2	3	1	14
Wicomico County	2	1	2	5	6
Worcester County	6	1	2	4	9
Statewide	288	21	22	354	866

Proposed TSMO ITS Assets

ITS Device Type	Count
CCTV	292
Detectors	284
DMS	31
RSU	282
Weather Sensors	9
Weigh Station	22
Grand Total	920

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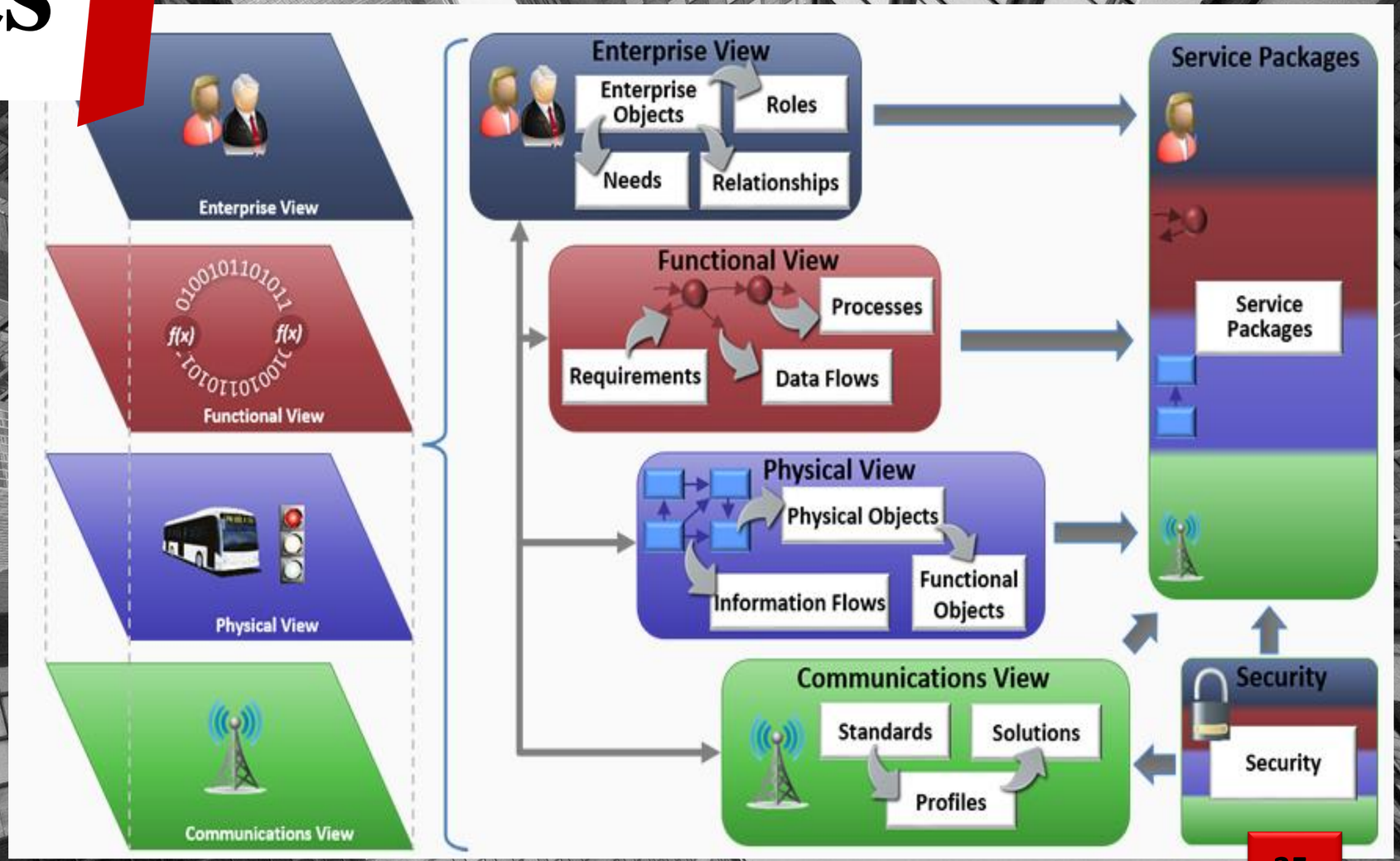
Architecture Components

BUILDING BLOCKS



Architecture Components

Operational Concept

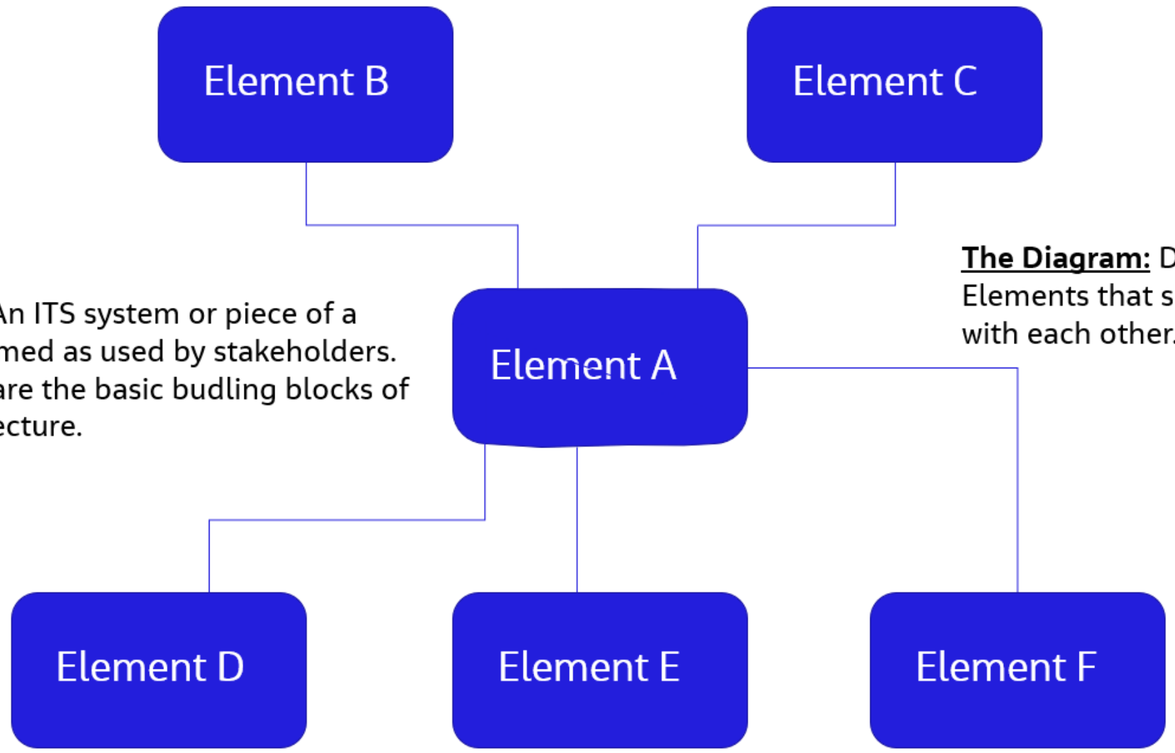
	Emergency Management	
Maryland State Highway Administration (SHA)	SHA CHART, Office of Traffic and Safety, and Office of Maintenance to coordinate transportation infrastructure protection operations with local, state, and federal public safety agencies.	Existing
	SHA CHART to provide Baltimore City with emergency services support.	Existing
	SHA CHART provides MSP with incident information and coordination via the CHART ATMS.	Existing
	SHA CHART provides MDTA police and the Authority Operations Center with incident information and coordination via the CHART ATMS.	Existing
	SHA CHART provides the Montgomery County TMC with incident information and coordination via the CHART ATMS.	Existing
	SHA CHART provides the Prince George's County TRIP Center with incident information and coordination via the CHART ATMS.	Existing
	SHA CHART Administers coordination and operations for regional emergency detour operations, including coordination along Freeway Incident Traffic Management (FITM) routes.	Existing
	SHA CHART provides MEMA, MIEMMS, Baltimore County Police, Prince George's County Police, Frederick County Police, Frederick County 911, Anne Arundel County EOC, Harford County EOC,	

Maryland its architecture

Architecture Components

ITS ELEMENTS

Interconnect Diagrams



Element: An ITS system or piece of a system named as used by stakeholders. Elements are the basic budling blocks of the Architecture.

The Diagram: Displays the Elements that share information with each other.

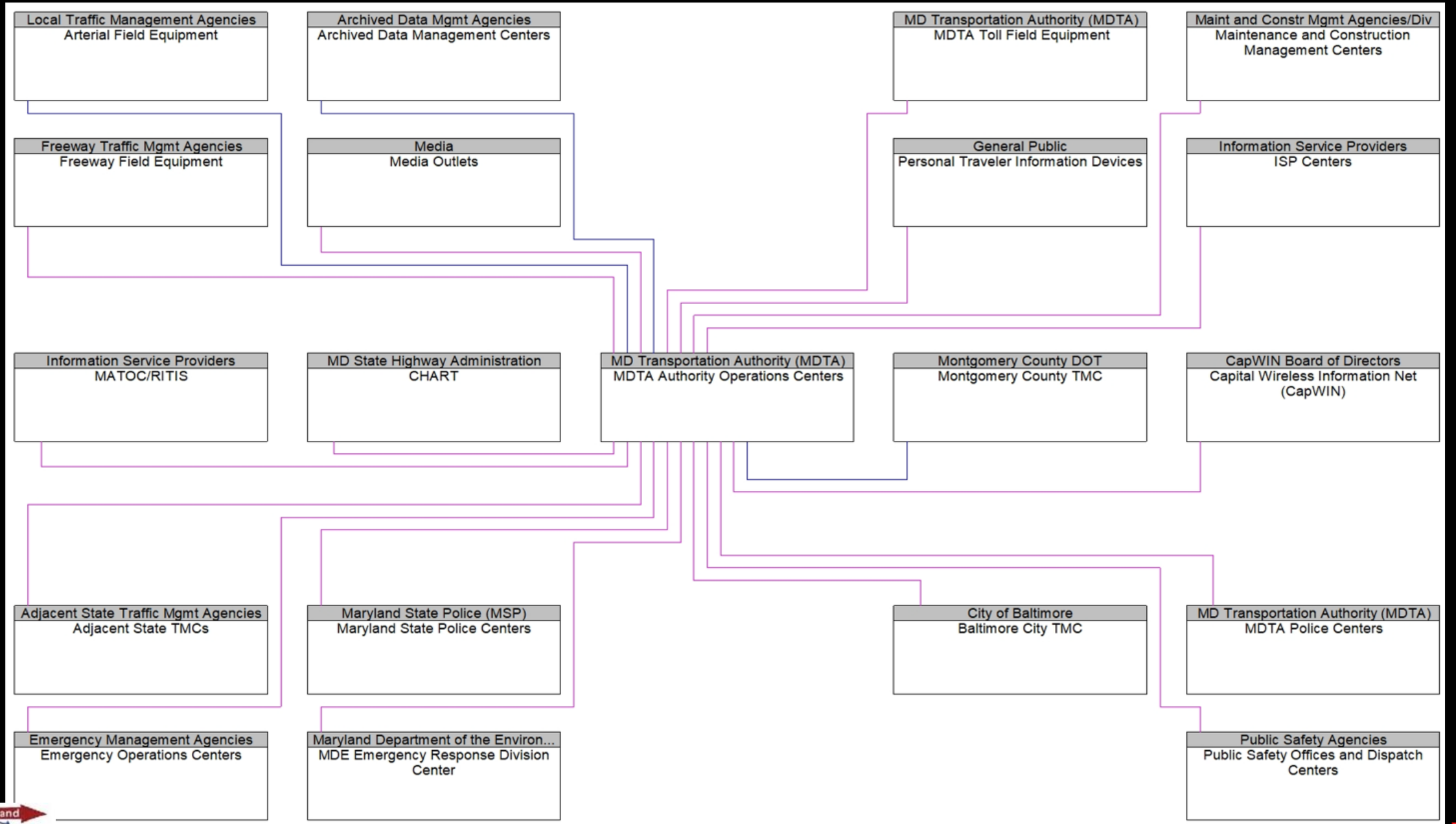
Section 5 – Statewide ITS Architecture

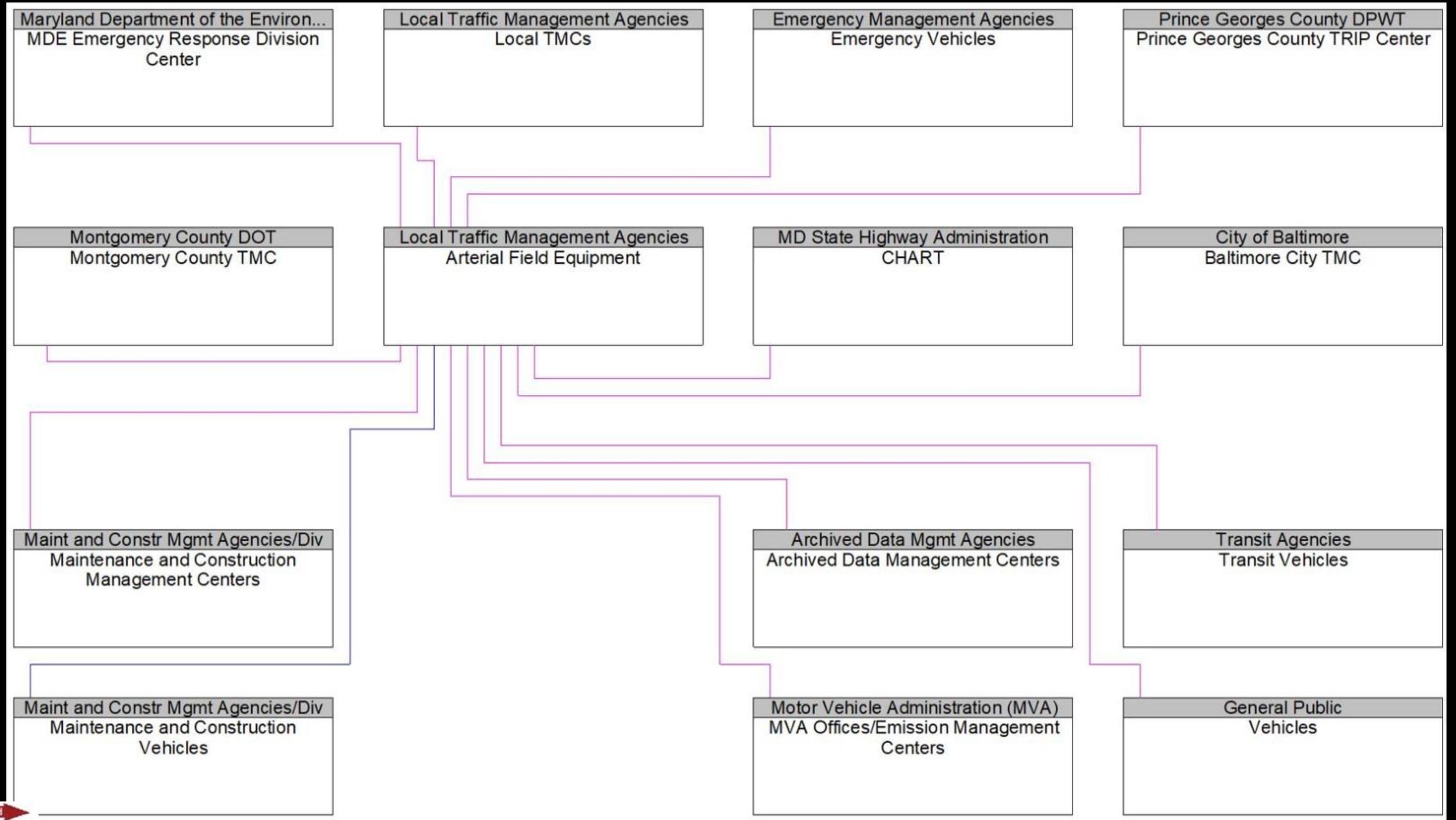
This section graphically displays the details of the ITS Architecture.

Included are the Interconnect Diagrams to include:

- Operations Centers
- Arterial Field Equipment
- And the interconnects for various agencies and how their information flows
- Each “generic” and “specific” element is depicted in terms of other elements with which it interfaces, and each element pair (interconnect) that operate in the transportation environment.

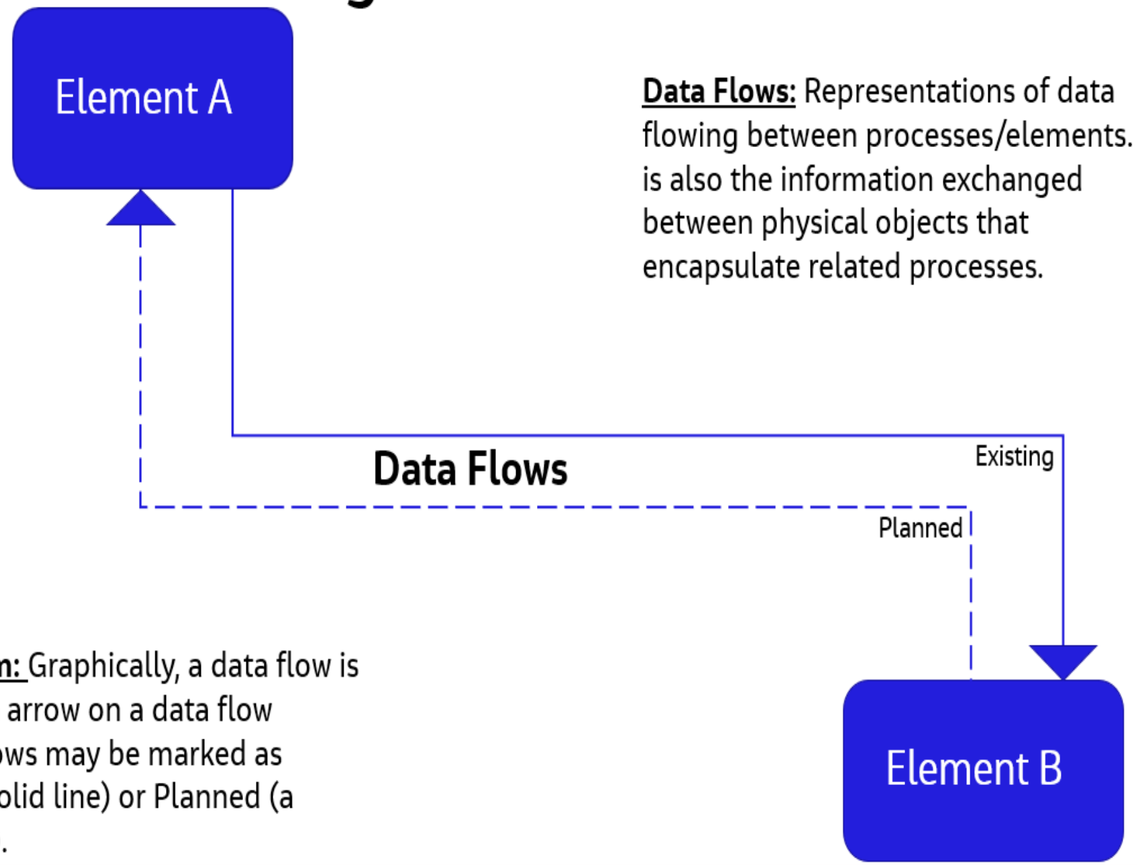
Diagrams on Next Slides


Local Traffic Management Agencies
Arterial Field Equipment
Archived Data Mgmt Agencies
Archived Data Management Centers
MD Transportation Authority (MDTA)
MDTA Toll Field Equipment
Maint and Constr Mgmt Agencies/Div
Maintenance and Construction Management Centers
Freeway Traffic Mgmt Agencies
Freeway Field Equipment
Media
Media Outlets
General Public
Personal Traveler Information Devices
Information Service Providers
ISP Centers
Information Service Providers
MATOC/RITIS
MD State Highway Administration
CHART
MD Transportation Authority (MDTA)
MDTA Authority Operations Centers
Montgomery County DOT
Montgomery County TMC
CapWIN Board of Directors
Capital Wireless Information Net (CapWIN)
Adjacent State Traffic Mgmt Agencies
Adjacent State TMCs
Maryland State Police (MSP)
Maryland State Police Centers
City of Baltimore
Baltimore City TMC
MD Transportation Authority (MDTA)
MDTA Police Centers
Emergency Management Agencies
Emergency Operations Centers
Maryland Department of the Environ...
MDE Emergency Response Division Center
Public Safety Agencies
Public Safety Offices and Dispatch Centers
Existing
Planned


Maryland Department of the Environ...
MDE Emergency Response Division Center
Local Traffic Management Agencies
Local TMCs
Emergency Management Agencies
Emergency Vehicles
Prince Georges County DPWT
Prince Georges County TRIP Center
Montgomery County DOT
Montgomery County TMC
Local Traffic Management Agencies
Arterial Field Equipment
MD State Highway Administration
CHART
City of Baltimore
Baltimore City TMC
Maint and Constr Mgmt Agencies/Div
Maintenance and Construction Management Centers
Archived Data Mgmt Agencies
Archived Data Management Centers
Transit Agencies
Transit Vehicles
Maint and Constr Mgmt Agencies/Div
Maintenance and Construction Vehicles
Motor Vehicle Administration (MVA)
MVA Offices/Emission Management Centers
General Public
Vehicles
Existing
Planned

ITS Architecture Diagrams

Information Flow Diagrams

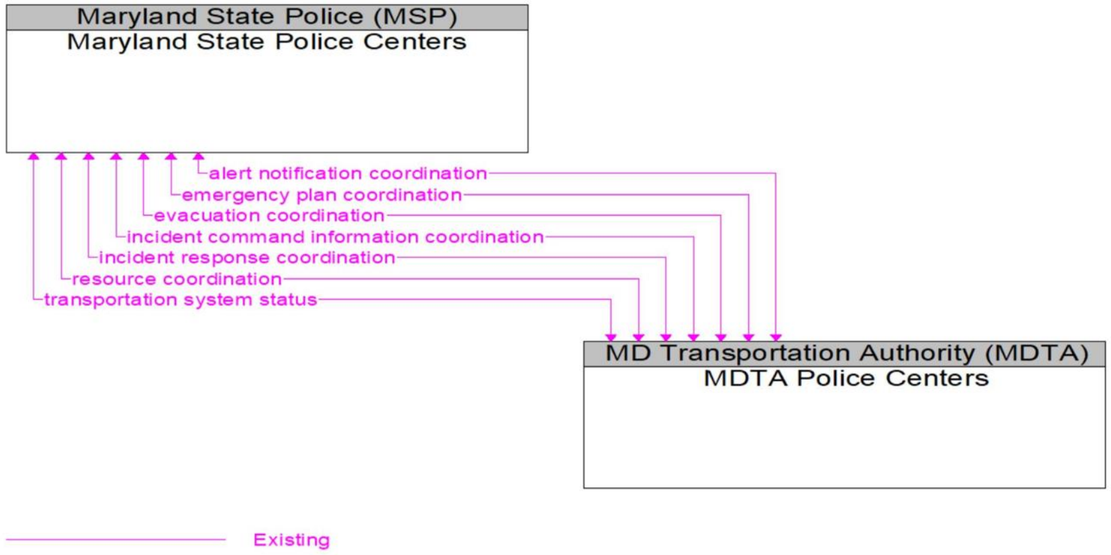


Data Flows: Representations of data flowing between processes/elements. It is also the information exchanged between physical objects that encapsulate related processes.

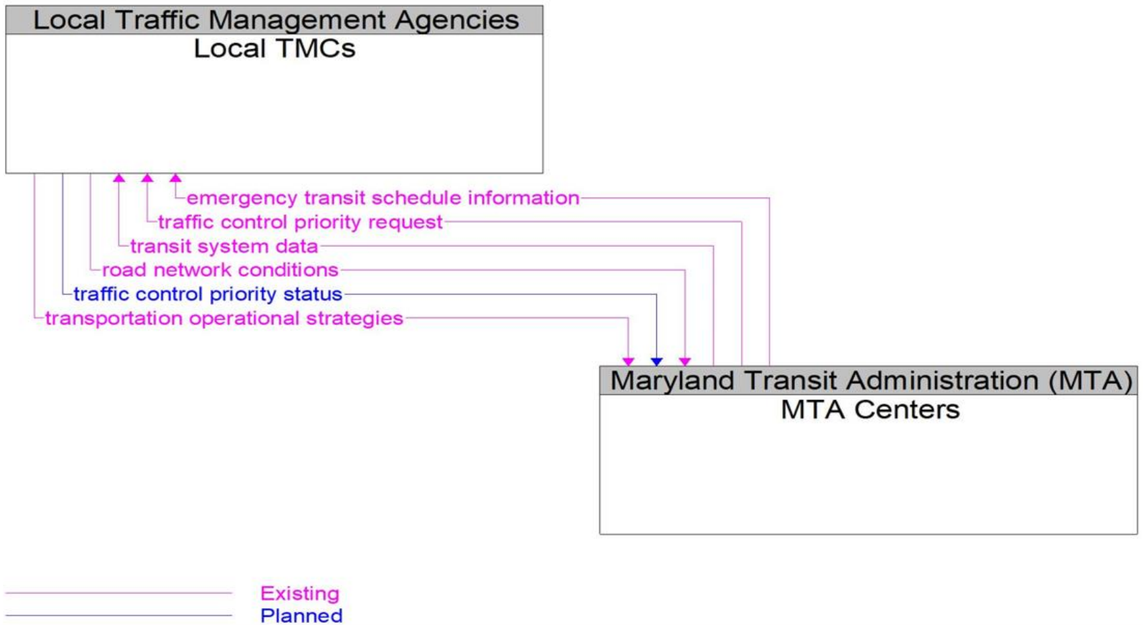
The Diagram: Graphically, a data flow is shown as an arrow on a data flow diagram. Flows may be marked as Existing (a solid line) or Planned (a dashed line).

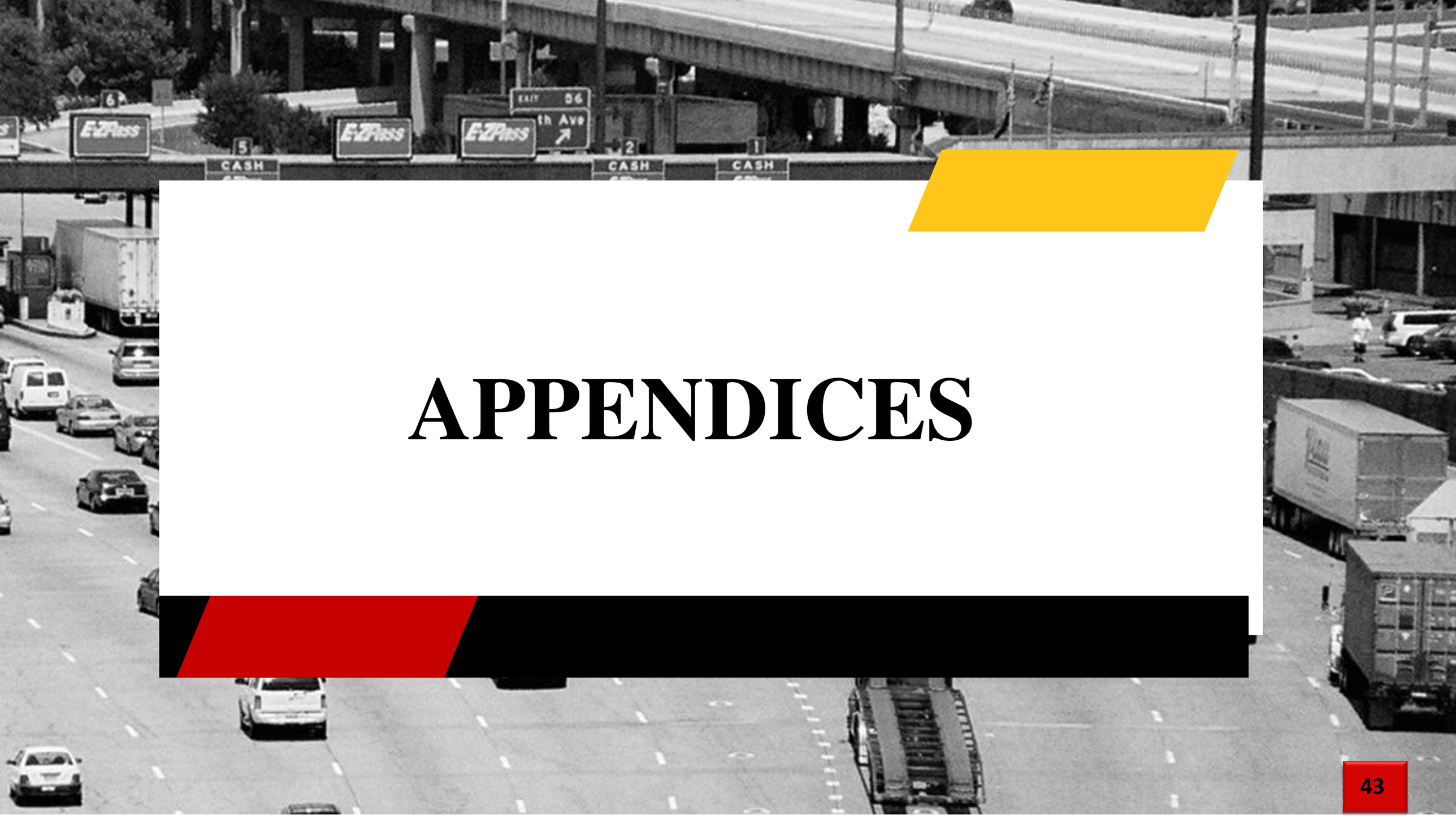
Examples

Examples:



Examples:





APPENDICES

Appendices

- Appendix A: Acronyms
- Appendix B: Stakeholder Outreach
- Appendix C: Compliance Matrix
- Appendix D: Element/Facility Relationships
- Appendix E: ITS Standards
- Appendix F: Functional Requirements
- Appendix G: Functional Area Definitions
- Appendix H: Service Packages
- Appendix I: Subsystem definitions
- Appendix J: Information Flow Definitions

Appendix D – Element/Facility Relationships

Appendix D – Element/Facility Relationships

Stakeholder	Element Name	Element Description
Adjacent State Traffic Management Agencies	Adjacent State TMCs	Adjacent TMCs is a Generic Element that represents the systems and personnel that manage a broad range of transportation infrastructure within states bordering Maryland. Maryland is bordered by Washington, D.C. and Virginia to the south, West Virginia to the southwest and Pennsylvania and Delaware to the north. These offices/operations centers generally monitor and control traffic, as well as coordinate maintenance, construction, and incident management operations along freeways and arterials. Facilities represented by this Generic Element include:- DelDOT TMC- DDOT TMC- PennDOT Statewide TMC- PennDOT District 8-0 TMC- PennDOT District 9-0 TMC- Pennsylvania Turnpike Commission TMC- VDOT- VDOT District 5, Hampton Roads TOC- VDOT District 9, Northern VA TOC- Virginia DSP- WVDOT
Archived Data Management Agencies	Archived Data Management Centers	The Archived Database Management Centers is a Generic Element that represents centralized office locations, systems, and personnel for agencies that collect, or may have an interest in collecting, archiving, managing, and distributing data generated from various ITS sources. These agencies are typically regional in nature and use the data for transportation administration, policy evaluation, safety, planning, performance monitoring, program assessment, operations, and research applications. Facilities represented by this Generic Element include: - Appalachian Regional Commission (ARC)- Baltimore Metropolitan Council (BMC) - Calvert/St. Mary's MPO Office- Cumberland MPO Office- Hagerstown MPO Office- MNCPPC Database and Office- MWCOG Database and Office- Salisbury/Wicomico MPO - Tri-County Council for Southern Maryland Office- Tri-County Council for Western Maryland Office- WILMAPCO
		Capital Wireless Information Net (CapWIN) is a Specific

Appendix E - ITS Standards

The ITS standards listed in the table relate the Maryland Statewide ITS Architecture Information flows to nationally recognized technology standards

SDO	Document No	Standard Name
Connected Vehicle Standards		
AASHTO	NTCIP 8002 Annex B1	Content Outline for NCTIP 1200 Series Standards
AASHTO/ITE/NEMA/SAE	Connected Transportation Interoperability (CTI) 4501 v01	Connected Intersections (CI) Implementation Guide
AASHTO/ITE/NEMA/SAE	Connected Transportation Interoperability (CTI) 4001 v01	Roadside Unit (RSU) Standard
AASHTO/ITE/NEMA/SAE	Connected Transportation Interoperability (CTI) 4502 v01	Connected Intersections Validation Report
IEEE	IEEE 802.11-2016	Standard for Information Technology - Telecommunications and Information Exchange Between Systems - Local and Metropolitan Area Networks - Specific Requirements - Part II: Wireless

Appendix F – Functional Requirements

Element Name	Functional Object	Functional Object Description
Adjacent State TMCs	Emergency Call-Taking	'Emergency Call-Taking' supports the emergency call-taker, collecting available information about the caller and the reported emergency, and forwarding this information to other objects that formulate and manage the emergency response. It receives 9-1-1, 7-digit local access, and motorist callbox calls and interfaces to other agencies to assist in the verification and assessment of the emergency and to forward the emergency information to the appropriate response agency.
	Emergency Data Collection	'Emergency Data Collection' collects and stores emergency information that is collected during operations by the Emergency Management Center. This data can be used directly by operations personnel, or it can be made available to other data users and archives in the region.
	Emergency Dispatch	'Emergency Dispatch' tracks the location and status of emergency vehicles and dispatches these vehicles to incidents. Pertinent incident information is gathered from the public and other public safety agencies and relayed to the responding units. Incident status and the status of the responding units is tracked so that additional units can be dispatched and/or unit status can be returned to available when the incident is cleared and closed.
	Emergency Early Warning System	'Emergency Early Warning System' monitors alerting and advisory systems, information collected by ITS surveillance and sensors, and reports from other agencies and uses this information to identify potential, imminent, or in-progress major incidents or disasters. Notification is provided to initiate the emergency response, including public notification using ITS traveler information systems, where appropriate.
	Emergency Environmental Monitoring	'Emergency Environmental Monitoring' collects current and forecast road conditions and surface weather information from a variety of sources. The collected environmental information is monitored and presented to the operator and used to more effectively manage incidents.
	Emergency	'Emergency Evacuation Support' coordinates evacuation plans

Appendix G – Functional Area Definitions

Appendix G – Functional Area Definitions

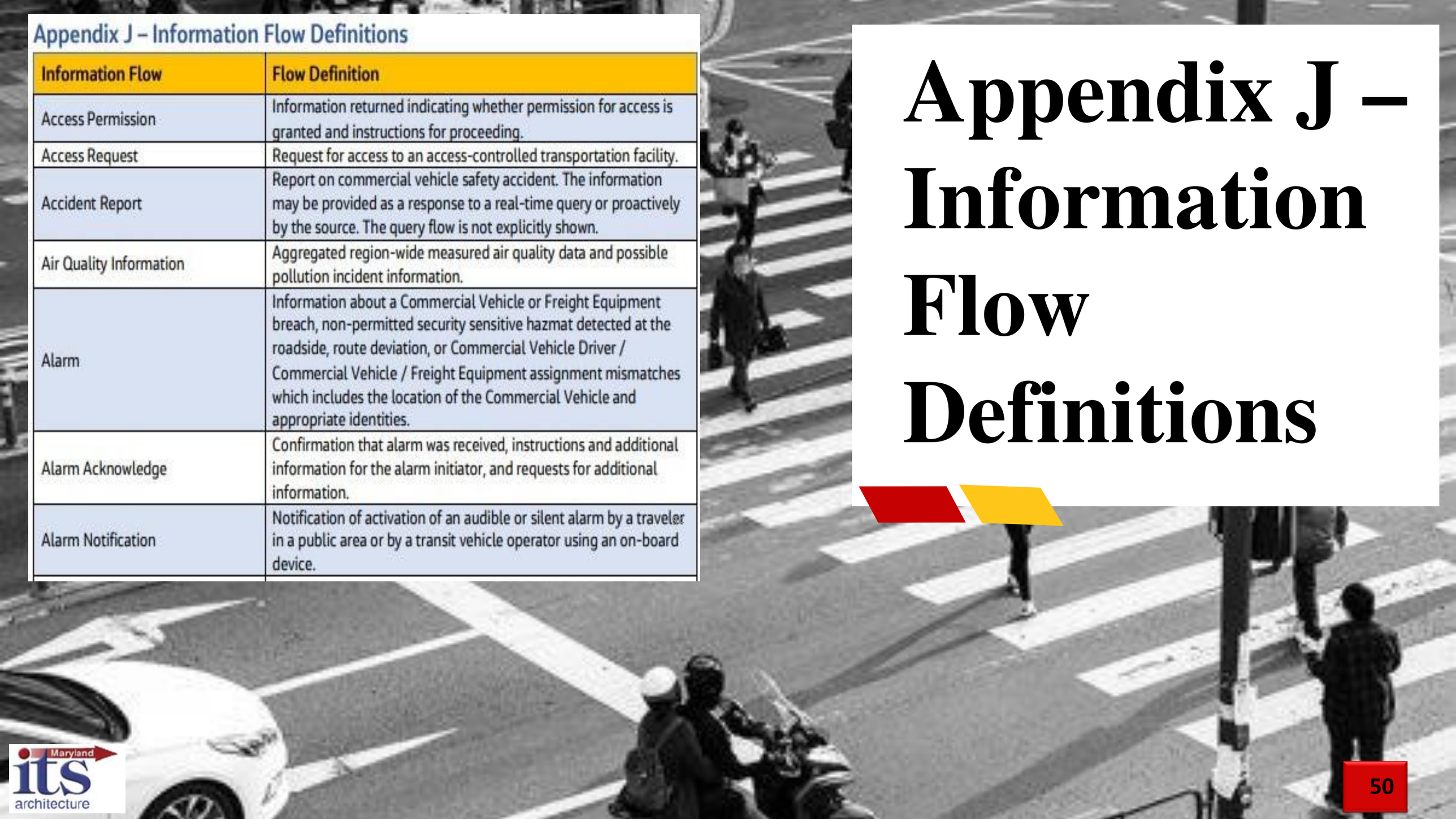
Functional Area	Functional Area Requirement Description
Archived Data Management	
Archive Data Repository	Collects data and data catalogs from one or more data sources and stores the data in a focused repository that is suited to a particular set of ITS data users. It includes capabilities for performing quality checks on the incoming data, error notification, and archive to archive coordination. It includes the capability to define a data registry that allows registration of data identifiers or data definitions for interoperable use throughout a region.
Archive Government Reporting	Selects and formats data residing in an ITS archive to facilitate local, state, and federal government data reporting requirements. It provides transportation system statistics and performance measures in required formats to support investment and policy decisions.
Archive On-Line Analysis and Mining	Provides advanced data analysis, summarization, and mining features that facilitate discovery of information, patterns, and correlations in large data sets. Multidimensional analysis, selective summarization and expansion of data details, and many other advanced analysis services may be offered.
Archive Situation Data Archival	Collects and archives traffic, roadway, and environmental information for use in off-line planning, research, and analysis. It controls and collects information directly from equipment at the roadside, reflecting the deployment of traffic detectors that are used primarily for traffic monitoring and planning purposes, rather than for traffic management. It also collects situation data from connected vehicles. The data collected, quality checks performed, and aggregation strategies are defined to support transportation system performance monitoring and management.
Commercial Vehicle Administration	
Commercial Vehicle	Issues credentials, collects fees and taxes, and supports enforcement

Appendix H – Service Packages

- Service packages represent slices of the architecture that address specific services such as **traffic signal control**
- A service package collects several different physical objects (systems and devices) and their functional objects and information flows that provide the desired service
- The table displays a menu of service packages
- You can click on the items you are interested in you can traverse to the physical, enterprise and functional view components that are associated with each service package

Area	Short Name	Name
Commercial Vehicle Operations	CVO01	Carrier Operations and Fleet Management
	CVO02	Freight Administration
	CVO03	Electronic Clearance
	CVO04	CV Administrative Processes
	CVO05	Commercial Vehicle Parking
	CVO06	Freight Signal Priority
	CVO07	Roadside CVO Safety
	CVO08	Smart Roadside and Virtual WIM
	CVO09	Freight-Specific Dynamic Travel Planning
	CVO10	Road Weather Information for Freight Carriers
	CVO11	Freight Drayage Optimization
	CVO12	HAZMAT Management
	CVO13	Roadside HAZMAT Security Detection and Mitigation
	CVO14	CV Driver Security Authentication
	CVO15	Fleet and Freight Security
	CVO16	Electronic Driver Logs
	CVO17	Intelligent Access Program

Appendix J – Information Flow Definitions

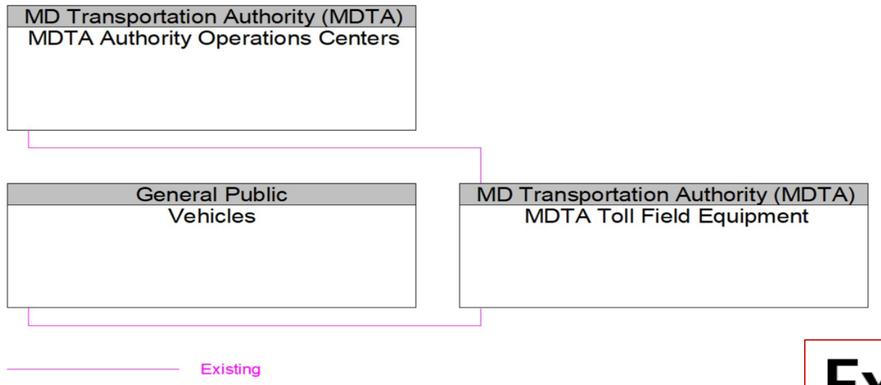


Appendix J – Information Flow Definitions

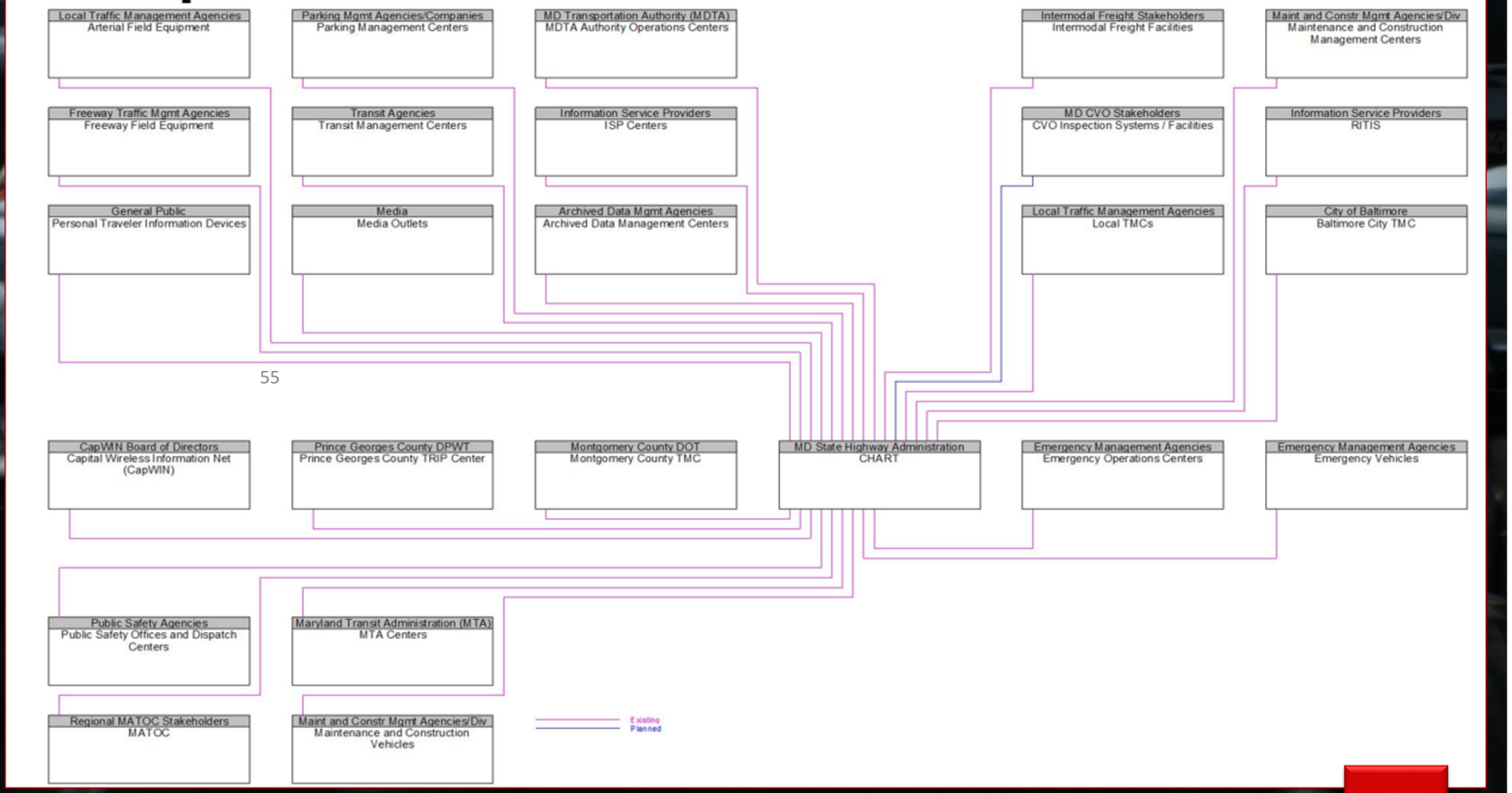
Information Flow	Flow Definition
Access Permission	Information returned indicating whether permission for access is granted and instructions for proceeding.
Access Request	Request for access to an access-controlled transportation facility.
Accident Report	Report on commercial vehicle safety accident. The information may be provided as a response to a real-time query or proactively by the source. The query flow is not explicitly shown.
Air Quality Information	Aggregated region-wide measured air quality data and possible pollution incident information.
Alarm	Information about a Commercial Vehicle or Freight Equipment breach, non-permitted security sensitive hazmat detected at the roadside, route deviation, or Commercial Vehicle Driver / Commercial Vehicle / Freight Equipment assignment mismatches which includes the location of the Commercial Vehicle and appropriate identities.
Alarm Acknowledge	Confirmation that alarm was received, instructions and additional information for the alarm initiator, and requests for additional information.
Alarm Notification	Notification of activation of an audible or silent alarm by a traveler in a public area or by a transit vehicle operator using an on-board device.

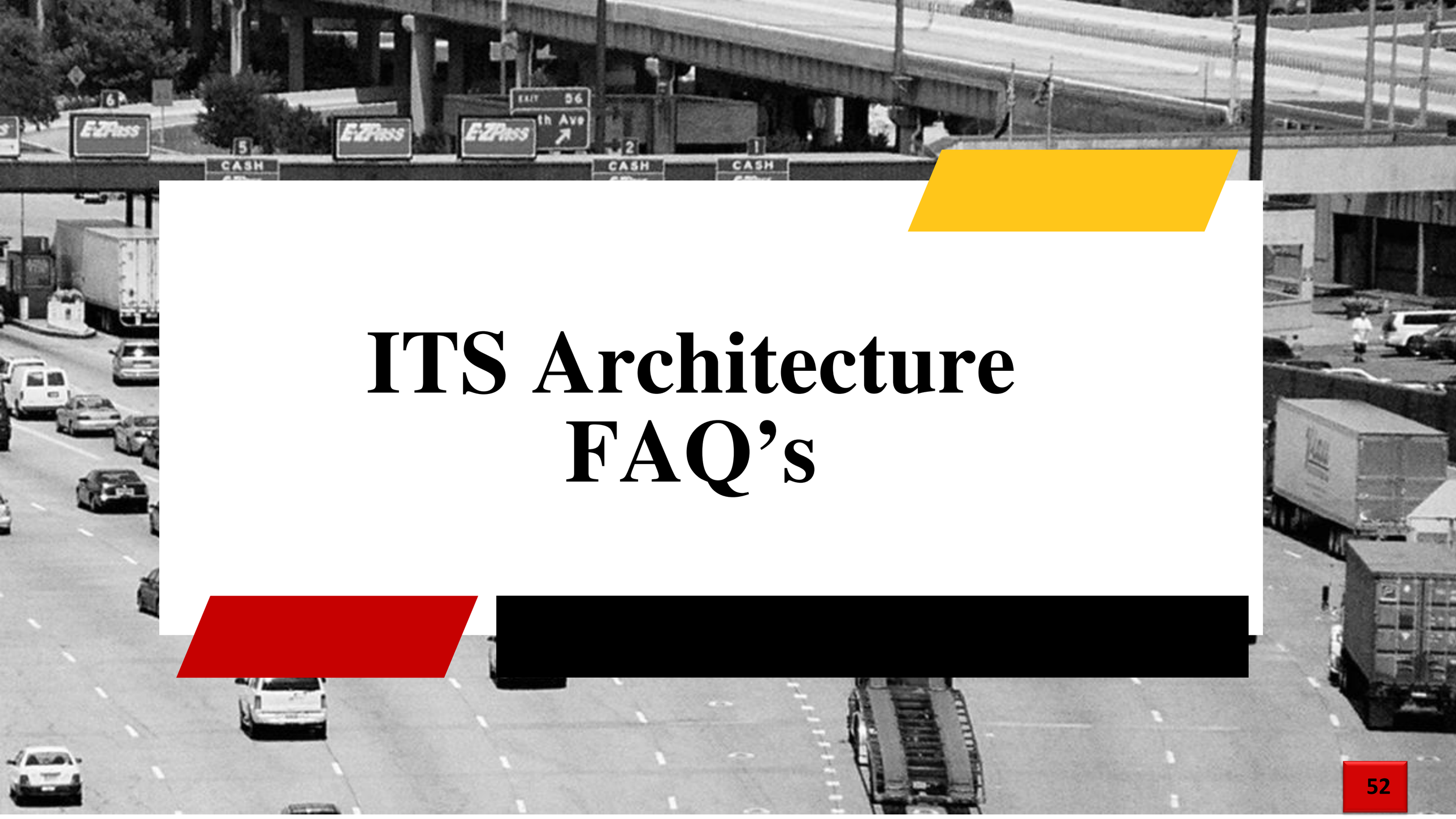
Examples

Examples:



Examples:





ITS Architecture FAQ's

Where can I find information on Maryland ITS Architecture?

https://itsmd.org/maryland-its-architecture/

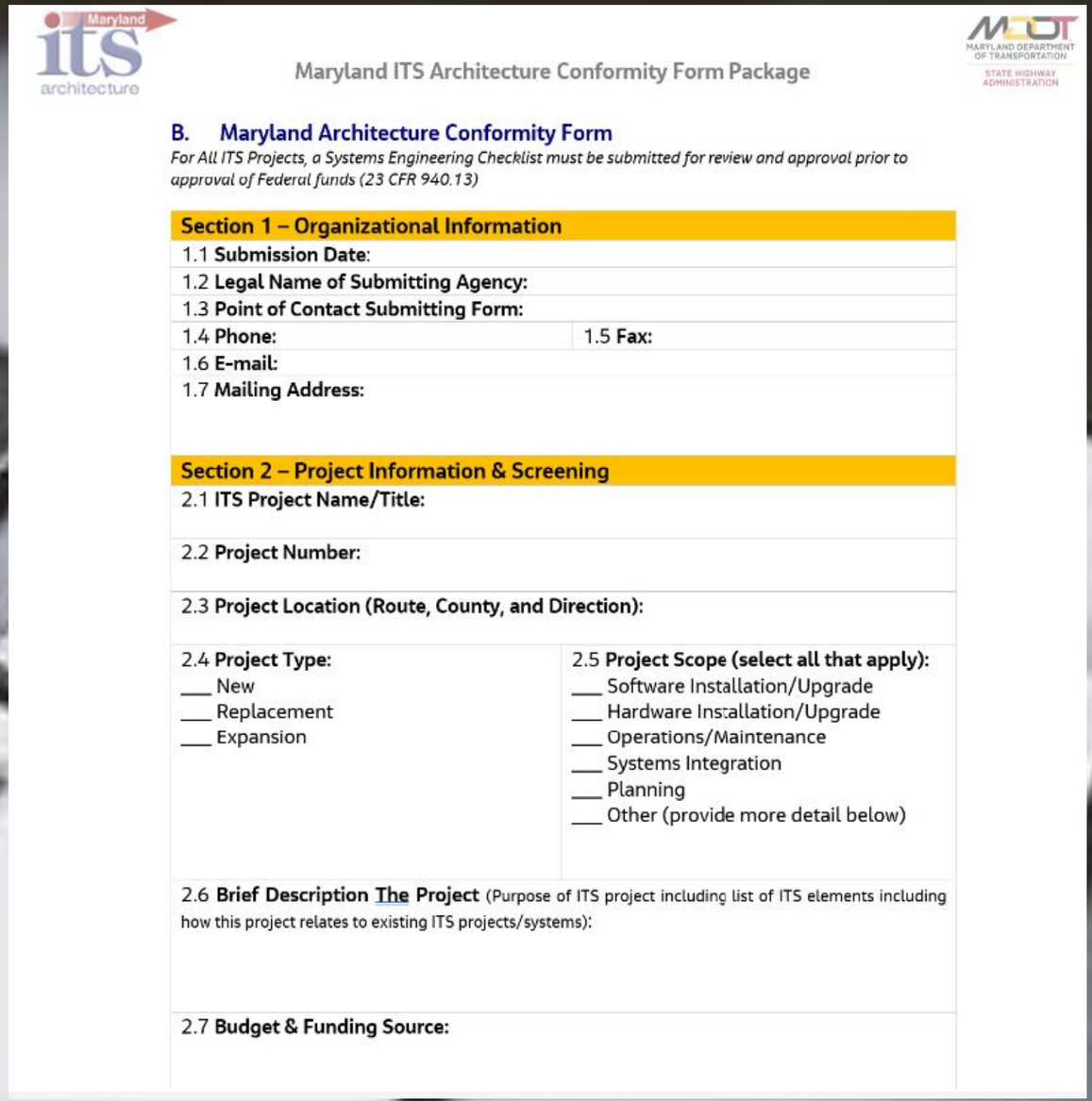
How is the ITS Architecture document stored and how to search.

Website Sections

1. Using the Architecture
2. Definitions and Acronyms
3. Conformity Requirements
4. Elements
5. Stakeholder
6. Subsystem Diagram
7. Standards
8. Full Architecture Document

Where to Go for Further Information

For more information:
Mr. Warren Henry, MDSHA,
email: whenry@MDOT.maryland.gov.



Maryland ITS Architecture Conformity Form Package

B. Maryland Architecture Conformity Form

For All ITS Projects, a Systems Engineering Checklist must be submitted for review and approval prior to approval of Federal funds (23 CFR 940.13)

Section 1 – Organizational Information	
1.1 **Submission Date:**	
1.2 **Legal Name of Submitting Agency:**	
1.3 **Point of Contact Submitting Form:**	
1.4 **Phone:**	1.5 **Fax:**
1.6 **E-mail:**	
1.7 **Mailing Address:**	

Section 2 – Project Information & Screening	
2.1 **ITS Project Name/Title:**	
2.2 **Project Number:**	
2.3 **Project Location (Route, County, and Direction):**	
2.4 **Project Type:** ___ New ___ Replacement ___ Expansion	2.5 **Project Scope (select all that apply):** ___ Software Installation/Upgrade ___ Hardware Installation/Upgrade ___ Operations/Maintenance ___ Systems Integration ___ Planning ___ Other (provide more detail below)
2.6 **Brief Description The Project** (Purpose of ITS project including list of ITS elements including how this project relates to existing ITS projects/systems):	
2.7 **Budget & Funding Source:**	

MARYLAND DEPARTMENT OF TRANSPORTATION

STATE HIGHWAY ADMINISTRATION

Thank You

Maryland its architecture