ITS Architecture Update

Project Review Meeting

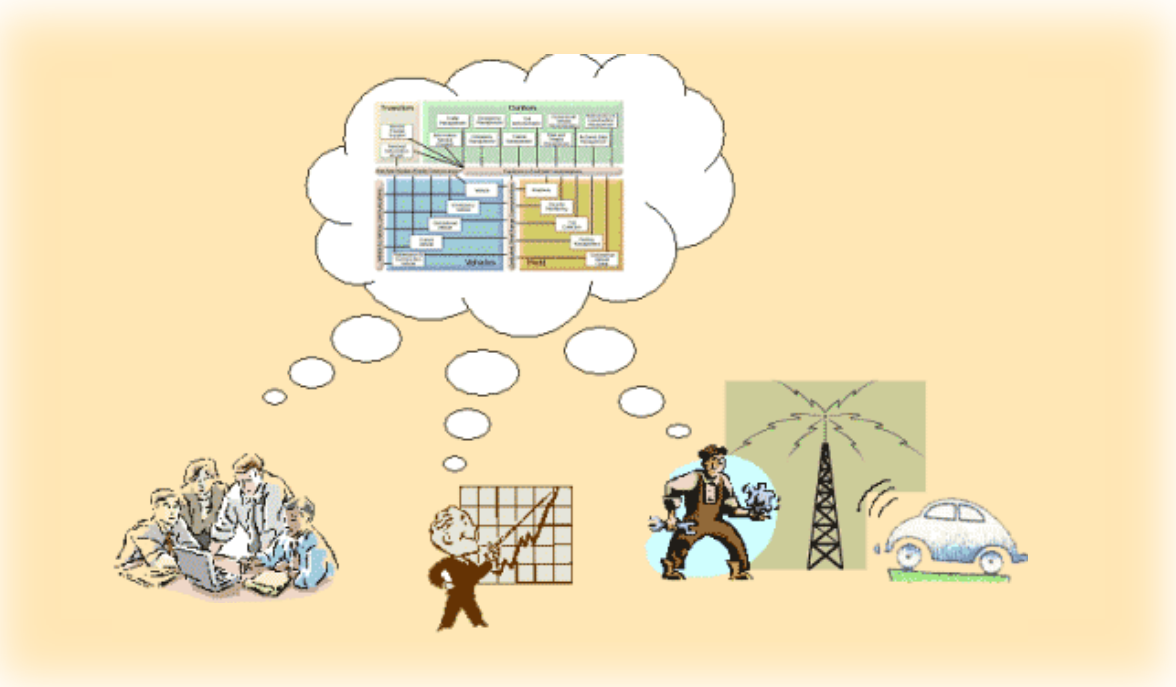
NOACA Meeting Room

November 12, 2009

Agenda

- Welcome, Introductions & Overview
- Regional ITS Projects Discussion
- Operational Concept
- Website Overview
- Lunch Break
- Review & Update Customized Market Packages
- Use & Maintenance Summary
- Next Steps

Welcome, Introductions & Overview



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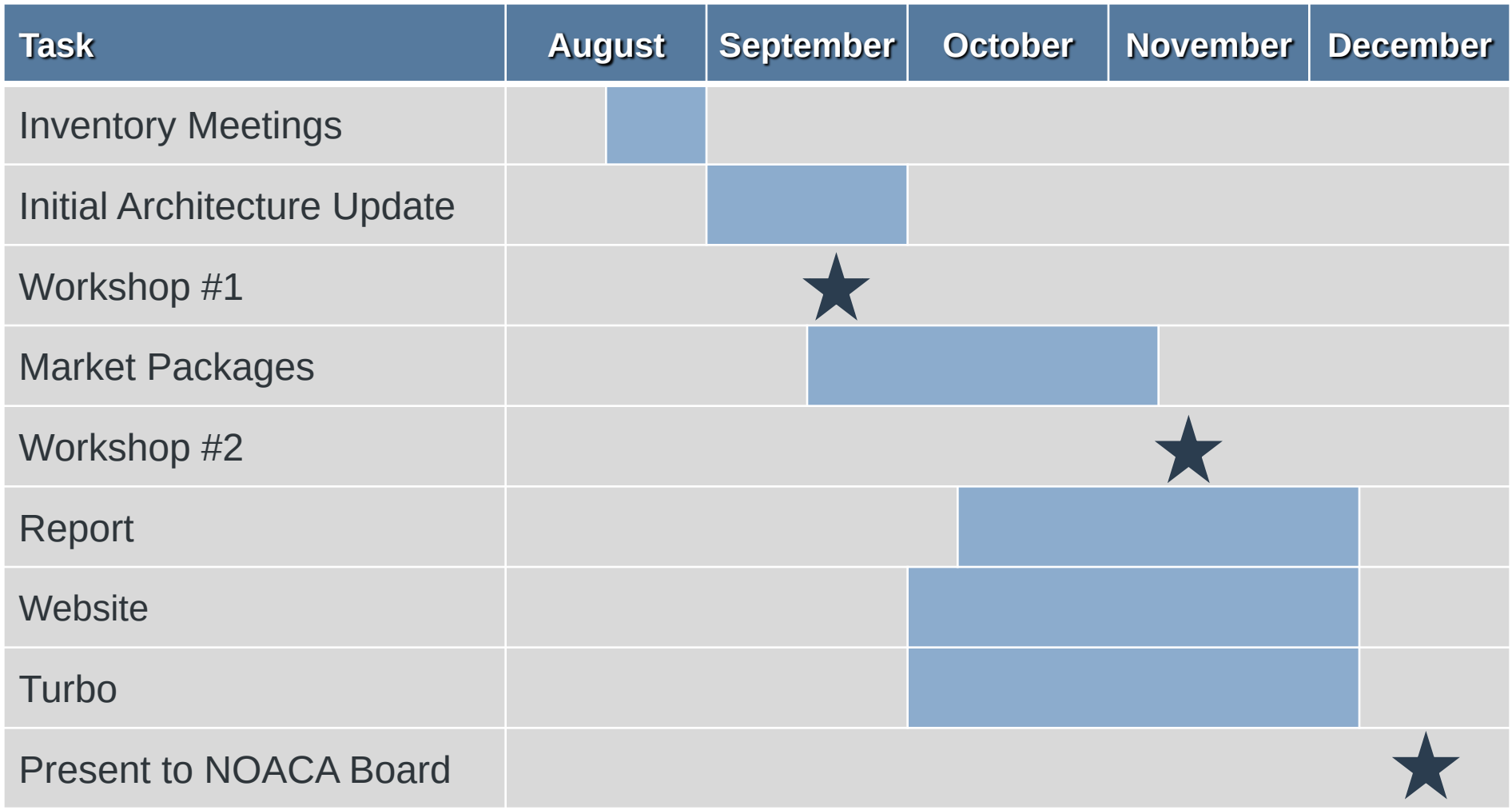
Project Overview Timeline



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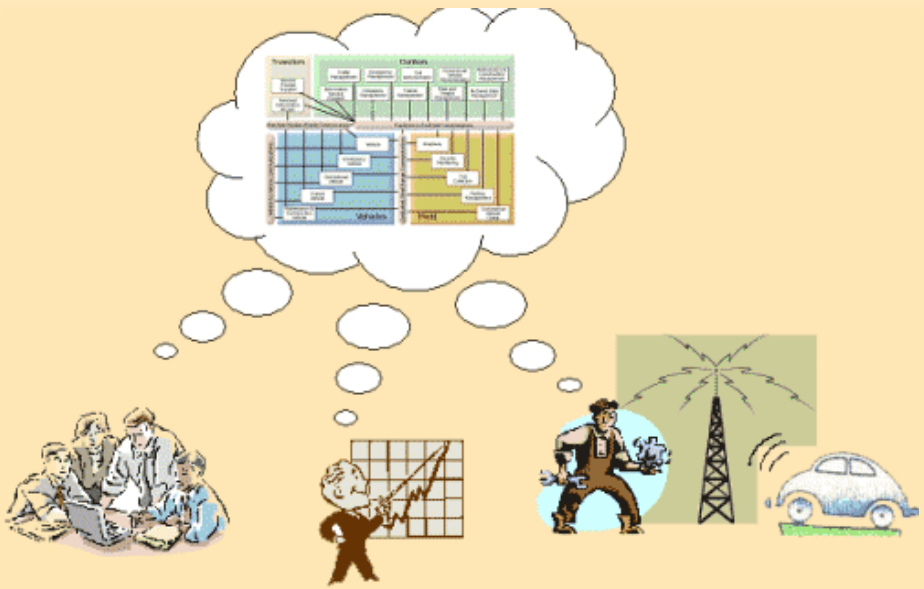
Regional ITS Projects Discussion



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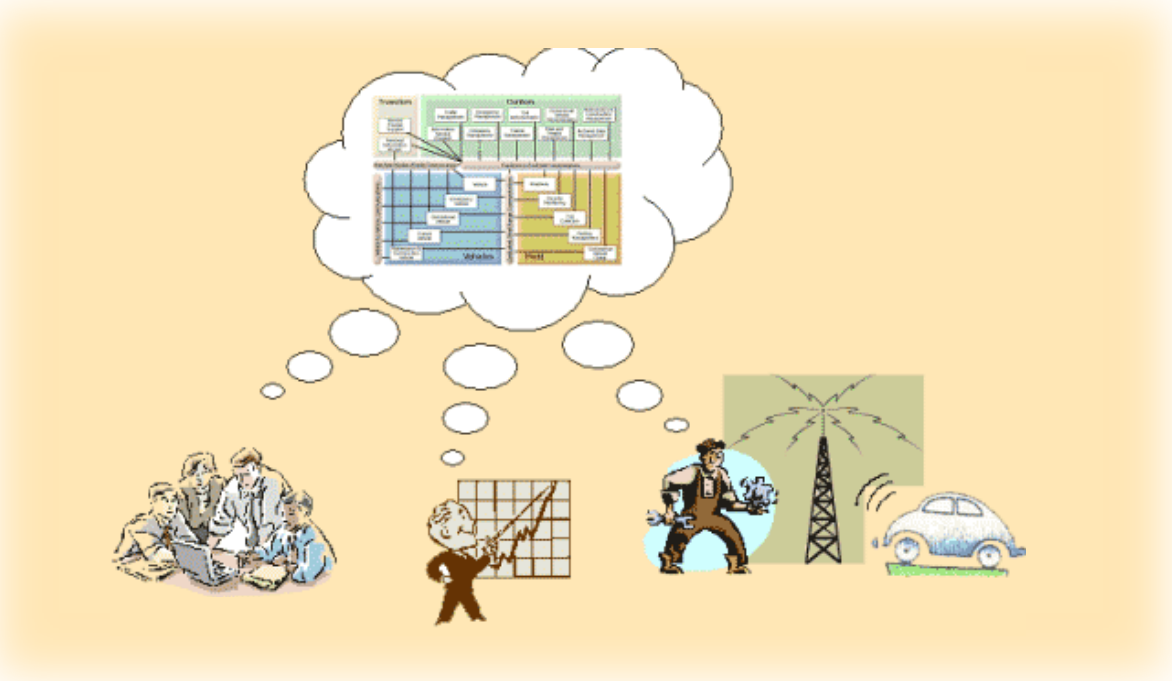
Needs Summary

- Prioritized needs based on Stakeholder input
  - High Priority
    - Improve work zone safety
    - Improve traffic safety
    - Improve traffic signal coordination to improve mobility
    - Improve real-time information about traffic, delay, road construction, and weather conditions
    - Identify alternate routes for emergency vehicles.
    - Improve emergency notification/dispatch and response times
    - Improve communications and informational sharing
    - Share archived data between agencies

Projects List

- Include projects that will accommodate high priority needs
  - Work Zone Safety Improvements (ODOT)
  - Cleveland Freeway Management Systems (ODOT)
  - Signal System Upgrades (NOACA, municipalities)
  - GCRTA Surveillance Control (GCRTA)
  - 5-1-1 Information System (ODOT)

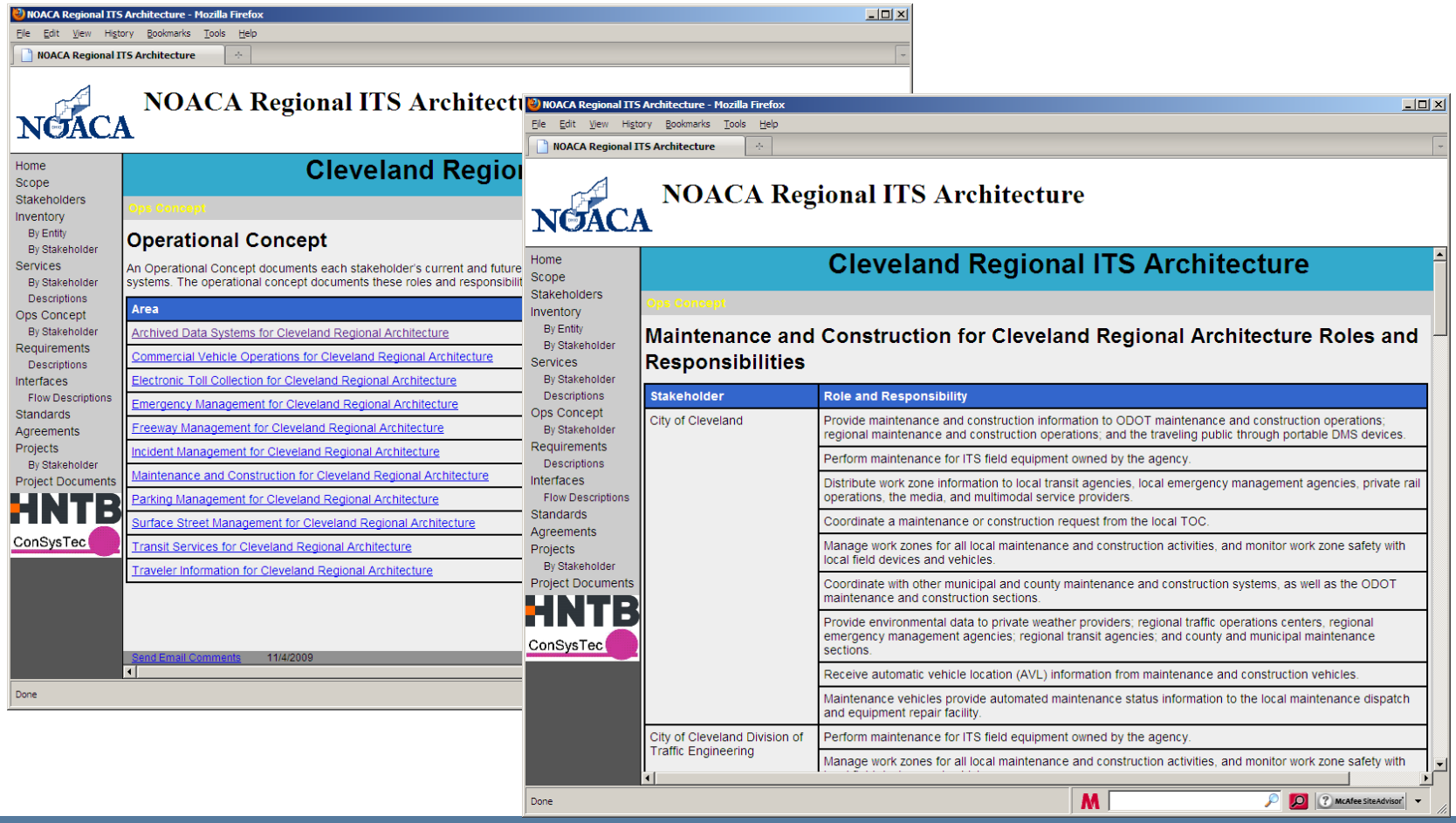
Review of Operational Concepts



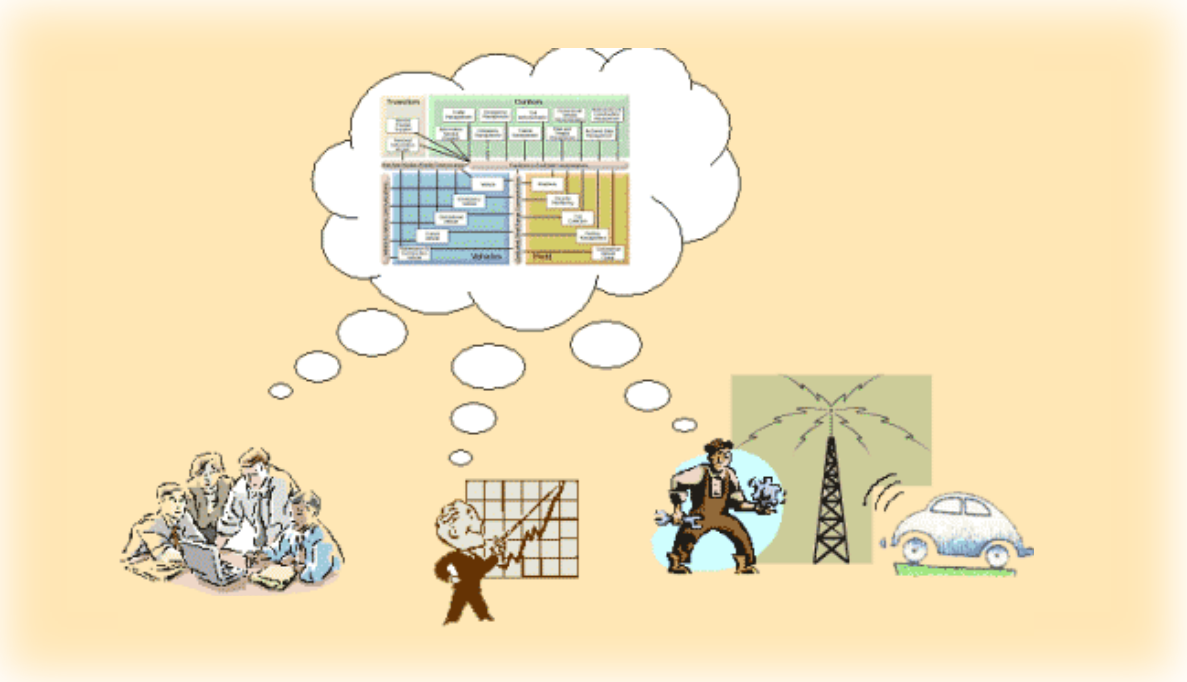
Operational Concept

- Defines roles and responsibilities of stakeholders
- Organized by ITS Area
  - Traffic Signal Control
  - Highway Management
  - Incident Management
  - Emergency Management
  - Transit Management
  - Maintenance Management
  - Traveler Information
  - Archived Data

Operational Concept



Website Overview
Review of Draft Architecture



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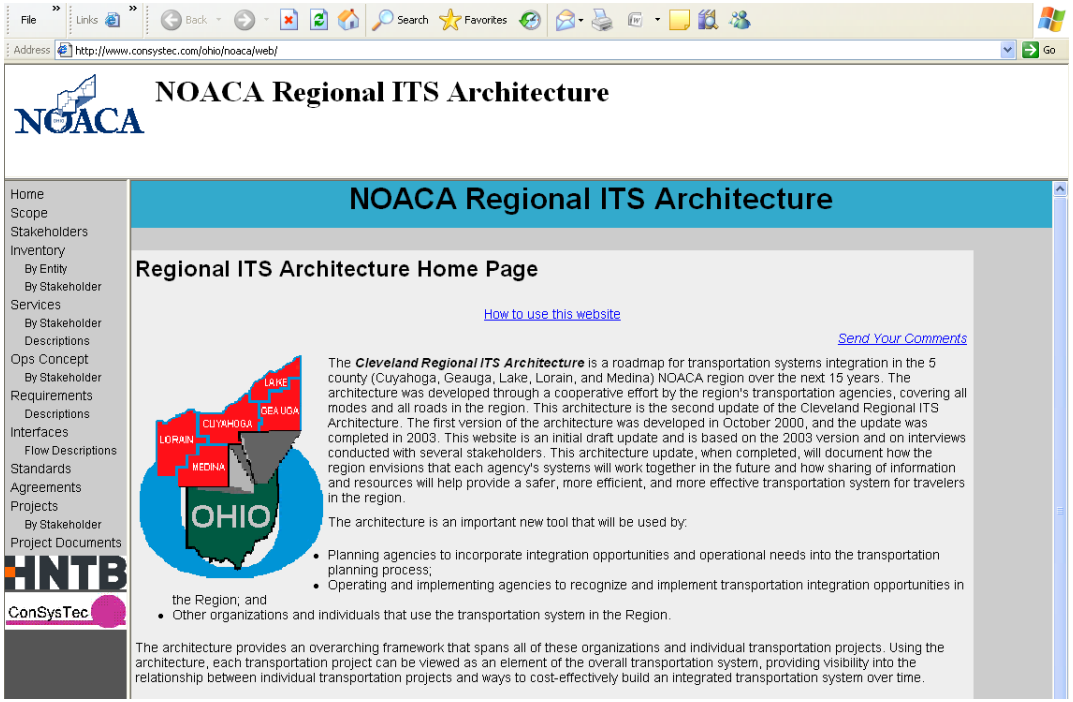
NOACA Regional ITS Architecture

- Draft architecture details can be viewed at http://www.consystec.com/ohio/noaca/web/



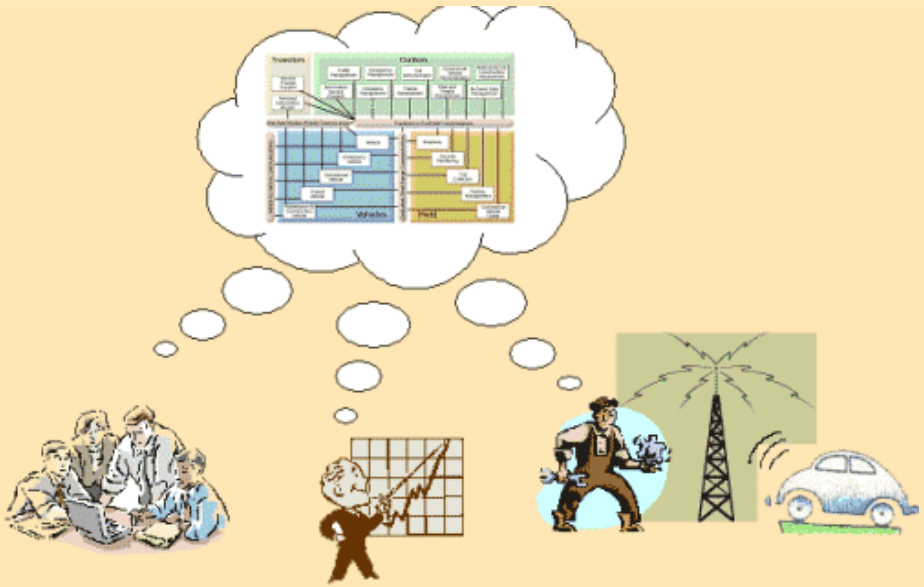
Draft Architecture - Summary Statistics

- 54 Stakeholders
  - NOACA, ODOT, GCRTA, City of Cleveland, etc.
- 157 Elements
  - ODOT CCTV, Buckeye Traffic, RTA Kiosks, etc.
- Services (Market Packages)/ Information Flows
  - 55 Market Packages
    - ATMS06: Traffic Information Dissemination
    - APTS04: Transit Fare Collection Management
  - 2798 Information flows connecting the elements to provide the services

Comments Received

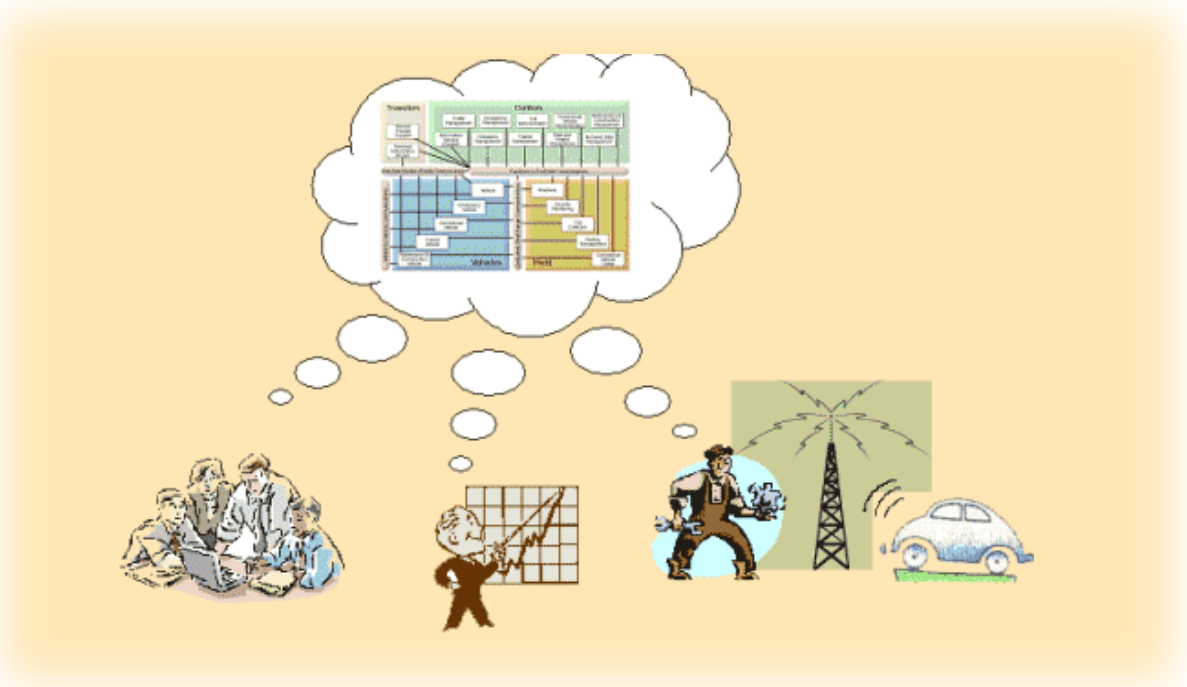
Comment	Disposition/ Discussion

Lunch Break



Review and Update Customized Market Packages

Use & Maintenance Summary



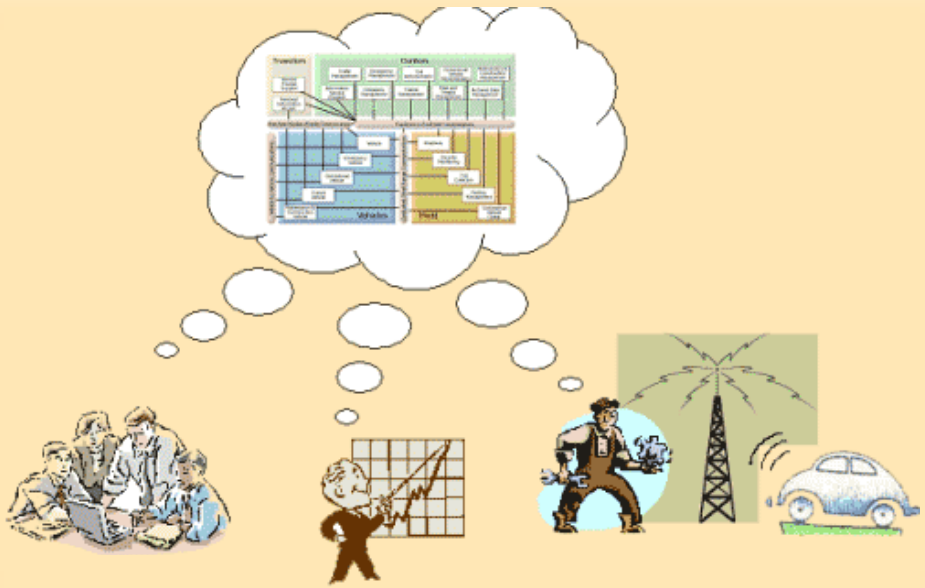
Use the ITS Architecture for:

- Transportation Planning
- Programming/Budgeting
- ITS Project Implementation

Architecture Use in Programming and Project Implementation

Maintaining the Architecture

Architecture Use in Programming



Architecture Use in Common Programming Process

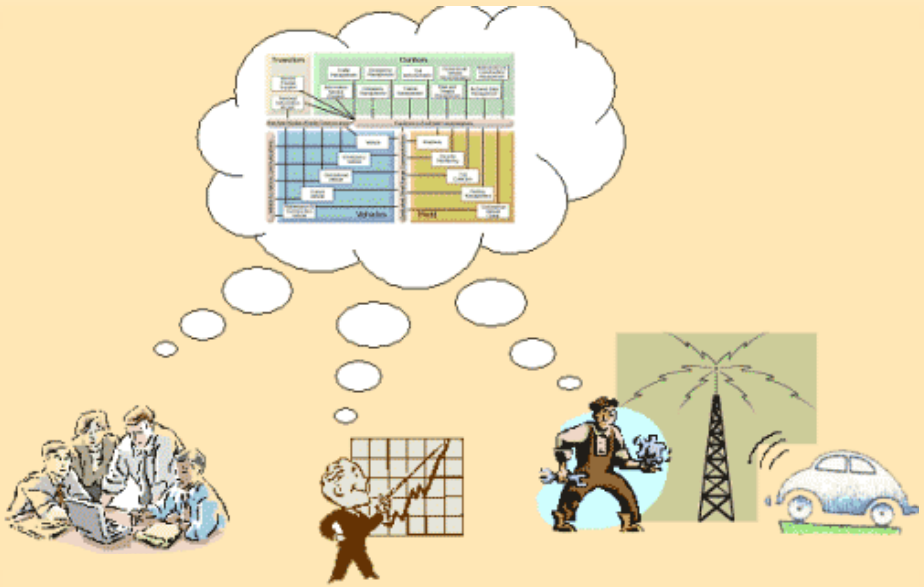
1- MPO issues Request for Projects

2 - Project Sponsors submit projects

3 - Project are prioritized by the MPO

4 - Projects are voted on/accepted by the MPO governing body.

Architecture Use in Project Implementation



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Example of Use on Project Submittals

Anchorage Metropolitan Area Transportation Solutions (AMATS) Checklist

Step One: Planning / TIP Development:

Project Agency Sponsors Agree to Comply with Federal ITS Regulations

When a project is nominated or added to the AMATS Transportation Improvement Program (TIP), project agency sponsors will provide answers to the following questions in the Project Information Packet during the project nomination process:

a. Does my project include any ITS elements? *
b. Does my project use funds from the federal highway trust fund (including the mass transit account) now and/or in the future?
   If you are not sure, consult with the AMATS Coordinator.
c. Does the project sponsor agree to comply with the federal ITS requirements?

If the answer is YES to the first two questions, then your project must comply with federal requirements or AMATS could be subject to loss of funding. Project agency sponsors must agree to comply with the federal requirements. The agreement will be documented as specified by AMATS. Proceed to Step Two. If the answer is yes to the first question, but no to the second, project agency sponsors are *encouraged* to use the steps recommended in this Checklist to foster a more efficient system.

*ITS means electronics, communications, or information processing used singly or in combination to improve the efficiency of a surface transportation system.

Example of Use on Project Submittals

Maricopa Association of Governments (MAG)

26-Aug-05

FY 2007 - 2011 TIP - Programming only 2011

MAG ITS Project Data Form

Please enter project data in highlighted cells, save the file with the lead agency name in it --ie. Mesa-ITSProj1.xls, and email the Excel f

The numbers shown in highlighted cells are for illustrative purposes only. Please use one worksheet per project.

Please enter required information in highlighted cells

Lead Agency	
Other Partnering Agencies	
ITS Project Title:	
ITS Market Package:	

A. ITS Strategic Plan (40 Points Max):

	ID#	Need Score
First user need that best matches the project	3	68
Second user need that matches the project	9	47
Third user need that matches the project	27	21
Total User Need Score		136

Total Estimated Points for ITS Plan 0.0

Determine whether the proposed ITS project is an arterial project OR an intersection/s project. Enter data under B1 or B2 -- NOT BOTH

B 1. Segment Congestion (30 Points Max):

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Example of Use during Project Prioritization

Rhode Island State Planning Commission

Addition of new criteria

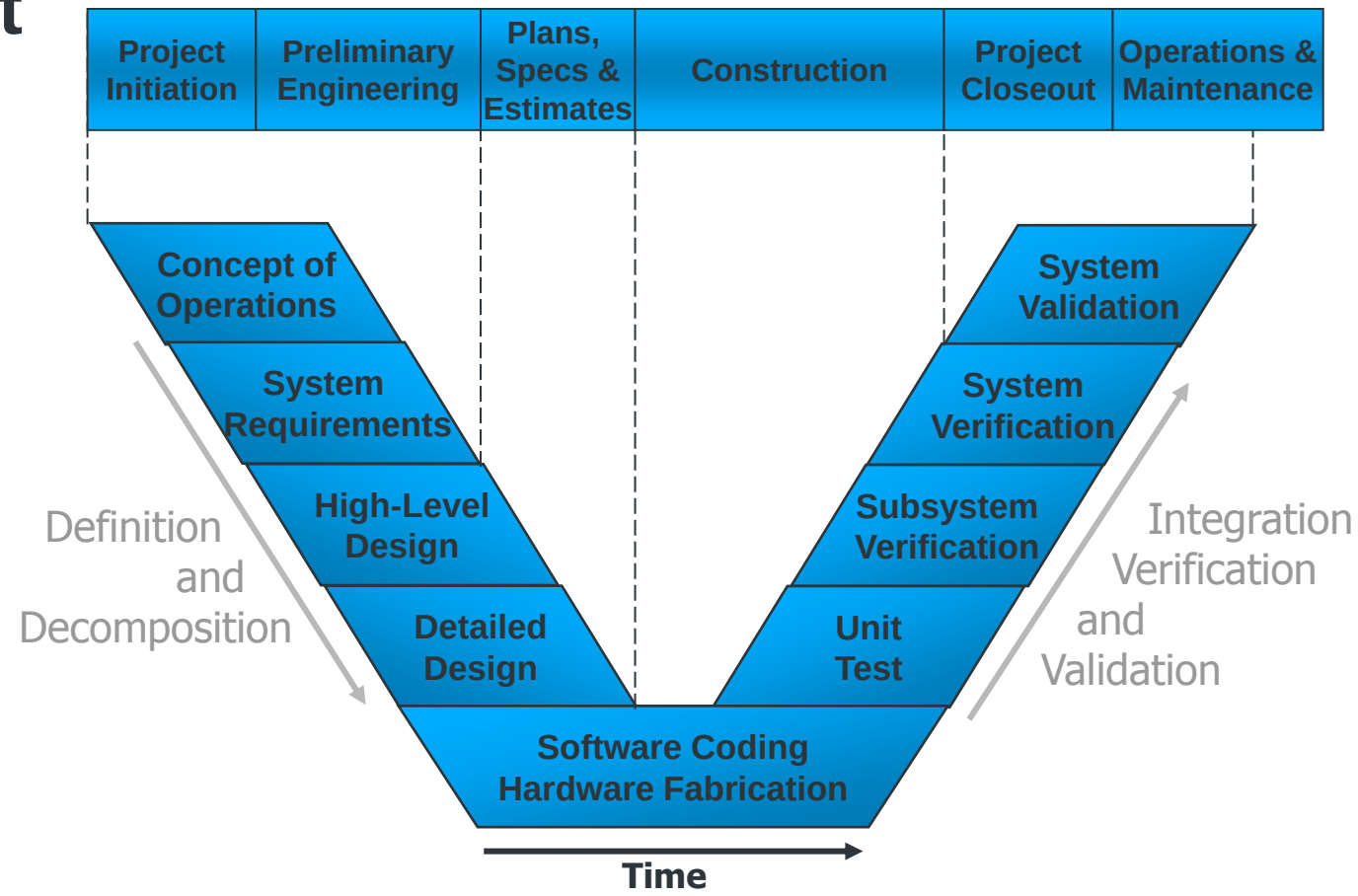
g. Enhances Intelligent Transportation System network

5 points: provides hardware and / or monitoring equipment to implement Rhode WAYS Strategic Deployment Plan or RIPTA ITS Plan (bus fareboxes, vehicle locators, etc.)
1-4 points: installation of fiber-optic cable on off-system highway; enhances dissemination of information; provides for shared use of equipment already in place
0 points: no ITS elements are part of the project
negative points: project is on a RhodeWAYS route that calls for ITS equipment, but equipment not provided

What is the Purpose of Systems Engineering?

- Reduce risk
  - Control costs and schedule
  - Satisfy users' needs
- Meet the requirements of the Federal Rule

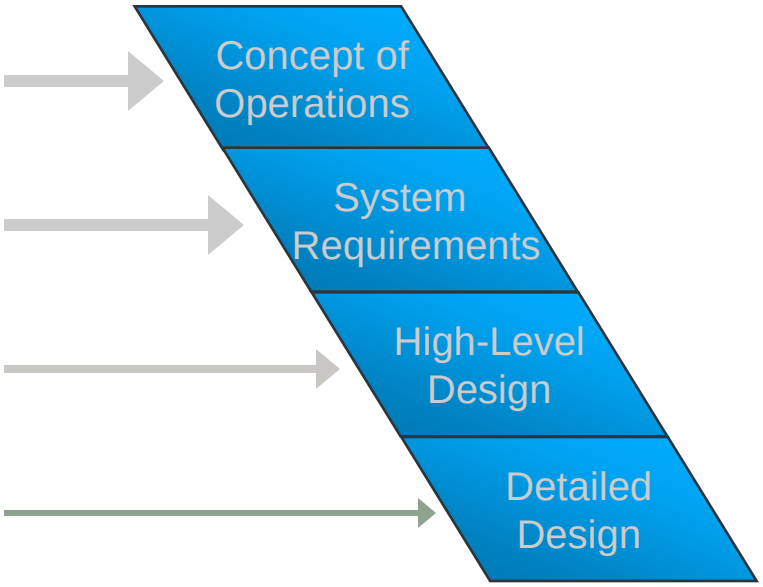
Systems Engineering and Traditional Project Development



Systems Engineering Analysis Requirements

- Rule/Policy requires all HTF-funded projects to be based on a systems engineering analysis
  - Scale commensurate with project scope
  - Identifies seven requirements “at a minimum”

23 CFR 940.11
1. **Portion of Regional ITS Architecture**
2. **Participating agencies roles and responsibilities**
3. **Requirements definitions**
4. **Alternatives analysis**
5. **Procurement options**
6. **ITS standards and testing procedures**
7. **Operations and management procedures and resources**



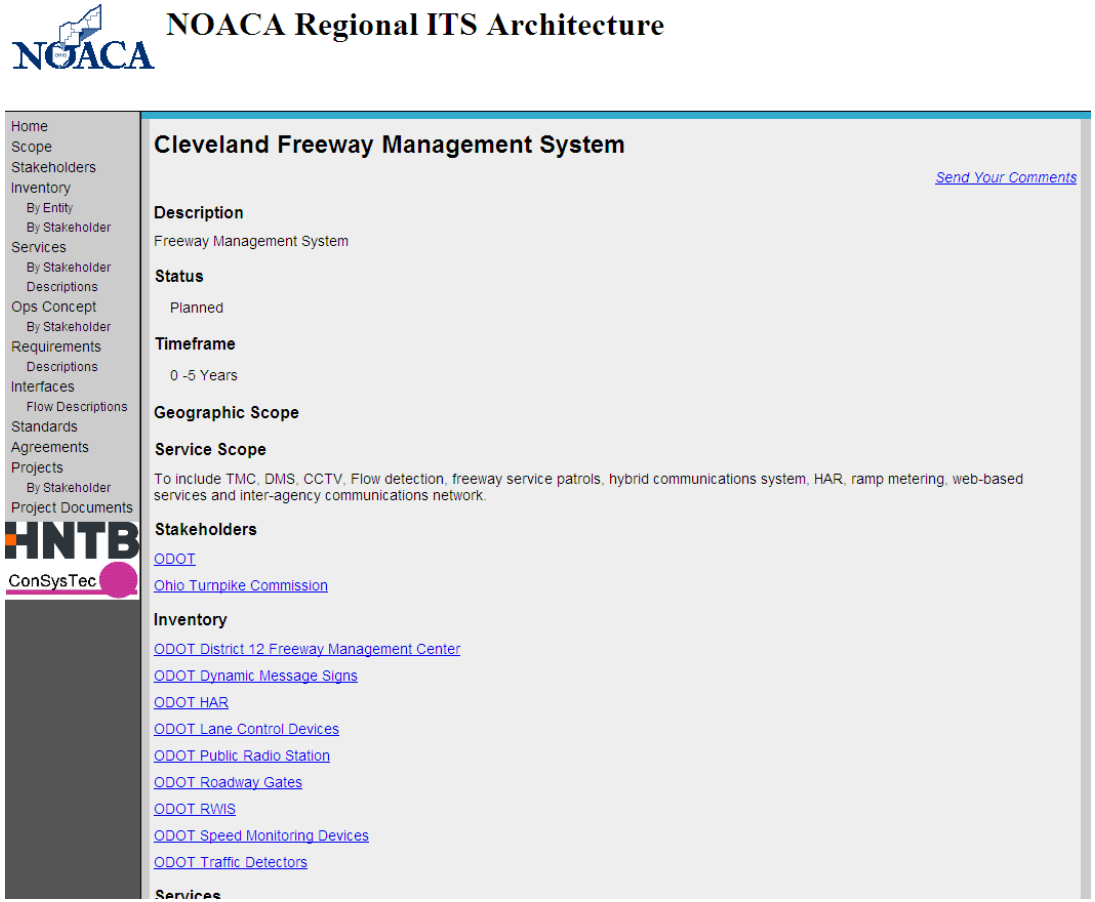
Two Methods

- If a project architecture has been created, look at the Projects web page.
- If a project architecture has not been created, look at the regional architecture and find the appropriate web pages.

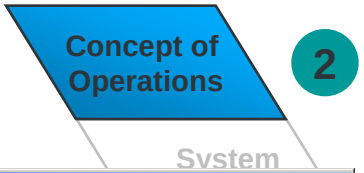
Portion of the Regional ITS Architecture

1

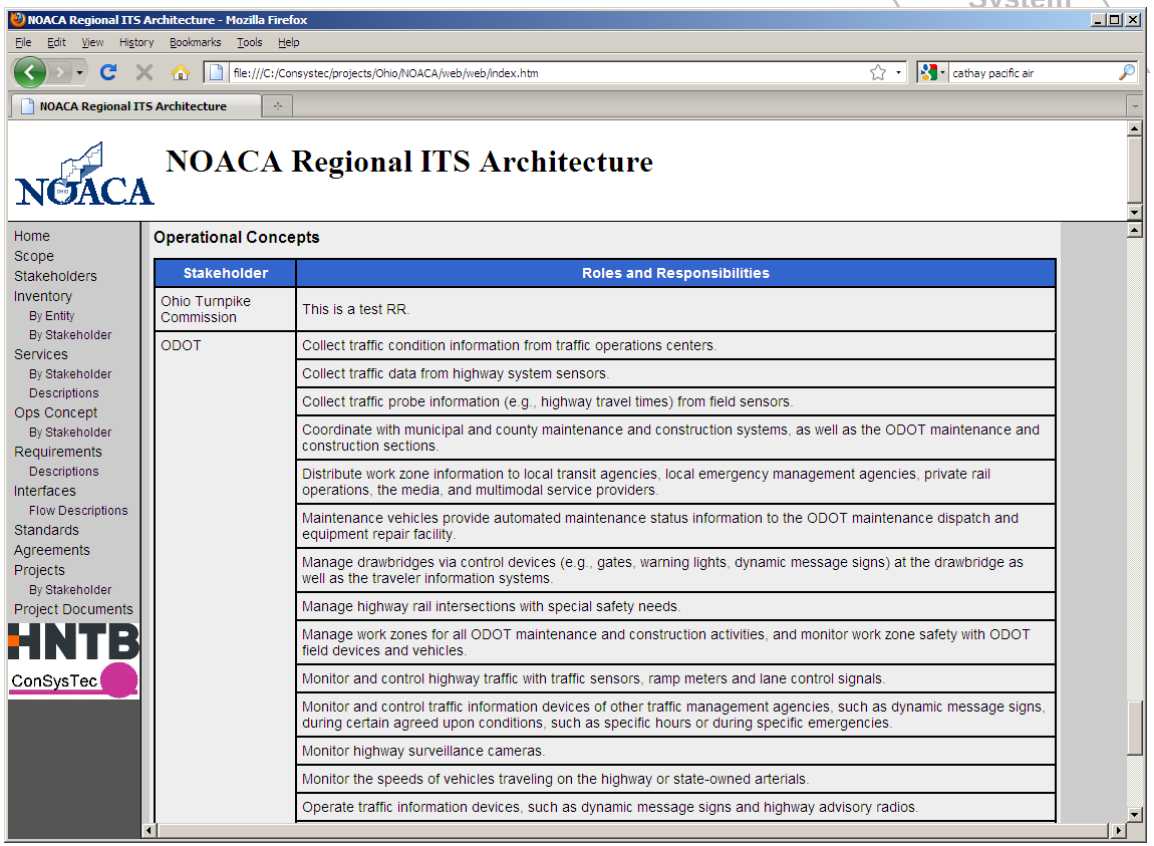
- Go to Projects page, then click on the Project.
- Project Details:
  - Project Description
  - Status
  - Timeframe
  - Stakeholders
  - Inventory
  - Services
  - Requirements
  - Operational Concepts



Concept of Operations



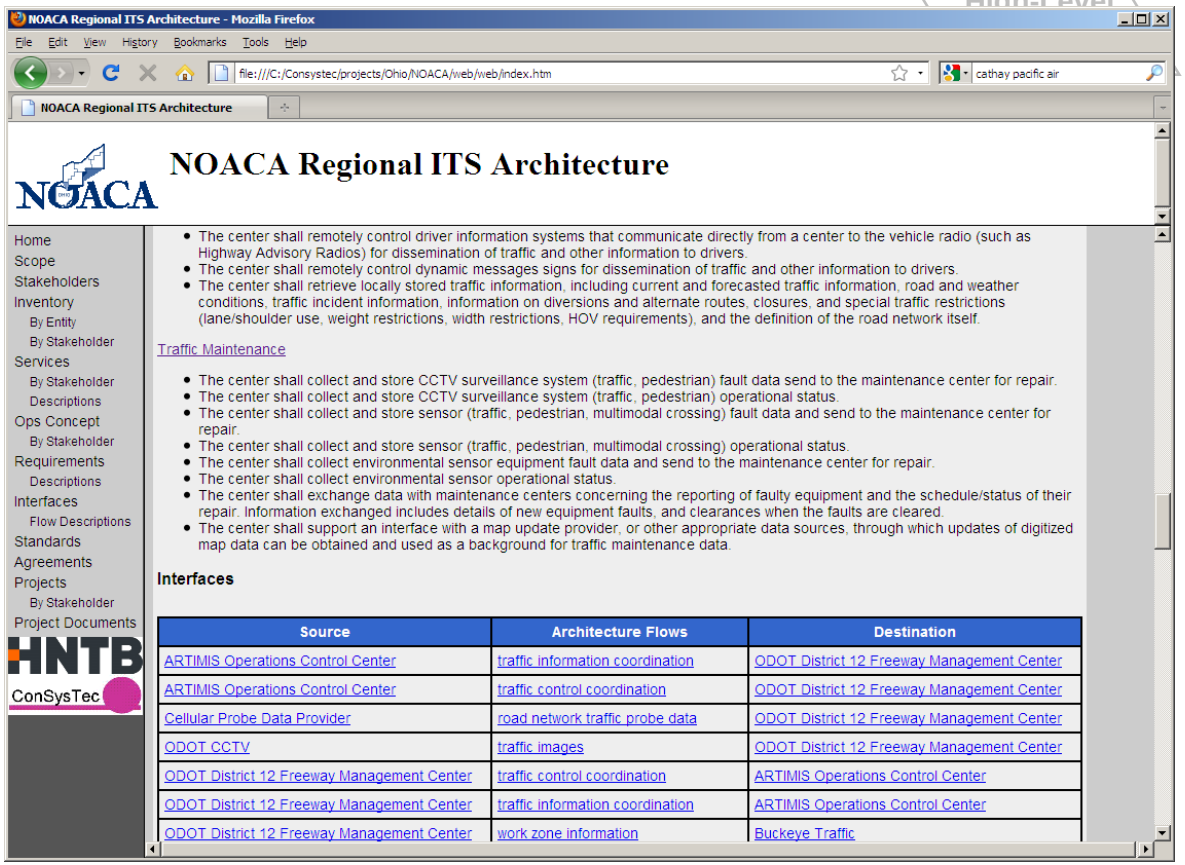
- Includes Agencies Roles and Responsibilities.
- Go to Projects Page, click on Project and scroll down to Operational Concepts.



Stakeholder	Roles and Responsibilities
Ohio Turnpike Commission	This is a test RR.
ODOT	Collect traffic condition information from traffic operations centers.
	Collect traffic data from highway system sensors.
	Collect traffic probe information (e.g., highway travel times) from field sensors.
	Coordinate with municipal and county maintenance and construction systems, as well as the ODOT maintenance and construction sections.
	Distribute work zone information to local transit agencies, local emergency management agencies, private rail operations, the media, and multimodal service providers.
	Maintenance vehicles provide automated maintenance status information to the ODOT maintenance dispatch and equipment repair facility.
	Manage drawbridges via control devices (e.g., gates, warning lights, dynamic message signs) at the drawbridge as well as the traveler information systems.
	Manage highway rail intersections with special safety needs.
	Manage work zones for all ODOT maintenance and construction activities, and monitor work zone safety with ODOT field devices and vehicles.
	Monitor and control highway traffic with traffic sensors, ramp meters and lane control signals.
	Monitor and control traffic information devices of other traffic management agencies, such as dynamic message signs, during certain agreed upon conditions, such as specific hours or during specific emergencies.
	Monitor highway surveillance cameras.
	Monitor the speeds of vehicles traveling on the highway or state-owned arterials.
	Operate traffic information devices, such as dynamic message signs and highway advisory radios.

System Requirements

- Go to Projects Page, click on Project and scroll down to Requirements.
- Then continue scrolling down to Interfaces.



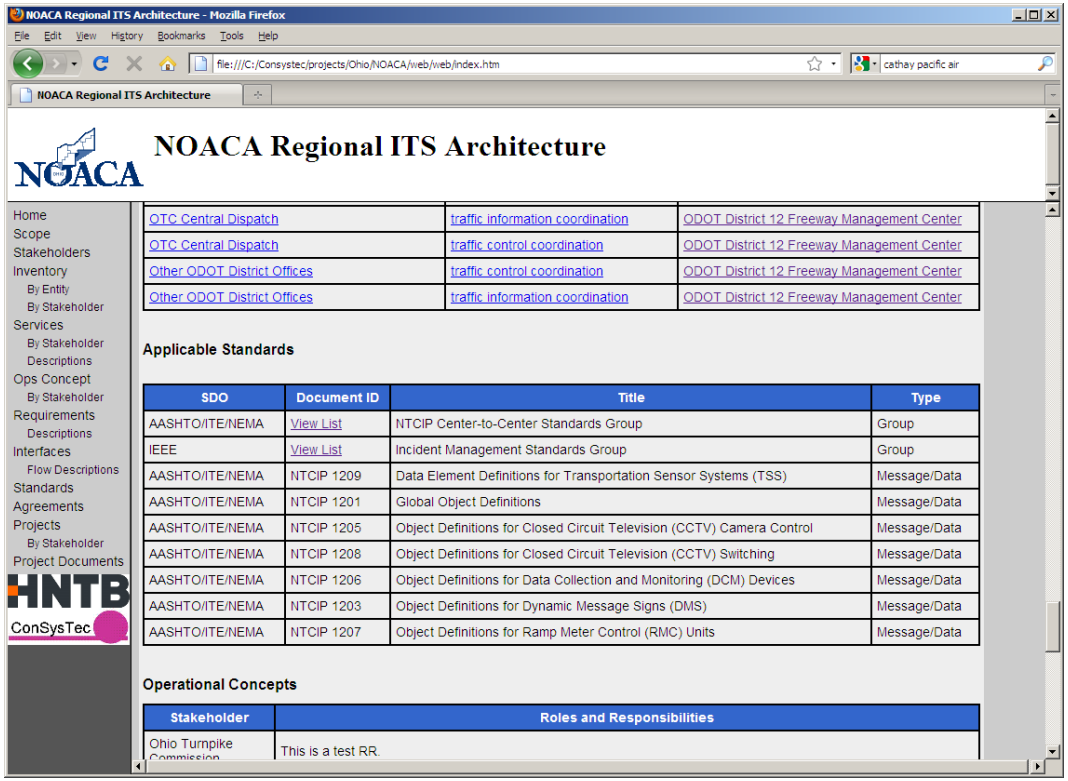
ITS Standards

High-Level Design

Detailed Design

4

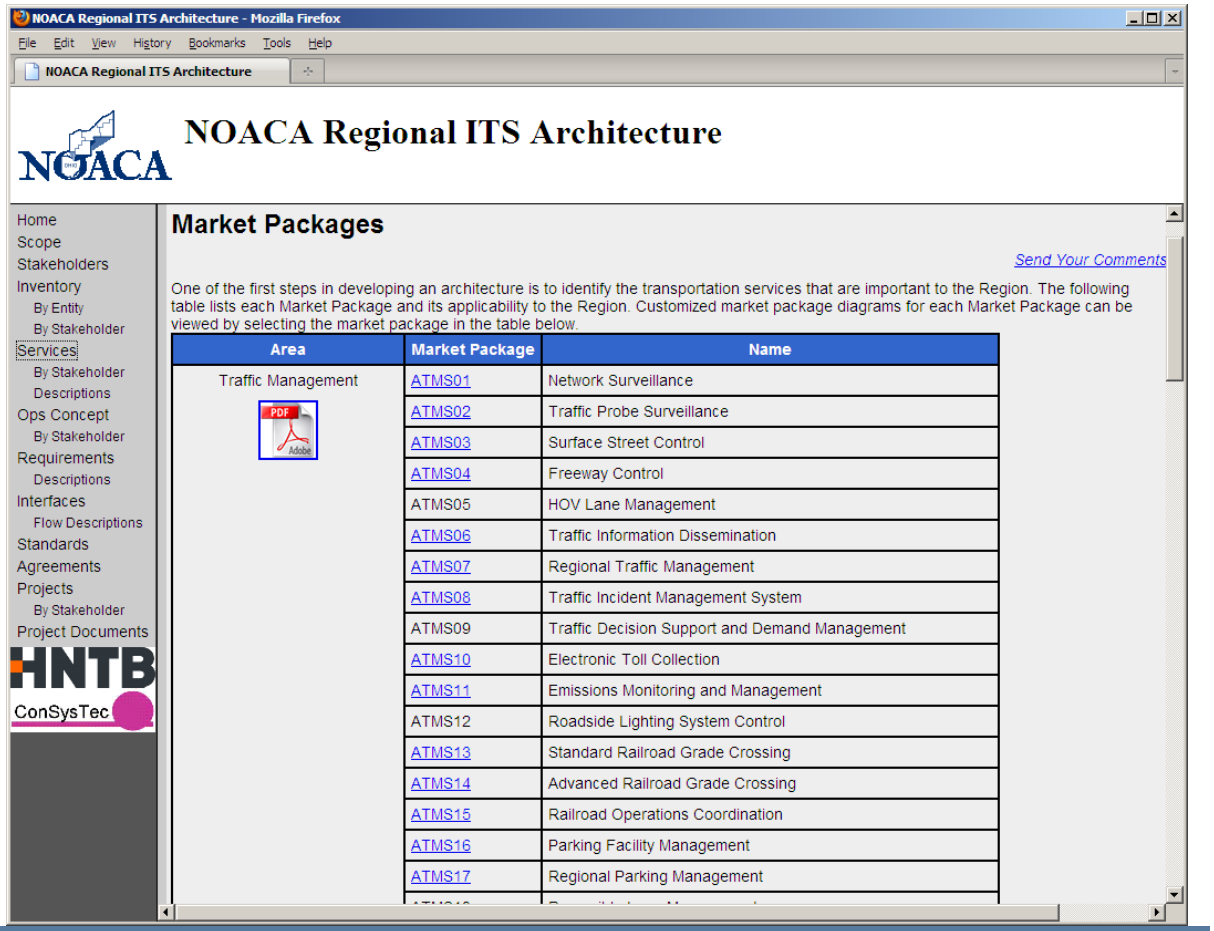
- Go to the Projects Page and scroll down to Applicable Standards



Portion of the Regional ITS Architecture

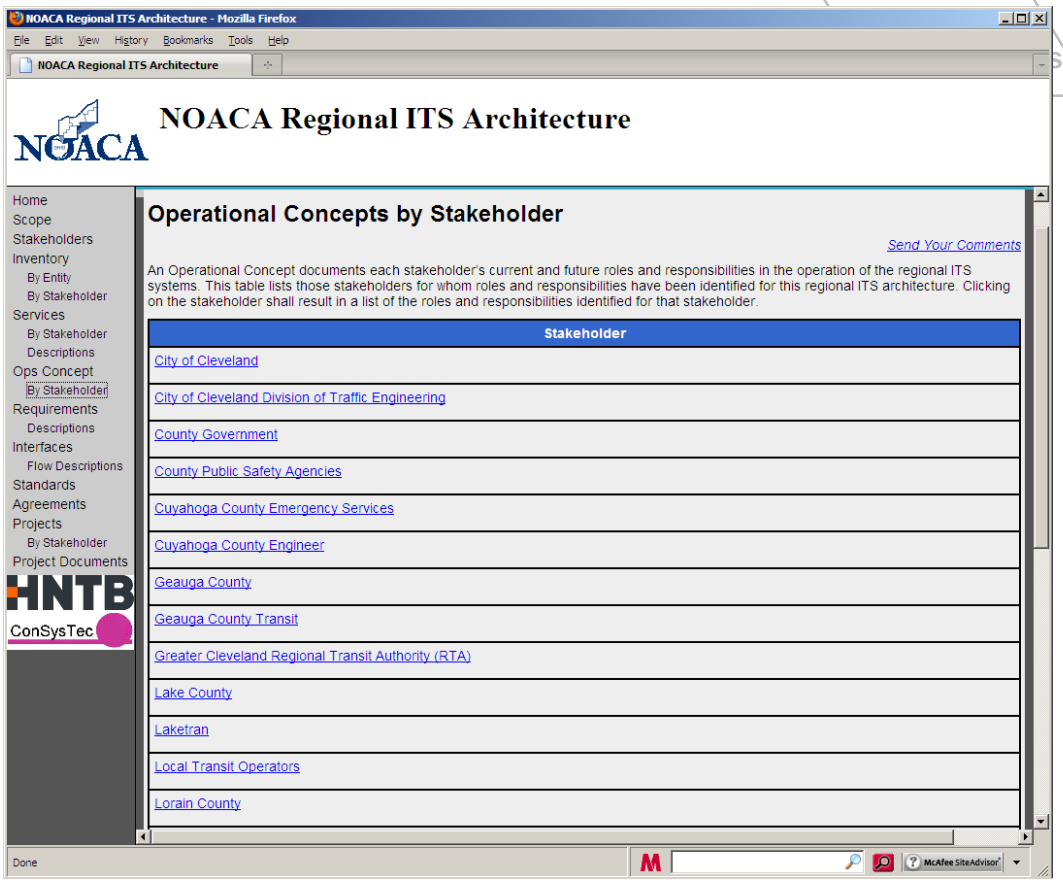
1

- Go to the Services page, and find the customized market package diagram(s) that represents the project.



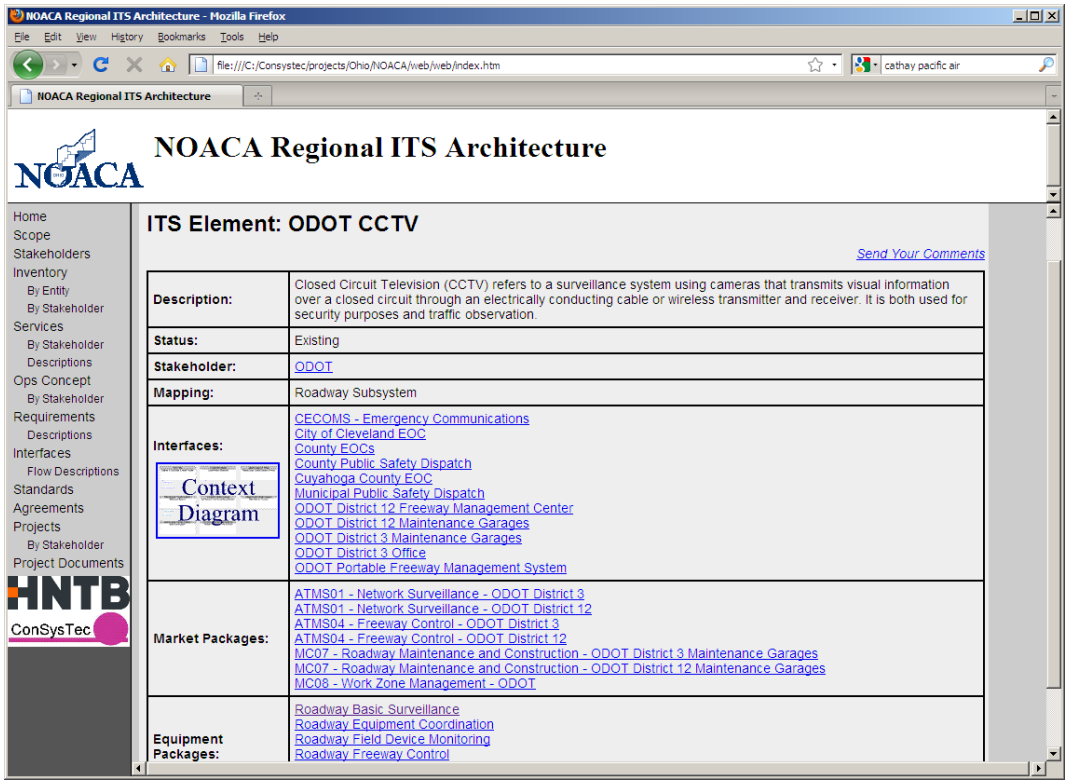
Concept of Operations

- Go to Operational Concepts Page and click on the appropriate Area(s), or
- Go to Operational Concepts by Stakeholder, and select the appropriate stakeholder



System Requirements

- Go to the Inventory page and click on an element.
- Click on an interface to view the flows.
- Click on an Equipment Package to view requirements.



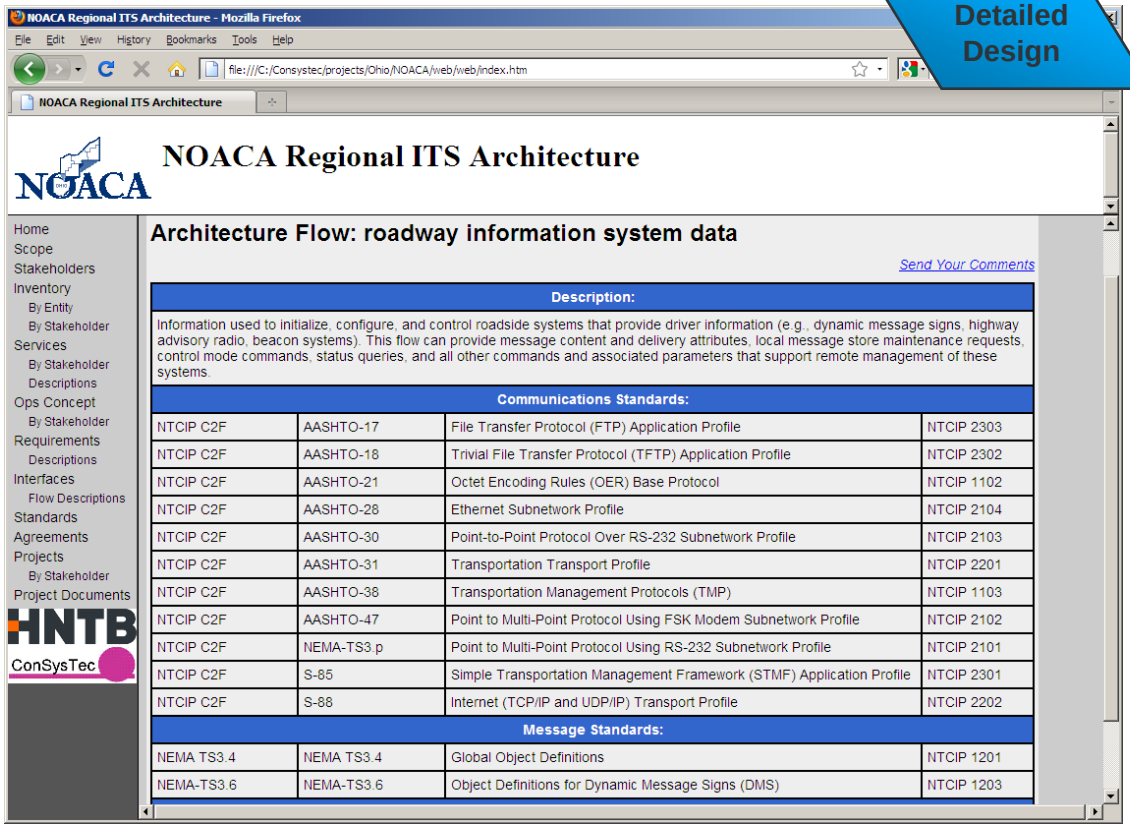
High-Level Design

Detailed Design

4

ITS Standards

- Go to the Inventory page and click on an element.
- Click on an interface to view the flows.
- Click on a flow to view applicable ITS standards.



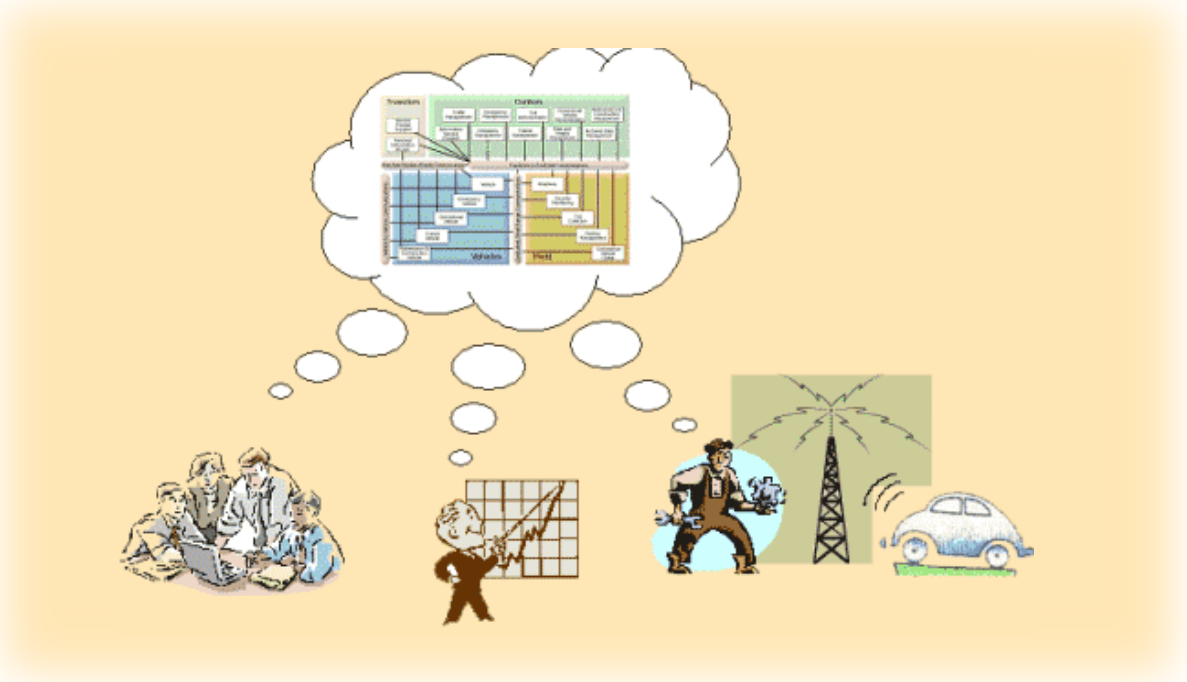
Architecture Flow: roadway information system data

Send Your Comments

Description:
Information used to initialize, configure, and control roadside systems that provide driver information (e.g., dynamic message signs, highway advisory radio, beacon systems). This flow can provide message content and delivery attributes, local message store maintenance requests, control mode commands, status queries, and all other commands and associated parameters that support remote management of these systems.

Communications Standards:			
NTCIP C2F	AASHTO-17	File Transfer Protocol (FTP) Application Profile	NTCIP 2303
NTCIP C2F	AASHTO-18	Trivial File Transfer Protocol (TFTP) Application Profile	NTCIP 2302
NTCIP C2F	AASHTO-21	Octet Encoding Rules (OER) Base Protocol	NTCIP 1102
NTCIP C2F	AASHTO-28	Ethernet Subnetwork Profile	NTCIP 2104
NTCIP C2F	AASHTO-30	Point-to-Point Protocol Over RS-232 Subnetwork Profile	NTCIP 2103
NTCIP C2F	AASHTO-31	Transportation Transport Profile	NTCIP 2201
NTCIP C2F	AASHTO-38	Transportation Management Protocols (TMP)	NTCIP 1103
NTCIP C2F	AASHTO-47	Point to Multi-Point Protocol Using FSK Modem Subnetwork Profile	NTCIP 2102
NTCIP C2F	NEMA-TS3.p	Point to Multi-Point Protocol Using RS-232 Subnetwork Profile	NTCIP 2101
NTCIP C2F	S-85	Simple Transportation Management Framework (STMF) Application Profile	NTCIP 2301
NTCIP C2F	S-88	Internet (TCP/IP and UDP/IP) Transport Profile	NTCIP 2202
Message Standards:			
NEMA TS3.4	NEMA TS3.4	Global Object Definitions	NTCIP 1201
NEMA-TS3.6	NEMA-TS3.6	Object Definitions for Dynamic Message Signs (DMS)	NTCIP 1203

Maintaining the Architecture



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NOACA Regional ITS Architecture Maintenance

- Why Changes Occur
- Maintenance Models
- Roles and Responsibilities
- Baseline
- Change Management Process

Why Changes Occur

- **Projects**
  - Additions/Deletions – new projects or dropped projects
  - Status – change in status (planned/existing)
  - Definition – change in details, scope, e.g., information flows, standards
  - Priorities – change in goals, budgets
  - Agreements – institutional change

Why Changes Occur

- **Regional**
  - Goals – changes in regional needs
  - Stakeholders – New stakeholders
  - Other architectures – changes to interfaces with adjoining regions
  - National ITS Architecture – changes to the National ITS Architecture

Maintenance Models

- **Two models**
  - Periodic Basis
    - Fixed time periods
  - Event Driven
    - As changes occur

Roles & Responsibilities

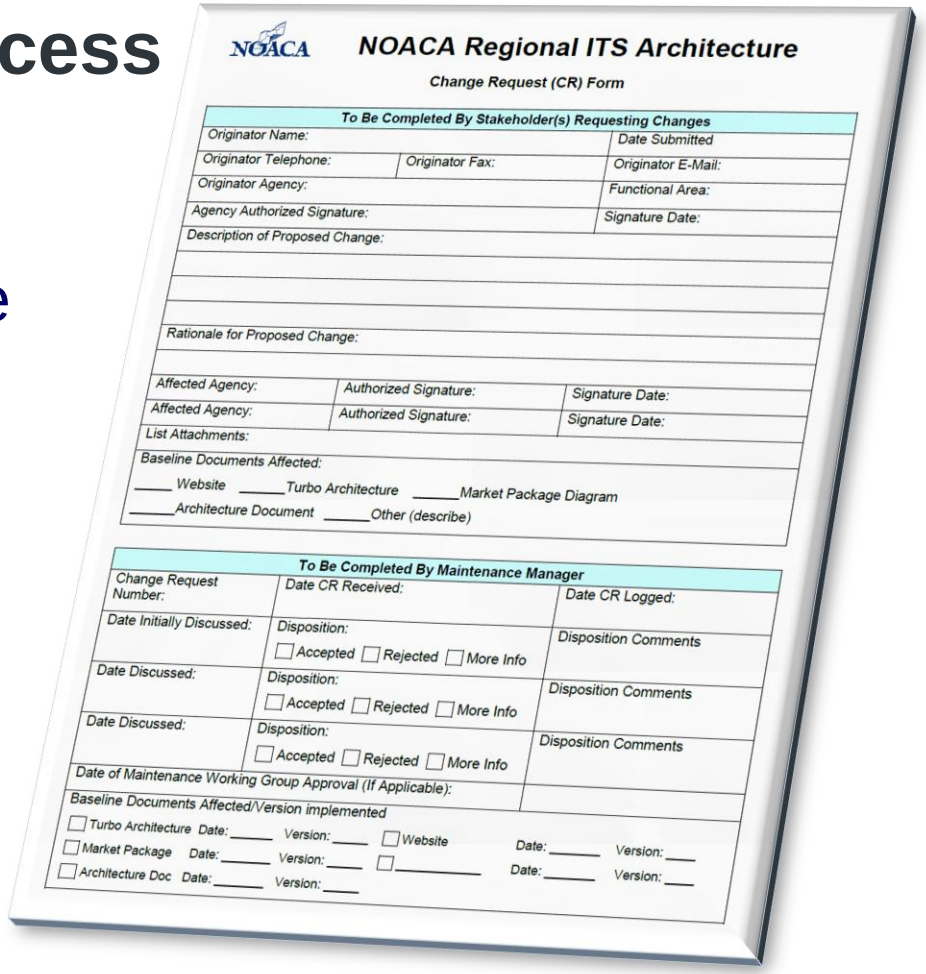
- Responsible Agency
- Maintenance Manager
- Stakeholders
- Maintenance Working Group

Baseline

- Architecture document
- Turbo Architecture database
- Architecture web pages
- Change request database

Change Management Process

- Submit a Change Request
- Define the Proposed Change
- Assess the impact
- Approving the Change
- Implementing the Change



NOACA Regional ITS Architecture

Change Request (CR) Form

To Be Completed By Stakeholder(s) Requesting Changes		
Originator Name:		Date Submitted
Originator Telephone:	Originator Fax:	Originator E-Mail:
Originator Agency:		Functional Area:
Agency Authorized Signature:		Signature Date:
Description of Proposed Change:		
Rationale for Proposed Change:		
Affected Agency:	Authorized Signature:	Signature Date:
Affected Agency:	Authorized Signature:	Signature Date:
List Attachments:		
Baseline Documents Affected: ____ Website ____Turbo Architecture ____Market Package Diagram ____Architecture Document ____Other (describe)		

To Be Completed By Maintenance Manager		
Change Request Number:	Date CR Received:	Date CR Logged:
Date Initially Discussed:	Disposition: ☐ Accepted ☐ Rejected ☐ More Info	Disposition Comments
Date Discussed:	Disposition: ☐ Accepted ☐ Rejected ☐ More Info	Disposition Comments
Date Discussed:	Disposition: ☐ Accepted ☐ Rejected ☐ More Info	Disposition Comments
Date of Maintenance Working Group Approval (If Applicable):		
Baseline Documents Affected/Version implemented ☐ Turbo Architecture Date:____ Version:____ ☐ Website Date:____ Version:____ ☐ Market Package Date:____ Version:____ ☐ _____ Date:____ Version:____ ☐ Architecture Doc Date:____ Version:____		

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Current Maintenance Plan

- Comprehensive update will be made every 3 years several months prior to the formal TIP update
- Interim updates: every 6 months if necessary
- Actively solicit changes annually
- Maintenance Working Group: Cleveland FMS Advisory Committee

Implementation

- Make agreed changes to baseline
- Update Change Request Database
- Inform Stakeholders
- Distribute changes
- Update website

Next Steps

- Please provide any additional comments by 12/1
- Your input will be used to create:
  - Update Turbo Database
  - Update Website
  - Distribute Draft Report
  - Receive Comments
  - Draft Final NOACA Regional ITS Architecture Document
- Formal adoption of the ITS Architecture by the NOACA Board

Thank you for your input today!

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