

# *Development of a Regional Intelligent Transportation System Architecture*

## **Stakeholder Meeting #1**

*In cooperation with:*

**Wichita-Sedgwick County Metropolitan Area Planning Department**

**City of Wichita**

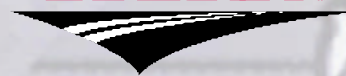
**Sedgwick County**

**Kansas Department of Transportation**

**Federal Highway Administration**

*Presented by:*

***ITERIS***<sup>TM</sup>



*In association with*

**RCC Consultants**

**January 18, 2005**

# **Wichita-Sedgwick County Regional ITS Architecture Workshop**

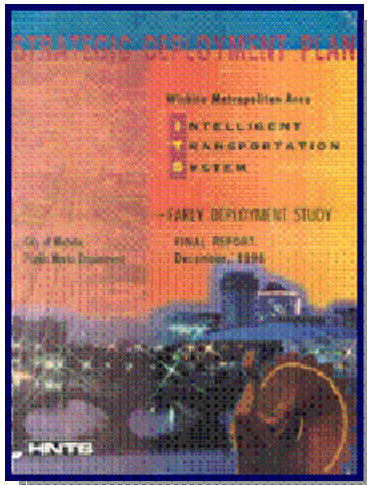
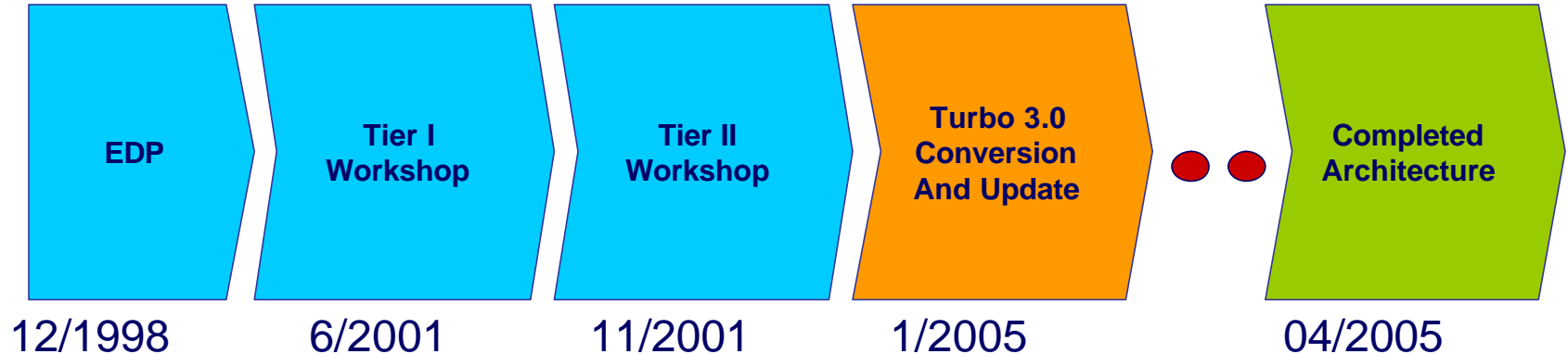
## **Introduction**

A thick red horizontal bar with rounded ends, positioned below the 'Introduction' text.

# Project Objectives

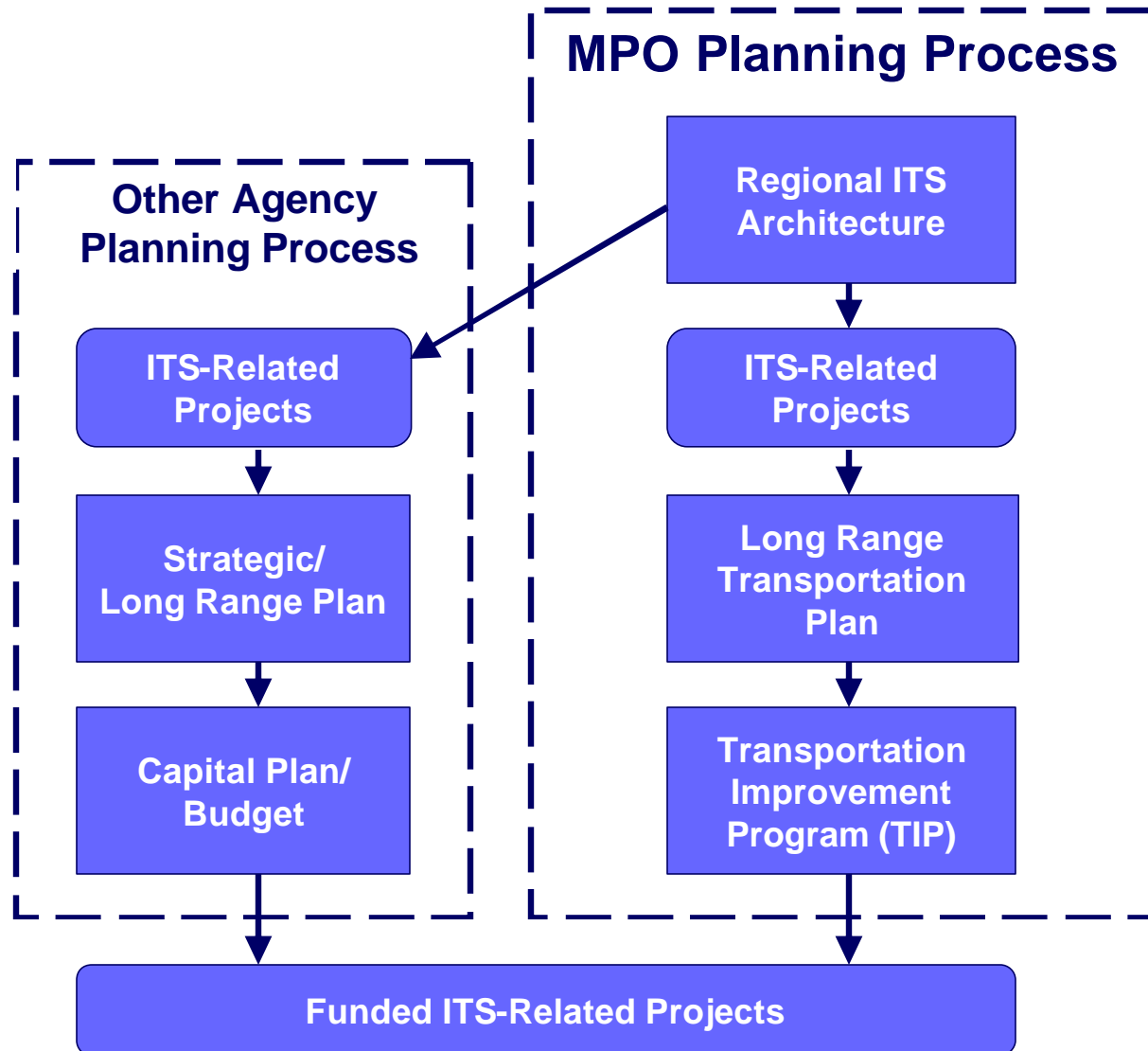
- Develop a **Regional ITS Architecture** for the Wichita-Sedgwick County region that will facilitate:
  - Integrating advanced technologies
  - **Development of an Implementation Plan**
    - Planning of ITS projects
    - Regional project development
  - **Development of a Communications Plan**
    - Identify Communications Resources
    - Analyze Communications Needs
    - Identify Network Architecture Options

# Wichita – Sedgwick County Regional ITS Architecture

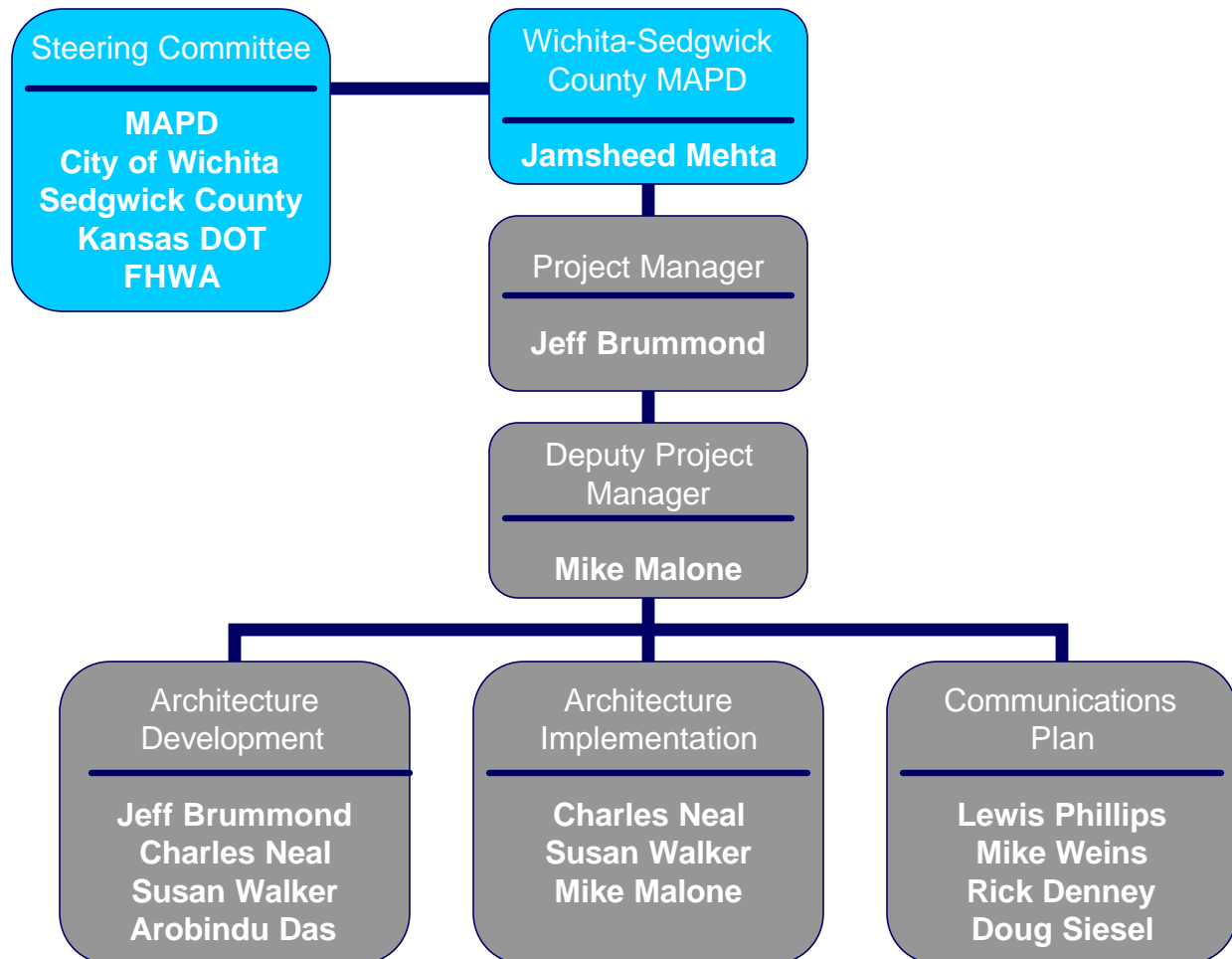


Based on 1998 ITS Strategic  
Deployment Plan and 2001  
Regional ITS Architecture

# ITS Planning Process



# Organization



# Workshops

- Two Workshops to review and gather inputs
  - Architecture
  - Implementation Plan/Communications Plan
  - Both are Three-day Workshops
    - Two days for Detailed Review
    - One half-day for Management
- Plus a MPO – Show and Tell

# We Need Your Input!

- This Architecture forms the Blueprint for Transportation System Integration for the Region
- This is Your Architecture and Needs to Reflect Your Existing and Future ITS projects
- Please Speak Up if Anything is Not Characterized Correctly or is Missing



# Agenda – Day 1

- Registration
- Introduction to the Project
- Regional ITS-Related Activities
- Lunch on your own
- Presentation of Inventory
- Presentation of Services
- Wrap-Up Day 1

# Agenda – Day 2

- Continental Breakfast
- Recap of Day 1
- Selection of Services
- Group Discussion of Services
- Lunch on your own
- Tailoring of Interfaces
- Group Discussion of Interfaces
- Tailoring Information Flows Example
- Wrap-Up Day 2 – Next Steps

# Agenda – Day 3 (Executive Overview)

- Continental Breakfast
- Project Overview
- Selected Wichita – Sedgwick County ITS Architecture Examples
- Next Steps

# What is ITS?



“ITS represents the application of information processing, communications technologies, advanced control strategies, and electronics to the field of transportation.”

23 CFR Parts 655 and 940

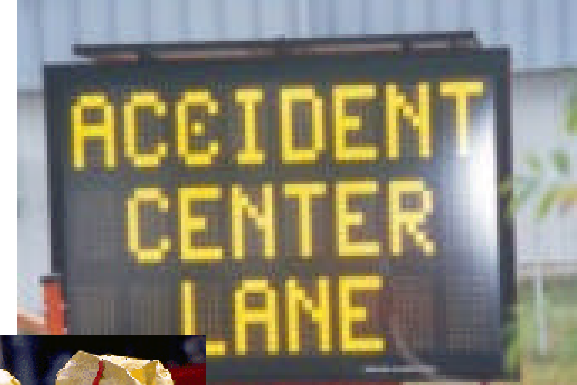
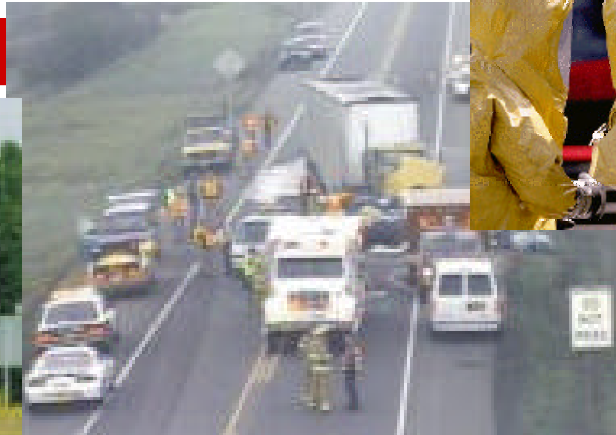


# What is ITS?



- Coordinated signals
  - City Wichita: 380 intersections
  - Sedgwick County: 35 intersections

# What is ITS?



- Incident response
  - Freeway diversion



**ITS?**

---

**Integrated  
Intelligent  
Transportation  
Systems**

# What is an Architecture?

## architecture, n.



“a unifying or coherent structure”

“the manner in which the components of a computer or computer system are organized and integrated”



# ITS Architecture

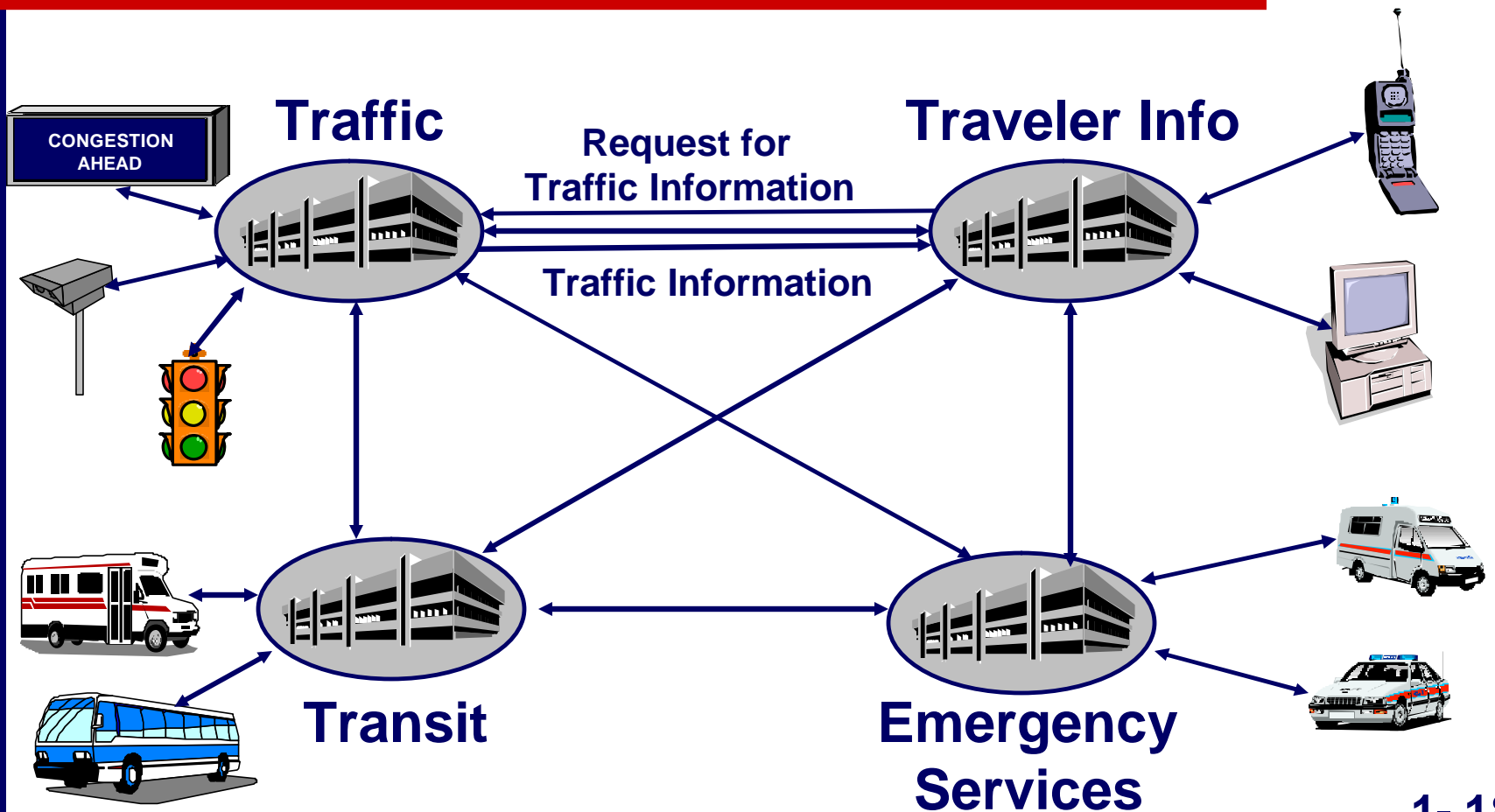
Structure or framework for deploying  
Integrated Transportation Systems

- blueprint for effective  
cooperation



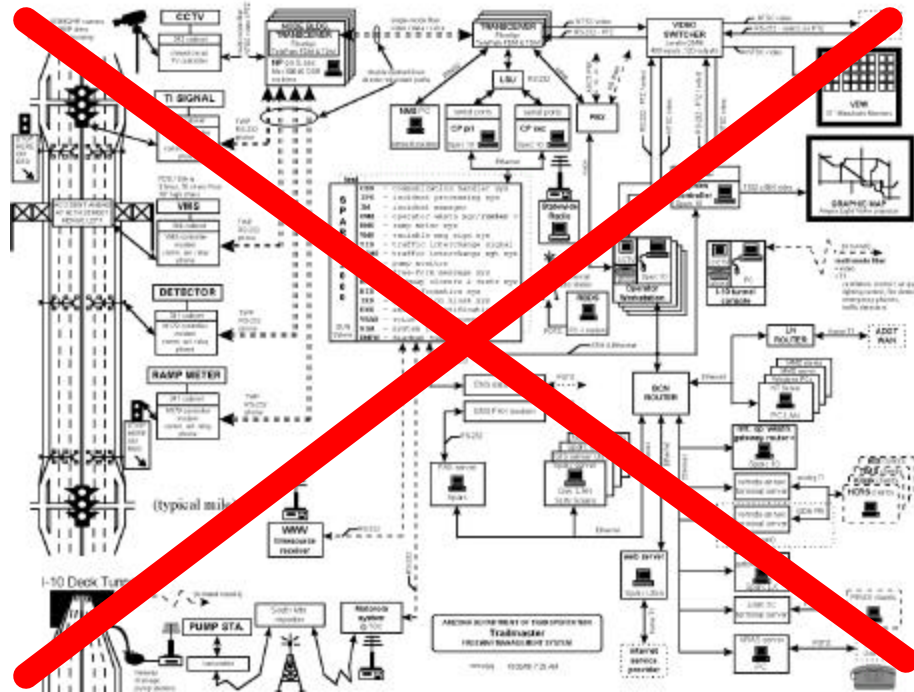
# ITS Architecture Includes:

Agencies , Systems, Connections , Information Flows



# ITS Architecture is not ...

- A design document
- Technology prescriptive



# Why develop an ITS Architecture?

- Identify integration opportunities
- Efficiently structure implementations
  - Prepare for future expansion
  - Leverage funding
  - Deploy projects consistent with plan
  - Identify standard interfaces
- Identify gaps in ITS services
- Comply with FHWA Rule/FTA Policy

# ITS Legislation

Section 520.6(e) of the Transportation Equity Act for the 21 Century (TEA-21) requires that all ITS projects funded through the Highway Trust Fund be in conformance with the National ITS Architecture and applicable standards

# Regional ITS Architecture

Framework or plan for deploying Integrated Transportation Systems in a specific area

- Agencies involved
- Transportation systems
- Transportation system services
- Connections between systems
- Information exchanged electronically between systems

# Statewide ITS Architecture

Framework for deploying ITS in the state of Kansas

- Include state-level systems and services
- Links to regional ITS architectures for details

# **Tool for Developing ITS Architectures**

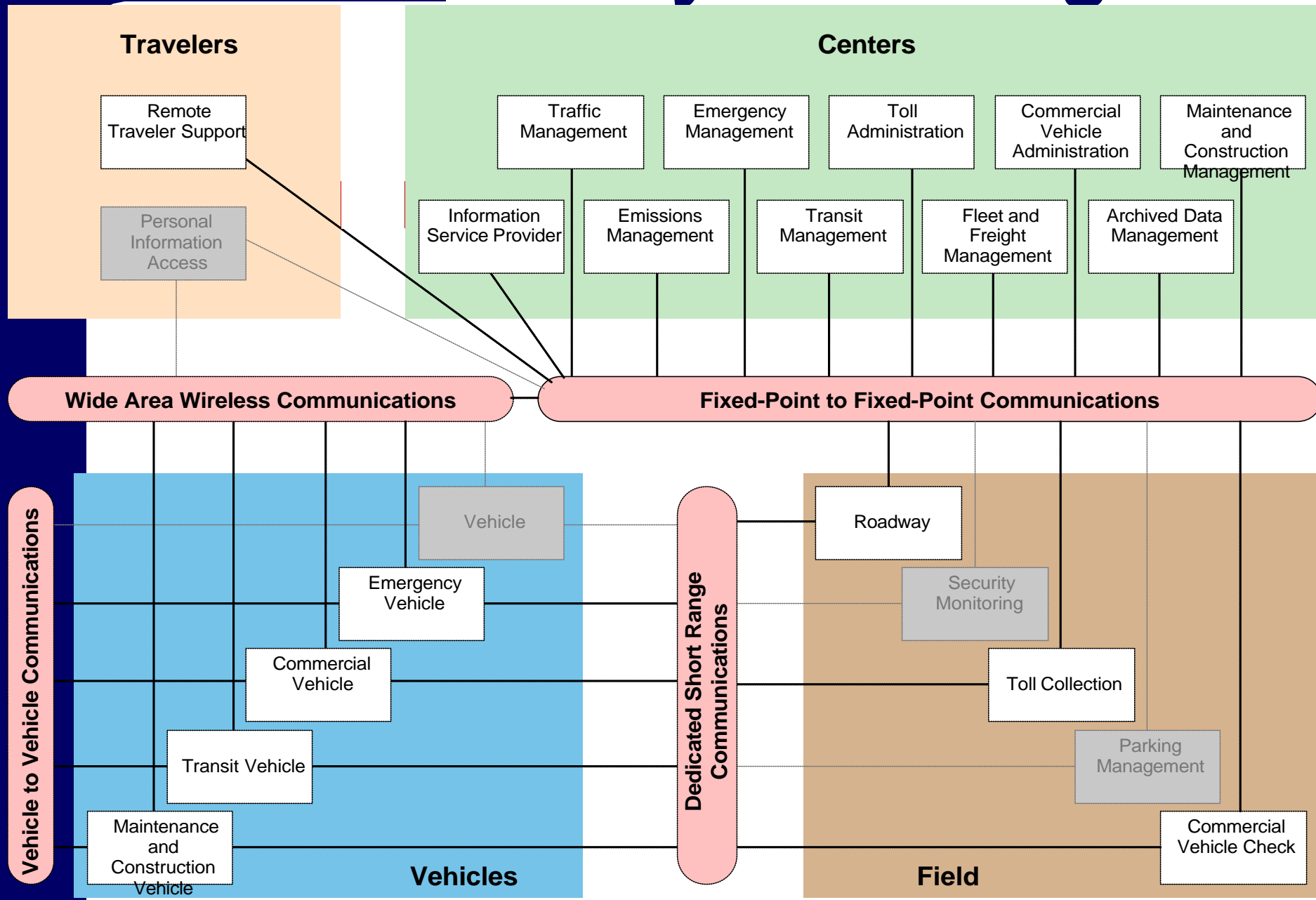
- **National ITS Architecture**



# National ITS Architecture

- An ITS framework defining
  - Potential participants
  - Potential system functions
  - Possible connections between systems
- Used as a template to create a plan for integration in a region (a.k.a. regional ITS architecture)

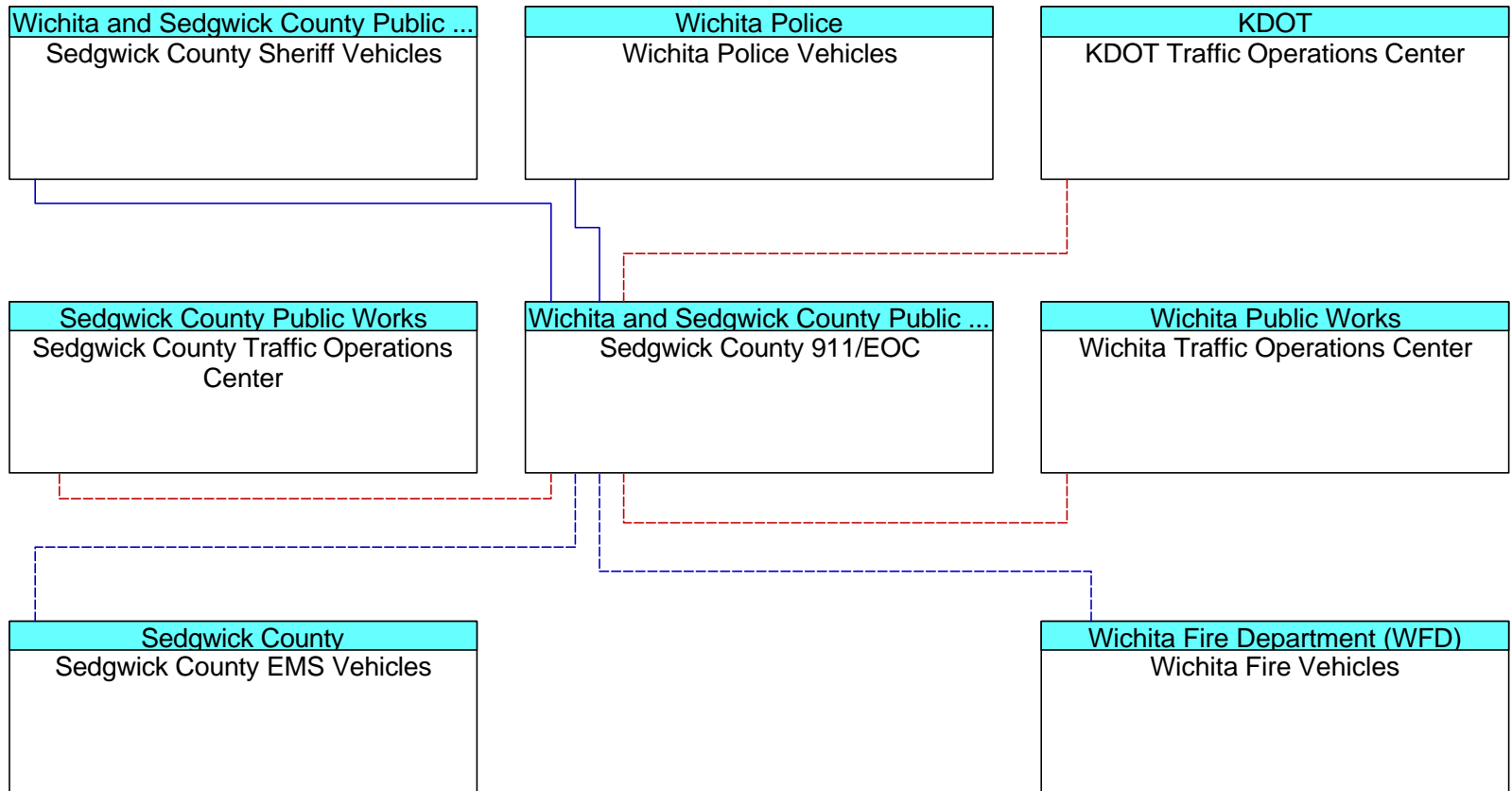
# Subsystem Diagram



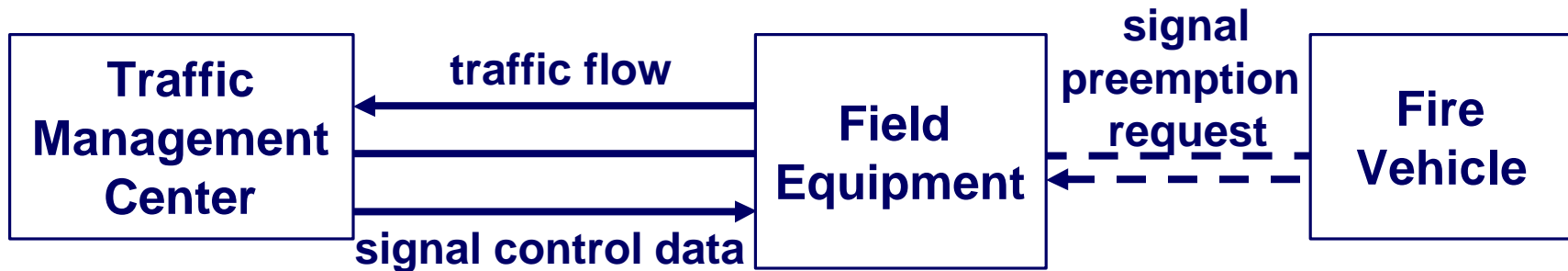
# **“Interconnects” identify Connections between Systems**



# Example of Interconnect Diagram

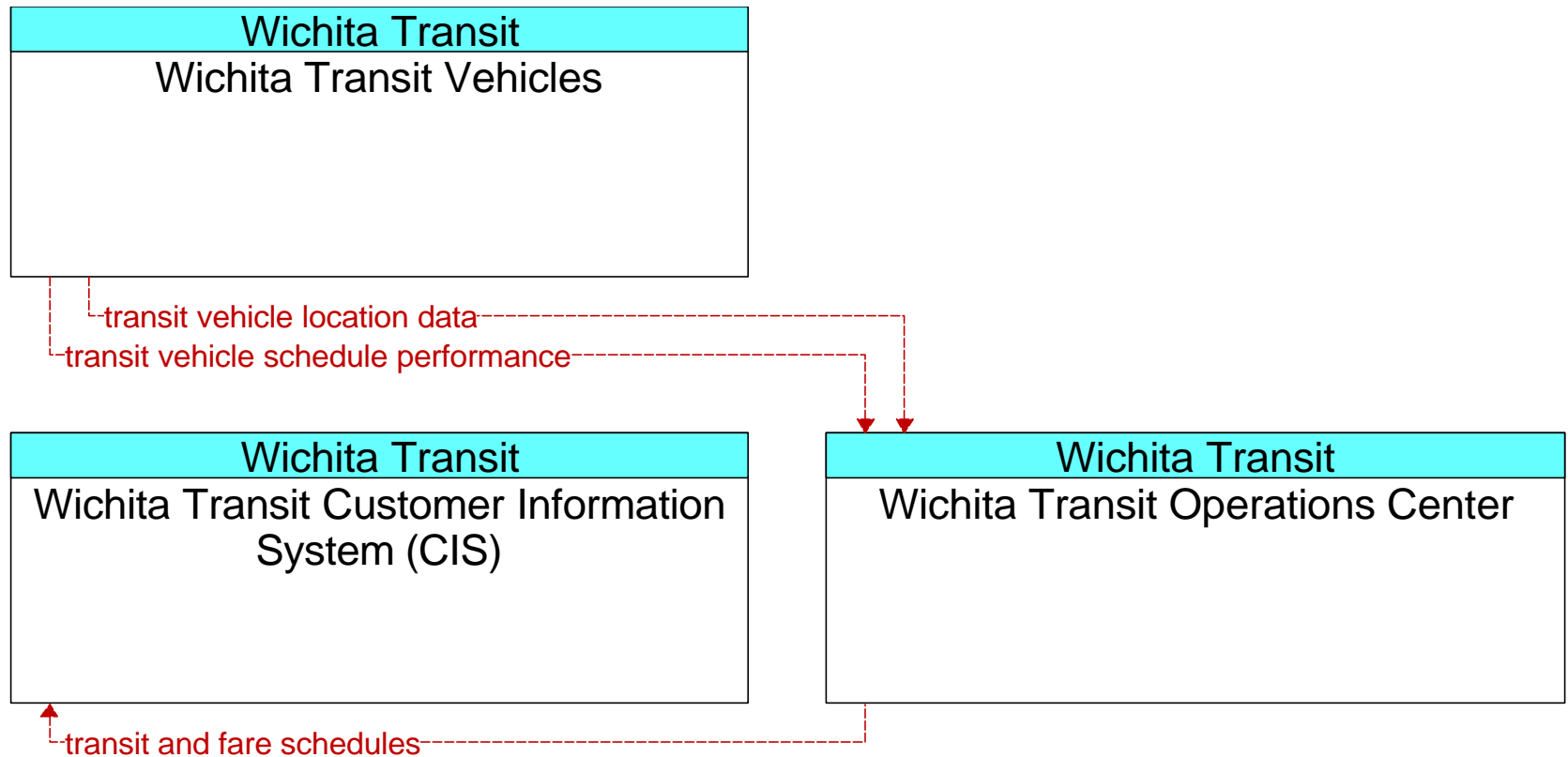


# “Architecture Flows” identify Information Transfers



An interconnects carries one or more architecture flows.

# Example of Architecture Flow Diagram



# How will the Wichita Regional ITS Architecture be developed?

## Four step architecture development process:

1. Inventory transportation-related systems
2. Identify transportation-related services
3. Identify what systems needs to exchange information
4. Identify what information needs to be exchanged

# Step 1: Inventory Systems

- Create initial system inventory
- Modify system inventory
- Relate the items in the system inventory to the National ITS Architecture entities (subsystems and terminators)



## Step 2: Identify Services

- Create initial list of services
- Relate the transportation services to the National ITS Architecture deployment elements
- Identify elements of inventory involved in each service

# Example Service: Emergency Response

Purpose: Dispatch vehicles and coordinate with other management centers (public safety and traffic)



**Emergency Management Subsystem**



**Traffic Management Subsystem**

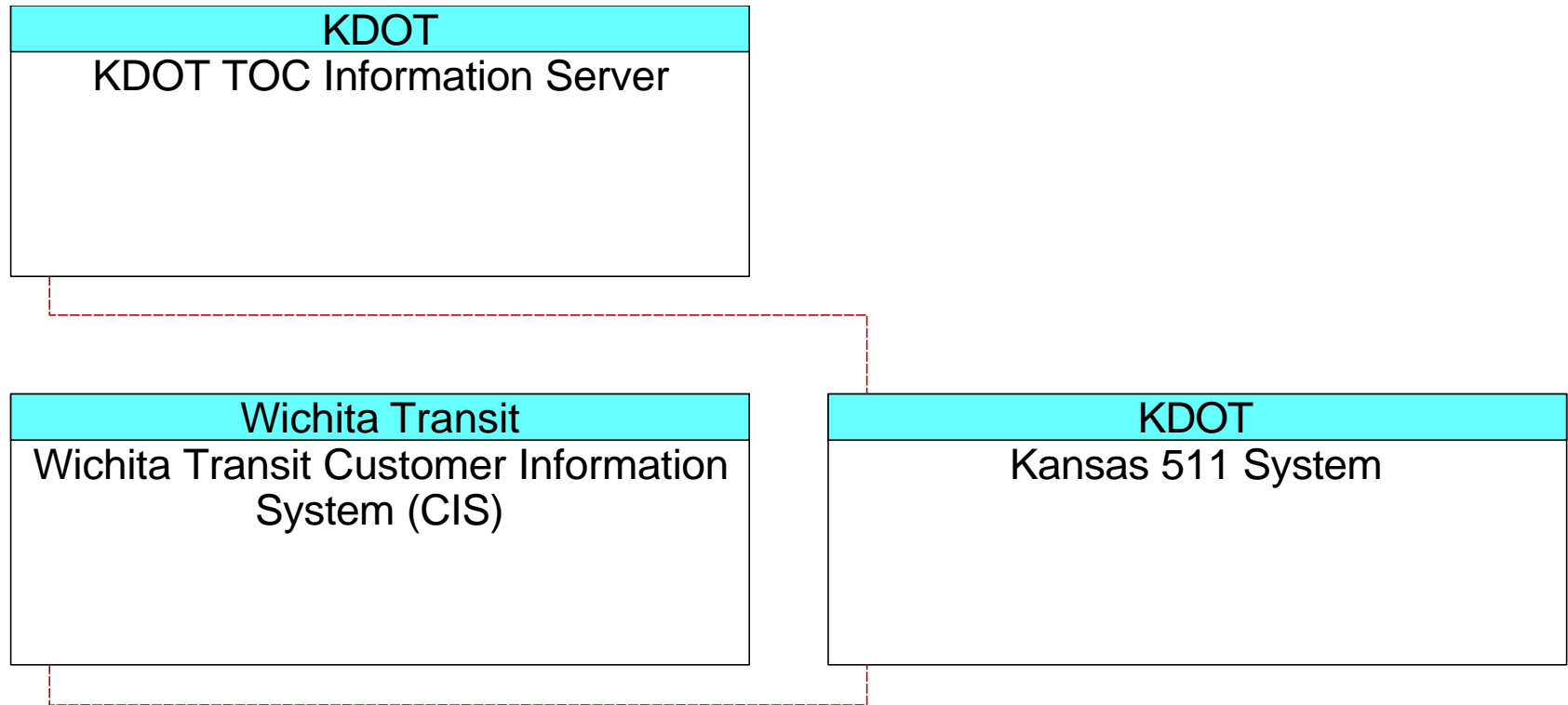


**Emergency Vehicle Subsystem**

# Step 3: Identify Interconnections

- Identify potential interconnections between systems using the National ITS Architecture
- Review potential interconnects
  - Remove inappropriate connections
  - Add missing connections

# Example of Architecture Interconnect Diagram

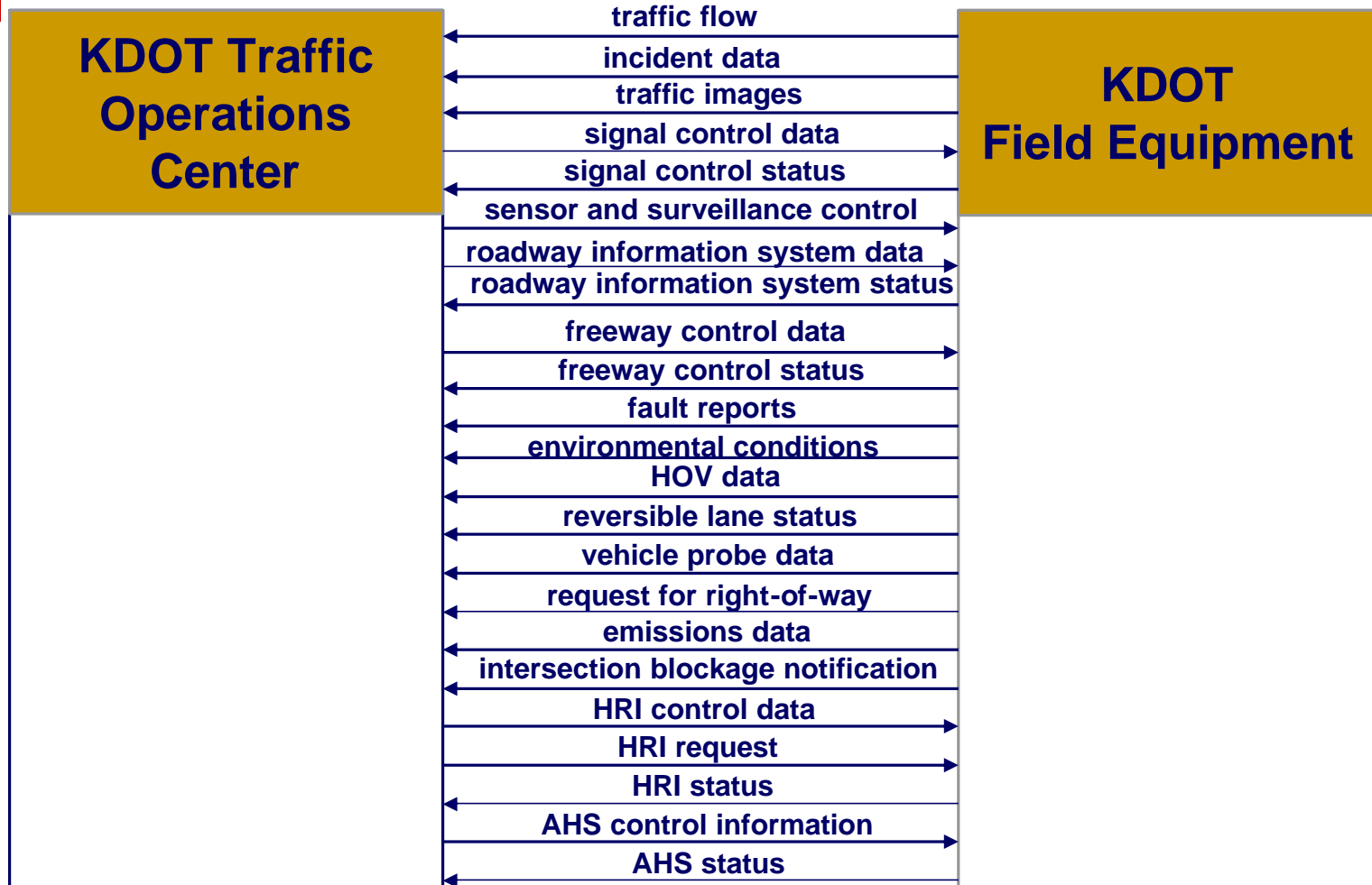


----- Near Term

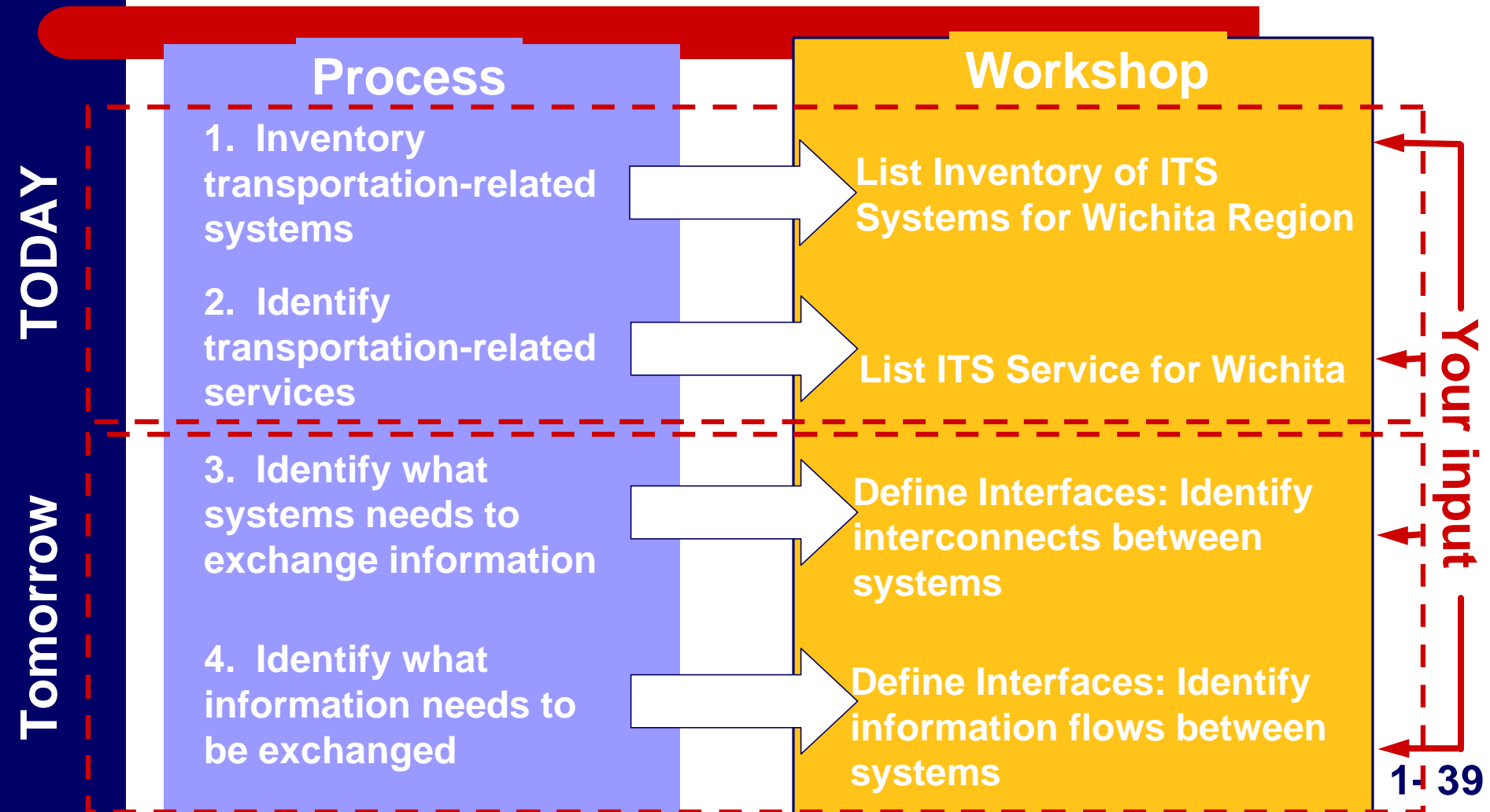
## **Step 4: Identify Information Flows (“Architecture Flows”)**

- Identify what information will be exchanged using the National ITS Architecture
- Review potential flows
  - Remove inappropriate flows
  - Add missing flows

# Example of Potential ITS Architecture Information Flows



# Architecture Development

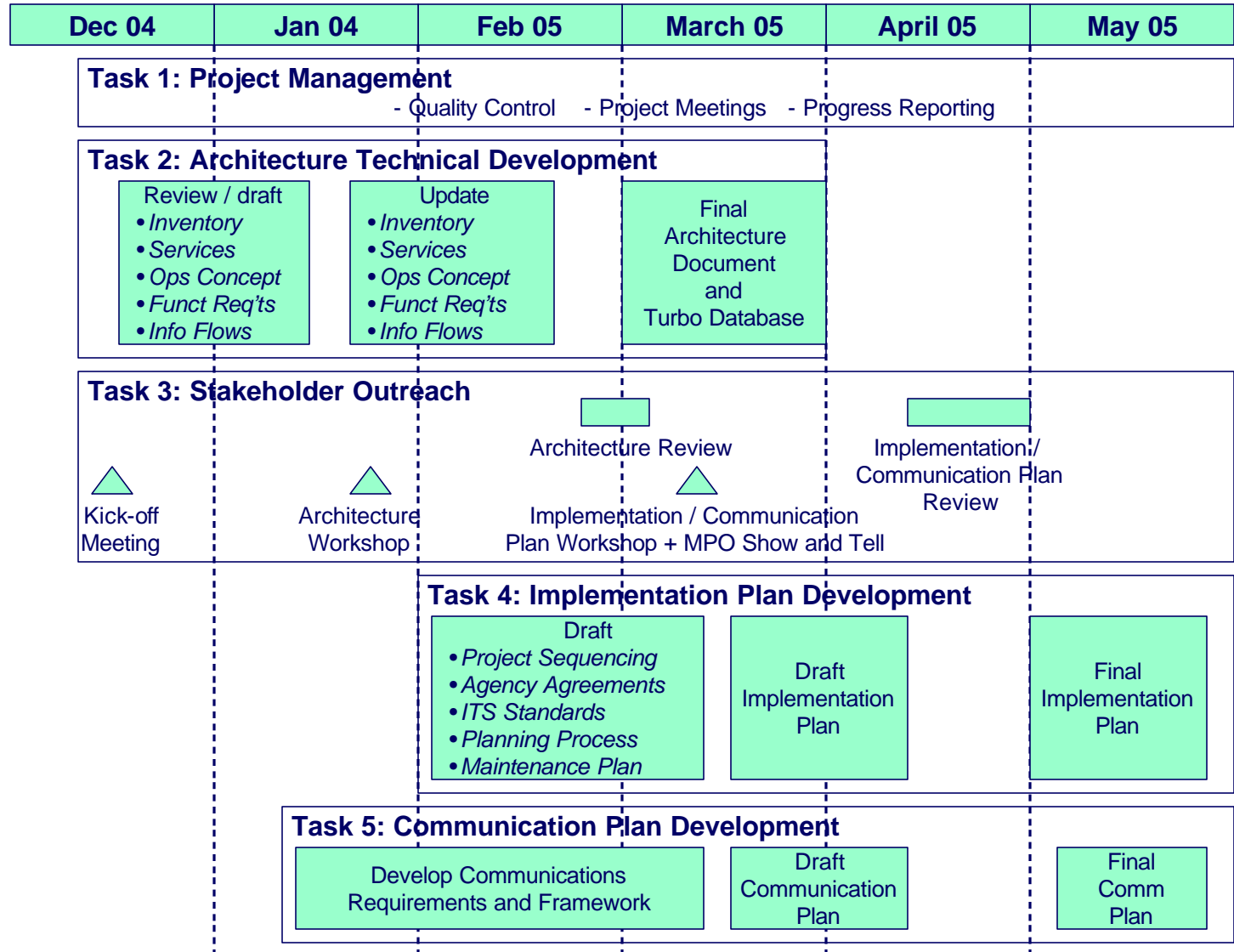


# Architecture Development

- Today and Tomorrow – Review and Feedback
  - Stakeholders
  - Inventory and
  - Services
- February 15<sup>th</sup> - Updated Architecture including Operational Concepts and High-Level Requirements
- February 15<sup>th</sup> to March 4<sup>th</sup> - Stakeholder Review
- April 1, 2005 – Finalize Wichita Architecture



# Schedule



# First Workshop - Architecture

- Bring Region's Stakeholders Together
- Review **What's New** from the Previous Wichita – Sedgwick County Regional ITS Architecture
  - Changes in the Region's Vision
  - Changes in the Region's Systems
  - Changes in the Region's Interfaces between Systems
  - Changes in the National ITS Architecture
- Result is an **Architecture Baseline** to be Reviewed by the Stakeholders and Finalized by April 1, 2005
  - Website: [www.iteris.com/wichitaarchitecture](http://www.iteris.com/wichitaarchitecture)
  - Documents

# Second Workshop – Implementation Plan

- Bring Region's Stakeholders Together
- Review draft Implementation Plan based on the Baseline Wichita – Sedgwick County Regional ITS Architecture
  - Project Definition
  - Sequencing of Projects
  - Agency Agreements
  - Standards
  - Estimated Project Costs
  - Maintaining the Architecture
- Result is an Implementation Plan that Leverages Your Architecture with Your Planning Processes

# Second Workshop – Communications Plan

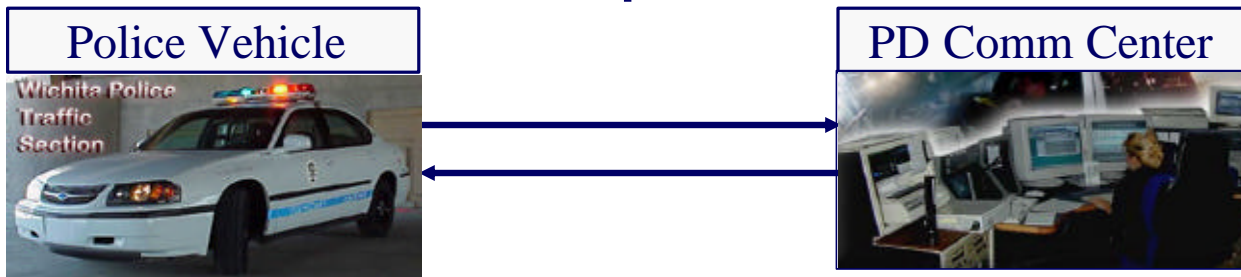
- Review draft Communications Plan based on the Baselined Wichita – Sedgwick County Regional ITS Architecture
  - Identify Available Communications Resources
  - Define and Analyze Communications Requirements
  - Analyze Communications Needs
  - Develop Network Architecture Options
- Result is a Communications Plan that Leverages Your Architecture with Your Overall Communications Planning

# Project Results

## ITS Architecture for the Wichita Region

- Stakeholders involved
- Transportation systems
- Transportation system services
- Connections between systems
- Information exchanges between systems

## ITS Architecture Implementation



# Your Role

- Make your systems and services known
- Discuss integration opportunities with other stakeholders

# Our Role

- Make connections from area systems and services to the National ITS Architecture
  - Leverage National ITS Architecture
  - Identify options for consideration
- Help you develop your architecture
- Facilitate discussion

# **Wichita-Sedgwick County Regional ITS Architecture**

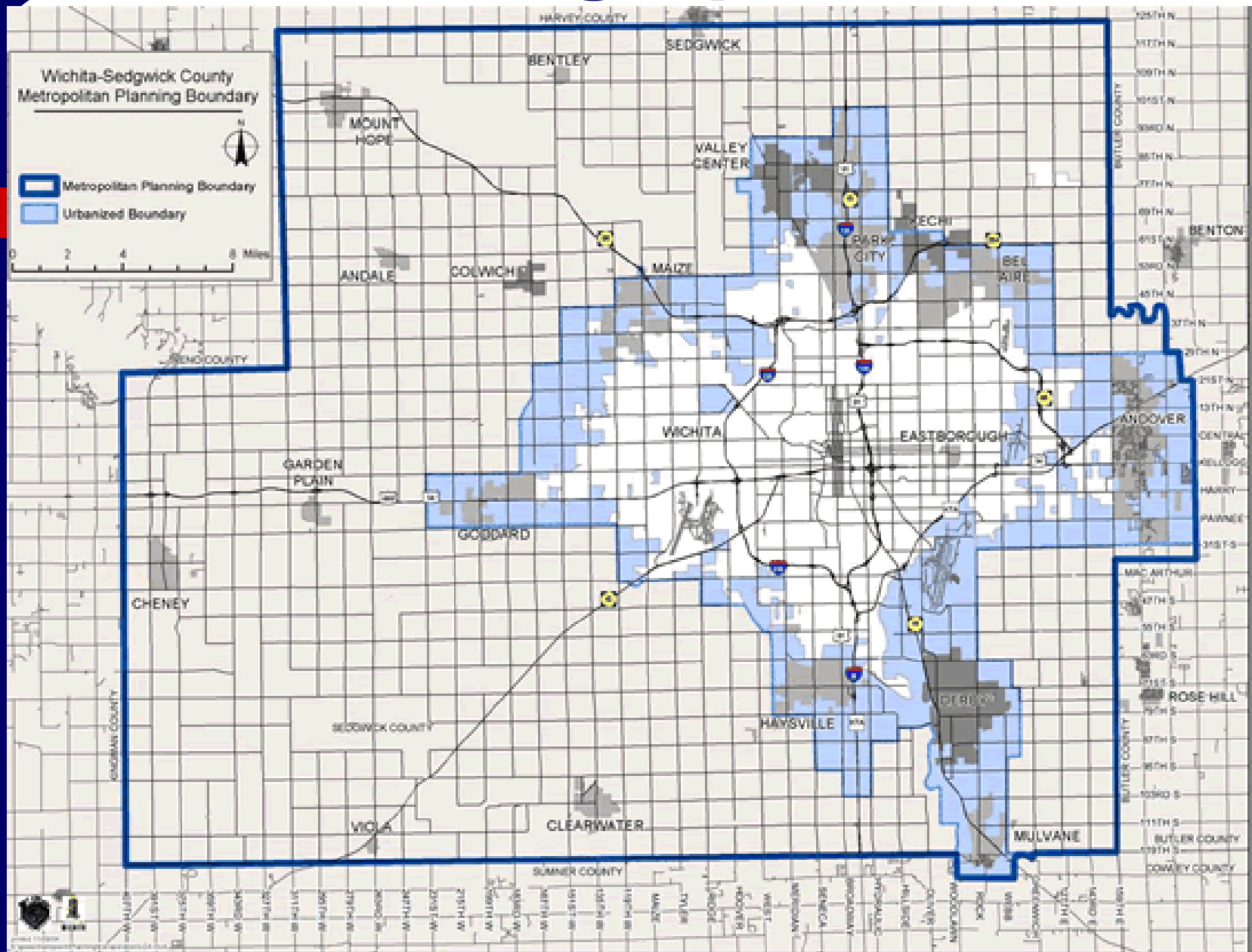
## **Workshop Regional ITS-Related Activities**



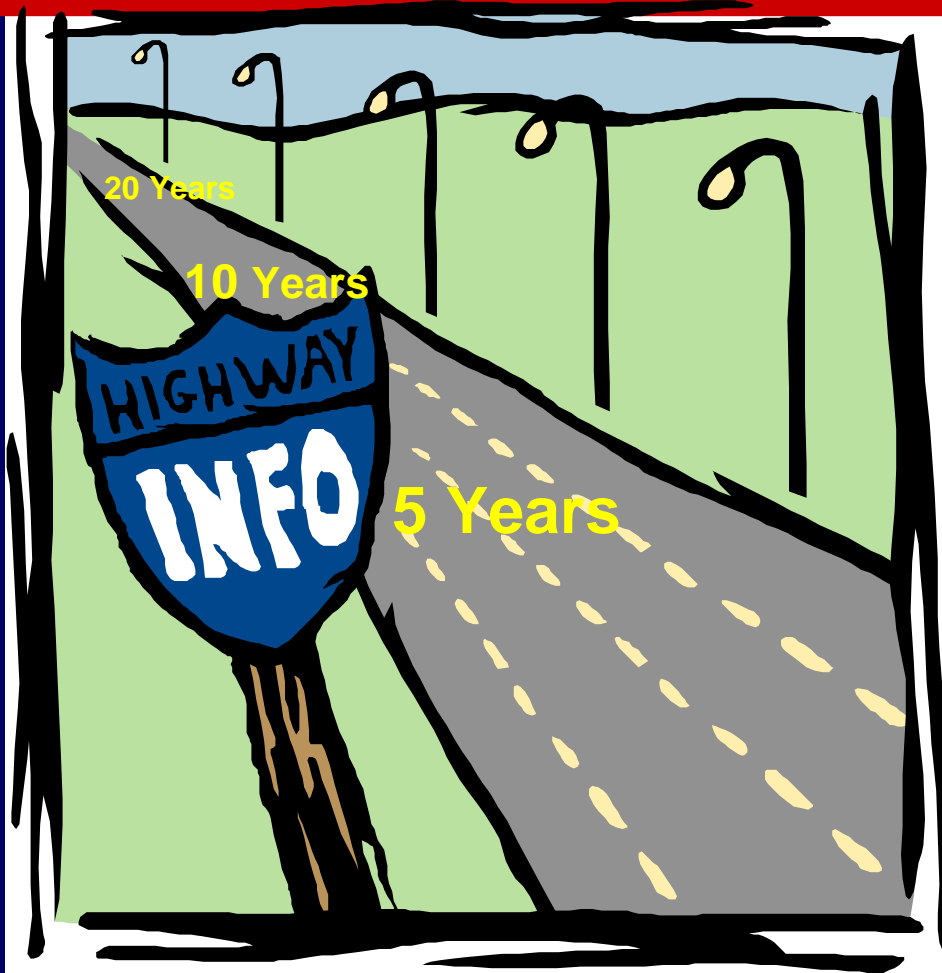
# Boundaries

- Geographic
- Timeframe
- Scope

# Geographic Boundary



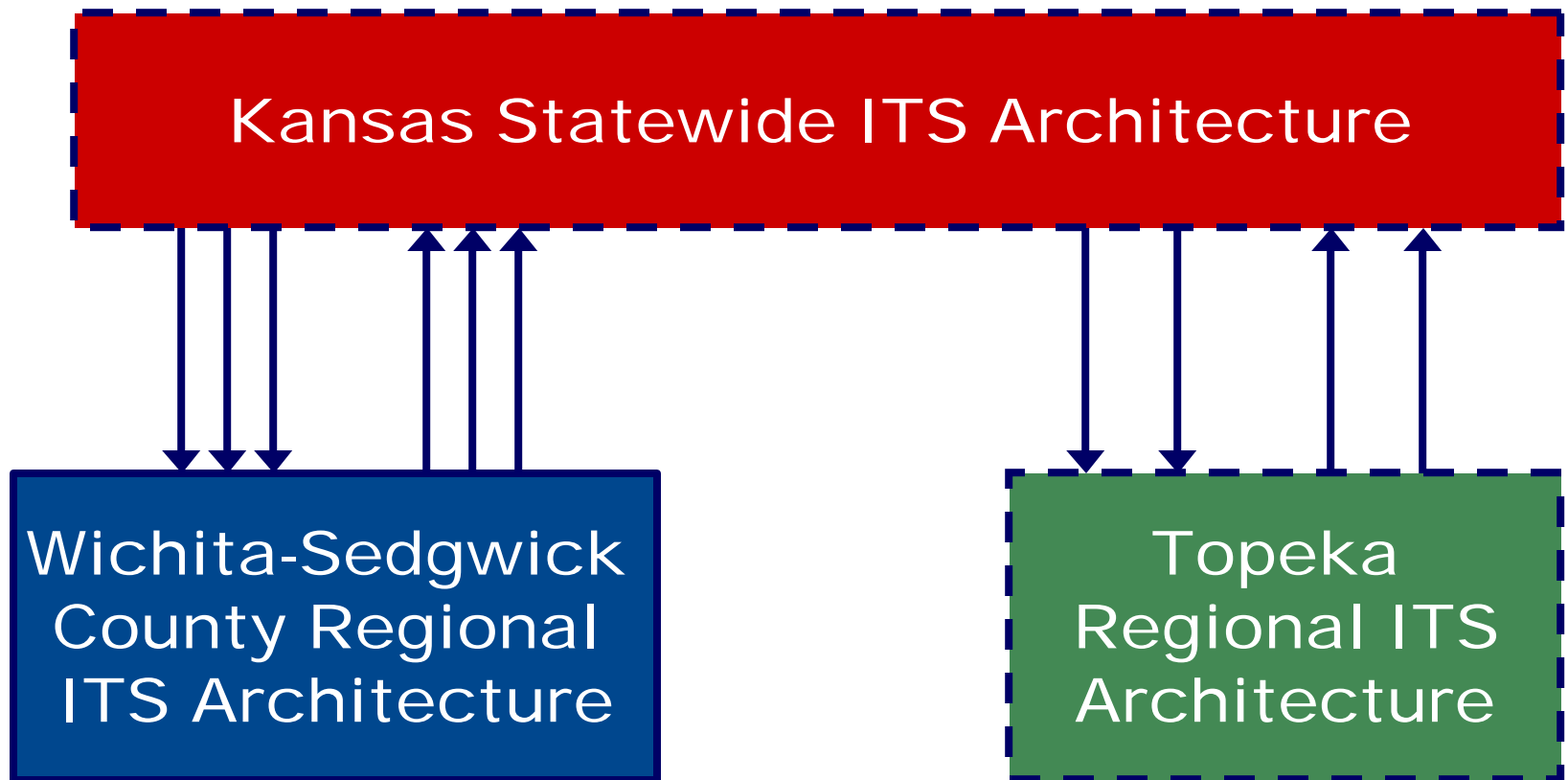
# Timeframe



- Existing
- Near Term 0-5 years
- Medium Term 6-10 years
- Long Term 10+ years



# Scope (Future)



# Introductions / Your Activities

- Please Introduce Yourself
- Give Your Affiliation
- Brief Description of Your ITS-Related Projects

# **Wichita-Sedgwick County Regional ITS Architecture Workshop**

## **Presentation of Inventory**



# Inventory

- List of ITS systems in Wichita Region
- Agency (or group of agencies) who own system (Stakeholders)
- Status
  - Existing
  - Planned within a timeframe

# ITS Systems

- Electronic systems that are used in ITS
- Examples:
  - Traffic control signals/signal systems
  - Transit automated vehicle location system (AVL)
  - 911 Centers
  - Police computer-aided dispatch system (CADD)



# Example of ITS System Inventory

Stakeholder	ITS Element
Burlington Northern Santa Fe	Rail Operations Center
Cable Television Stations	Cable Television
County Sheriff	Sheriff Dispatch Center
City Paratransit Systems	City Paratransit Dispatch
City Paratransit Systems	City Paratransit Vehicles
State DOT	Animal-Vehicle Warning System
State DOT	Automated Gate System
State DOT	CCTV RoadCams
State DOT	District Center
Yellowstone National Park	National Park Parking System

# Inventory Report

Inventory Report for Wichita - Microsoft Word

File Edit View Insert Format Tools Table Window Help

Type a question for help

Normal Times New Roman 12 B I U

1 2 3 4 5 6 7

## Inventory Report

1/14/2005 12:18:07PM

### Element Inventory for Region Wichita-Sedgwick County Regional ITS Architecture

---

**\*KTA** *Status: Existing*

---

*Description:* This element represents motorist using their cell phones to report incidents to the Kansas Highway Patrol - Turnpike.  
*Associated Stakeholder:* KHP-Turnpike  
*Mapped to Entity:* Emergency Telecommunications System

---

**Air Quality Alert System** *Status: Near Term*

---

*Description:* The Air Quality program inspects sources of air pollution in Wichita and Sedgwick County, conducts air monitoring, responds to hazardous materials incidences as needed, assists citizens and businesses in resolving indoor air quality problems, and provides education on all air quality issues.  
*Associated Stakeholder:* Wichita Department of Environmental Health  
*Mapped to Entity:* Emissions Management

---

**Commercial Vehicles** *Status: Existing*

---

*Description:* This is a generic representation of the various commercial vehicle fleets (e.g., JB Hunt) that will traverse through the geographic scope of this Architecture.  
*Associated Stakeholder:* Commercial Vehicle Operators  
*Mapped to Entity:* Commercial Vehicle Subsystem

---

Page 1 Sec 1 1/9 At 0" Ln 61 Col 1 REC TRK EXT OVR

# **Wichita-Sedgwick County Regional ITS Architecture Workshop**

## **Presentation of Services**



# ITS Services

- What we use our systems to do
- For example,
  - Traffic Operations
  - Travel Demand Management (TDM)
  - Transit Management
  - Commercial Vehicle Operations (CVO)
  - Public Safety

# Example Service: Emergency Response

Purpose: Dispatch vehicles and coordinate with other management centers (public safety and traffic)



**Traffic Management Subsystem**



**Emergency Management Subsystem**



**Emergency Vehicle Subsystem**

# Services Covered in National ITS Architecture - Our “Menu”

- ☐ Network Surveillance
- ☐ Probe Surveillance
- ☐ Surface Street Control
- ☐ Freeway Control
- ☐ HOV Lane Management
- ☐ Traffic Information Dissemination
- ☐ Regional Traffic Control
- ☐ Incident Management System
- ☐ Traffic Forecast and Demand Management
- ☐ Electronic Toll Collection
- ☐ Emissions Monitoring and Management
- ☐ Virtual TMC and Smart Probe Data
- ☐ Standard Railroad Grade Crossing
- ☐ Advanced Railroad Grade Crossing
- ☐ Railroad Operations Coordination
- ☐ Parking Facility Management
- ☐ Reversible Lane Management
- ☐ Road Weather Information System
- ☐ Regional Parking Management
- ☐ Broadcast Traveler Information
- ☐ Interactive Traveler Information
- ☐ Autonomous Route Guidance
- ☐ Dynamic Route Guidance
- ☐ ISP Based Route Guidance
- ☐ Integrated Transportation Management/Route Guidance
- ☐ Yellow Pages and Reservation
- ☐ Dynamic Ridesharing
- ☐ In Vehicle Signing

# ITS Services

- List of services for Wichita Region
- Systems involved in the service
- Status
  - Existing
  - Planned within a timeframe



# Market Package Report

Market Packages for Wichita - Microsoft Word

File Edit View Insert Format Tools Table Window Help

Type a question for help

Normal Times New Roman 12 B I U

1 2 3 4 5 6 7

## Market Packages (Transportation Services)

1/14/2005 12:27:43PM

### Market Packages for Region Wichita-Sedgwick County Regional ITS Architecture

---

#### Network Surveillance (ATMS01) -- Near Term

This market package includes traffic detectors, other surveillance equipment, the supporting field equipment, and fixed-point to fixed-point communications to transmit the collected data back to the Traffic Management Subsystem. The derived data can be used locally such as when traffic detectors are connected directly to a signal control system or remotely (e.g., when a CCTV system sends data back to the Traffic Management Subsystem). The data generated by this market package enables traffic managers to monitor traffic and road conditions, identify and verify incidents, detect faults in indicator operations, and collect census data for traffic strategy development and long range planning. The collected data can also be analyzed and made available to users and the Information Service Provider Subsystem.

#### City of Wichita Network Surveillance [Instance] (ATMS01) -- Near Term

#### KDOT Network Surveillance [Instance] (ATMS01) -- Existing

#### Sedgwick County Network Surveillance [Instance] (ATMS01) -- Near Term

#### Surface Street Control (ATMS03) -- Existing

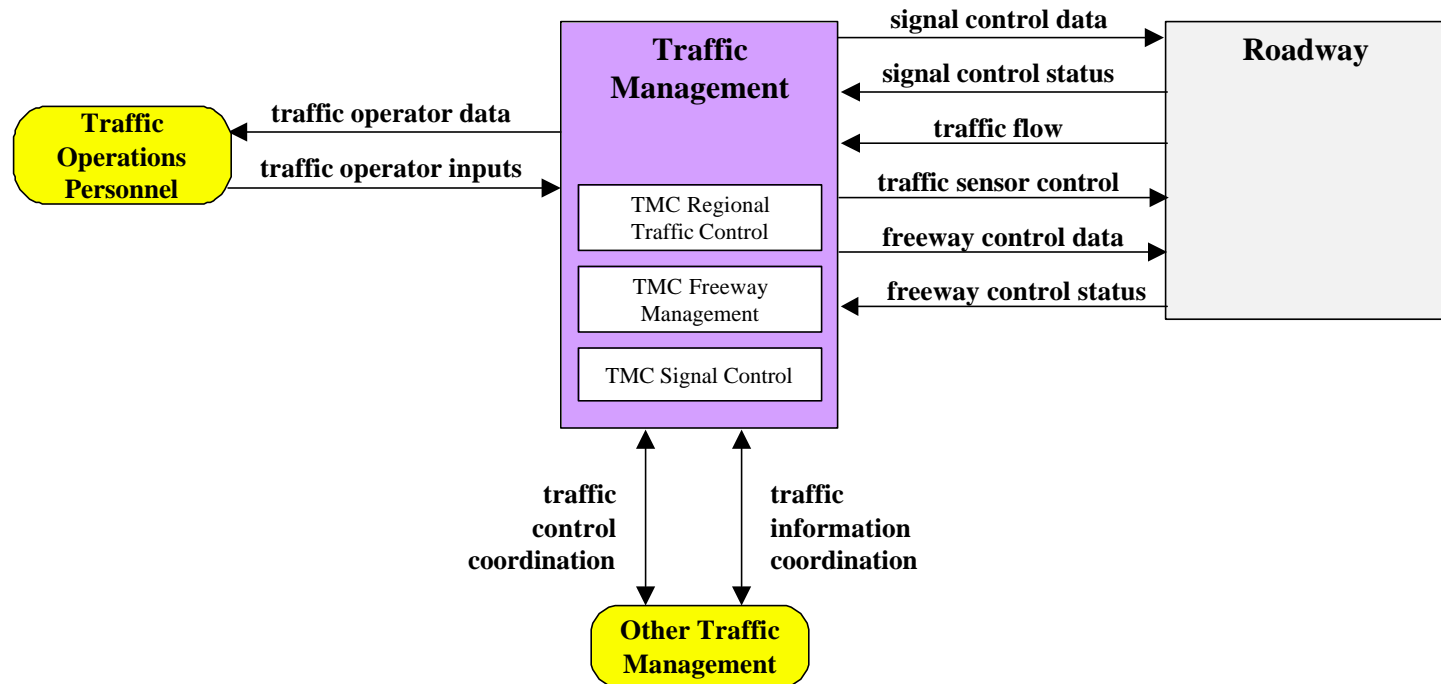
This market package provides the central control and monitoring equipment, communication links, and the signal control equipment that support local surface street control and/or arterial traffic management. A range of traffic signal control systems are represented by this market package ranging from fixed-schedule control systems to fully traffic responsive systems that dynamically adjust control plans and strategies based on current traffic conditions and priority requests. Additionally, general advisory and traffic control information can be provided to the driver while en route. This market package is generally an

Page 1 Sec 1 1/9 At 0" Ln 53 Col 1 REC TRK EXT OVR

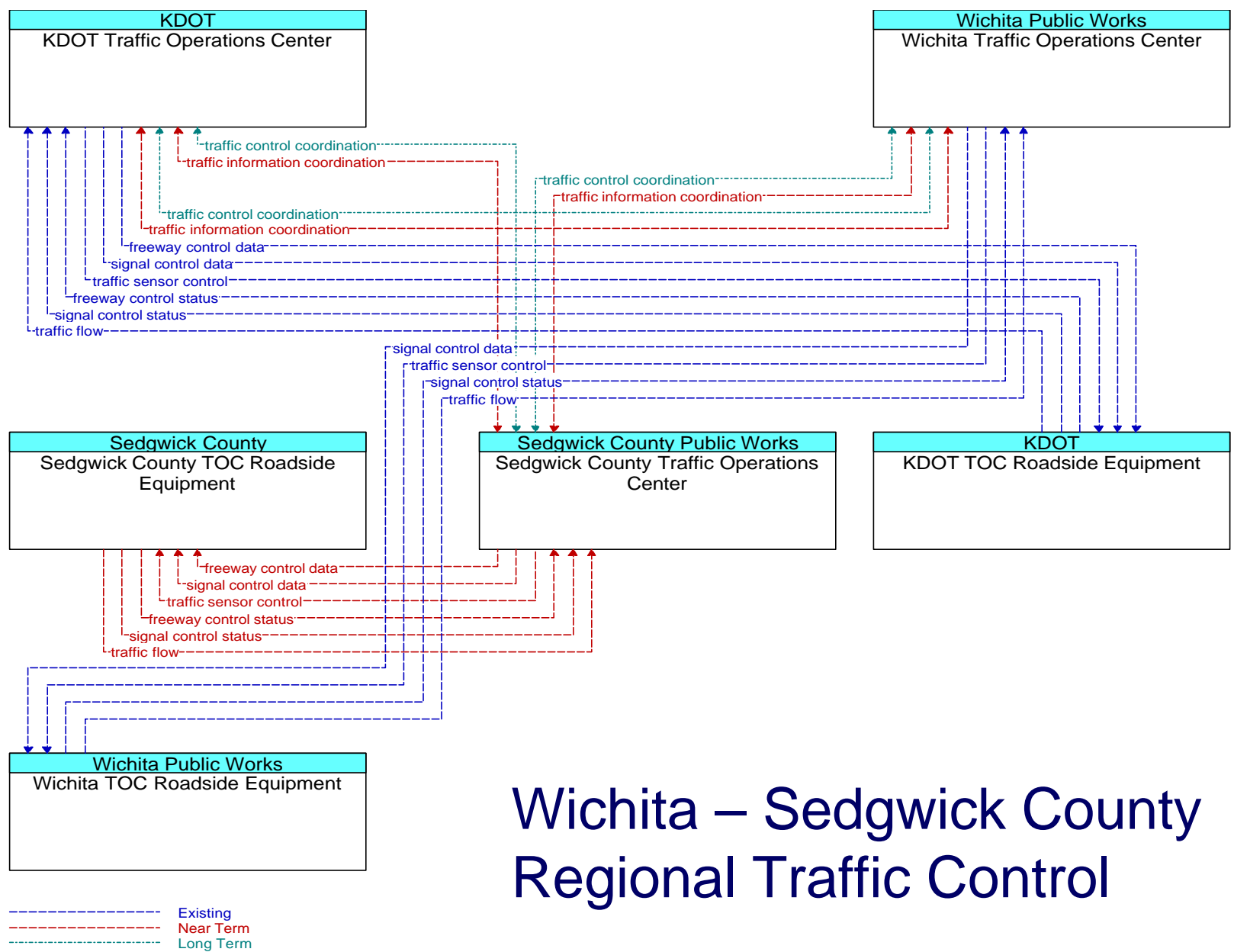


# Market Packages in the National ITS Architecture

## ATMS07 – Regional Traffic Control



# Market Package Diagrams



## Wichita – Sedgwick County Regional Traffic Control

# **Wichita-Sedgwick County Regional ITS Architecture Workshop**

## **Selection of Services**



# **Wichita-Sedgwick County Regional ITS Architecture Workshop**

**Tailoring  
Interconnects**

A thick red horizontal bar with rounded ends, positioned below the text 'Tailoring Interconnects'.

# **Wichita-Sedgwick County Regional ITS Architecture Workshop**

**Tailoring  
Information Flows**

A thick red horizontal bar with rounded ends, positioned below the text 'Tailoring Information Flows'.

# **Wichita-Sedgwick County Regional ITS Architecture Workshop**

## **Next Steps**

A thick red horizontal bar with rounded ends, positioned below the 'Next Steps' text.

# Things to Think about...

- Others who should be involved
- Opportunities to share funding/resources
- Opportunities for integration
- Opportunities to share regional architecture effort with policy and decision makers

# Accomplishments / Next Steps

Discuss architecture with stakeholders/groups:

- ☒ Investigate inventory items that were not defined or not defined well
- ☒ Finalize list of services
- ☒ Tailor connects between systems
- ☒ Tailor information flows between systems



# Next Steps after the Workshop

- We need your review of
  - What we covered the previous two days
    - Stakeholders
    - System Inventory
    - Services
    - Interconnects
  - Updated Flows between systems
  - Operational Concepts based on Architecture
  - Requirements based on Architecture

# Wichita – Sedgwick County Regional ITS Architecture Development

- Completed Stakeholder Architecture Workshop #1
- Next Workshop will focus on the Review of the ITS Implementation Plan and the ITS Communications Plan
  - March 8-10
- Architecture complete by April 1, 2005

# Wichita – Sedgwick County Regional ITS Architecture Information

- Jeff Brummond, Iteris – Project Manager
  - (703) 925-3813
  - [jab@iteris.com](mailto:jab@iteris.com)
- Mike Malone, Iteris – Deputy Project Manager
  - (402) 476-5101
  - [msm3@iteris.com](mailto:msm3@iteris.com)
- Project Web Site
  - [www.iteris.com/wichitaarchitecture](http://www.iteris.com/wichitaarchitecture)