Oklahoma City Area Regional Transportation Study (OCARTS) Intelligent Transportation Systems (ITS) Architecture

Oklahoma Department of Transportation

In Coordination With:

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Regional ITS Architecture

ASSOCIATION OF CENTRAL OKLAHOMA GOVERNMENTS

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GLOSSARY

ACOG.......... Association of Central Oklahoma Governments
ARP.......... Alternate Route Plan
CCTV.......... Closed Circuit Television
CMS.......... Congestion Management Systems
CVISN.......... Commercial Vehicle Information Systems Network
CVO.......... Commercial Vehicle Operations
DMS.......... Dynamic Message Signs
DOT.......... Department of Transportation
DPS.......... Department of Public Safety
EDP.......... Early Deployment Plan
FFY.......... Federal Fiscal Year
FHWA.......... Federal Highway Administration
FMCSA.......... Federal Motor Carrier Safety Administration
FY.......... Fiscal Year
I.......... Interstate
IM MOU.......... Incident Management Coalition Memorandum of Understanding
IM GUIDE.......... Incident Management Procedures Manual and Resource Guide
IMP.......... Incident Management Plan
IMSC.......... Incident Management Subcommittee
INCOG.......... Indian Nations Council of Governments
ITPC.......... Intermodal Transportation Policy Committee
ITS.......... Intelligent Transportation Systems
ITTC.......... Intermodal Transportation Technical Committee
MOU.......... Memorandum of Understanding
MPO.......... Metropolitan Planning Organization
OCARTS.......... Oklahoma City Area Regional Transportation Study
ODOT.......... Oklahoma Department of Transportation
OHP.......... Oklahoma Highway Patrol
OKC.......... City of Oklahoma City
OTA.......... Oklahoma Transportation Authority
RTMC.......... Regional Traffic Management Center
SC.......... ITS Steering Committee
SDO.......... Standards Development Organization
TEA21.......... Transportation Equity Act for the 21st Century
TISC.......... Traveler Information Subcommittee
TMC.......... Traffic Management Center
TOSC.......... Technology and Operations Subcommittee
UPWP.......... Unified Planning Work Program
US DOT.......... United States Department of Transportation

INTRODUCTION

Intelligent Transportation Systems (ITS) represent the application of information processing, communications technologies, advanced control strategies, and electronics to the field of transportation, so as to improve the quality of life, promote a strong economy, as well as enhance and protect environmental quality.

> *"The vision for the OCARTS area is one of* ***enhanced transportation****,* ***mobility****,* ***efficiency****,* ***productivity****, and* ***safety*** *through the use of user-friendly ITS technologies and systems.*[a]*"*

In Fiscal Year (FY) 2003, ACOG, the Metropolitan Planning Organization (MPO) for the Oklahoma City area, continued with its effort to realize this vision for Intelligent Transportation Systems within the Oklahoma City Area Regional Transportation Study (OCARTS) area. The purpose of this report is to document the cooperative planning and programming of Intelligent Transportation Systems initiatives, with particular emphasis on the development of the OCARTS area Regional ITS Architecture, an important activity that began in FY 2001.

PRECEDING ACTIVITIES

OCARTS AREA ITS EARLY DEPLOYMENT PLAN

Traffic incidents have been identified as an important cause of congestion in the OCARTS area. As a result, special attention focused on the management of incidents and the use of alternate routes during the development of an ITS Early Deployment Plan (EDP) for the Central Oklahoma region. Over the course of two years, the document was laid out and completed in coordination with the Oklahoma Department of Transportation (ODOT) to provide the framework for using ITS technologies to enhance the regional transportation network.

The EDP consists of several components:

- ITS Early Deployment Plan – A 20-Year Plan for Deploying Technology Based Solutions
- Incident Management Plan – An Approach for Management of Incidents on the OCARTS Area Transportation System
- Alternate Route Plan – A Report that identifies Potential Alternate Routes for each of the Major Transportation Corridors in the OCARTS area

The Intermodal Transportation Policy Committee formally accepted the OCARTS ITS EDP Executive Summary on October 28, 1999. Since then, the EDP has served as the region's basic guide for the coordinated region-wide planning and implementation of ITS initiatives.

[a] Source: OCARTS ITS Early Deployment Plan - An Approach for Managing Traffic Congestion in the OCARTS Area, prepared by BRW for ACOG and ODOT, July 1999

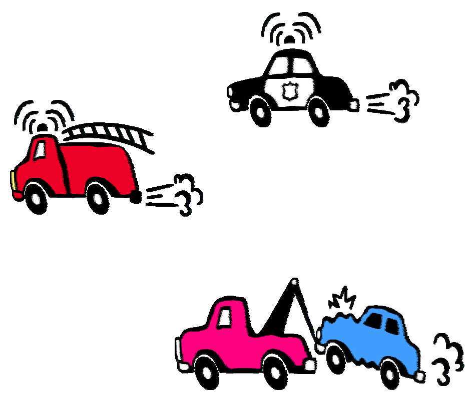
OCARTS AREA ITS COMMITTEES

Region-wide planning and implementation of ITS initiatives is overseen by several OCARTS area ITS committees, established in early FY 2001. These committees are structured in such a way that overall guidance concerning ITS improvements in the region are provided by an *ITS Steering Committee*, which is technically supported by an *Incident Management Subcommittee*, a *Technology and Operations Subcommittee*, and a *Traveler Information Subcommittee*, as illustrated in Figure 1.

<u>ITS Steering Committee (SC)</u>

The ITS Steering Committee provides overall guidance for the regional ITS planning and assures consistency with the Statewide ITS Plan. The Steering Committee identifies potential "Kickstart" projects and appropriate short- and long-term ITS funding sources. The committee plays a major role in the education of agency leaders to solicit their support and commitment. Another function of the Steering Committee is to compile and integrate information received from each of the subcommittees and to present the results to the appropriate committees for approval.

<u>Incident Management Subcommittee (IMSC)</u>



The Incident Management Subcommittee's main involvement revolves around the implementation of the EDP's Alternate Route Plan and the Incident Management Plan, as well as the development of a regional Incident Management Procedures Manual and Resource Guide (IM Guide). The committee also facilitates the coordination among member entities and agencies to identify needed improvements on the chosen alternate routes. The initiation of "Quick Clearance" legislation to speed up the clearing of traffic lanes during non-injury accidents is another key issue. The Incident Management Subcommittee further assists the Steering Committee in the identification of potential Kickstart projects. Secondary functions of the IMSC are the participation in various ITS training courses, the active support of public education and media campaigns, etc.

<u>Technology and Operations Subcommittee (TOSC)</u>

The Technology and Operations Subcommittee has played and continues to play a fundamental role in the completion and the ongoing maintenance of the OCARTS area Regional ITS Architecture. The subcommittee is also in charge of research, discussion, and documentation of the conceptual design of future ITS components and services, as well as the identification of applicable standards. The subcommittee members furthermore participate in the appropriate ITS Architecture training courses and workshops.

Traveler Information Subcommittee (TISC)

The Traveler Information Subcommittee has not yet been convened. The anticipated functions of the subcommittee revolve around public education campaigns, as well as the coordination of interagency information exchange, the collection, preparation, and dissemination of Traveler Information, as well as the discussion of Public-Private Partnerships.

The OCARTS area ITS committees met several times throughout FY 2001, 2002, and 2003. Their activities and actions have been documented in the FY 2001 and FY 2002 Intelligent Transportation Systems Reports, as well as the FY 2002 Incident Management Report.[b]

[b] The Unified Planning Work Program (UPWP) FY 2001-2.03, Subtask 2 and FY 2002-2.03, Subtask 2 – Intelligent Transportation Systems Reports and the UPWP FY 2002-2.03, Subtask 3 - Incident Management Report are available at the ACOG office.

Figure 1: OCARTS Area ITS Committee Structure

Representatives reporting back to their respective Agencies

ITS Steering Committee

Agencies to be included:

Oklahoma Department of Transportation (ODOT) - (Planning, Traffic Engineering, and Division 3 and 4)
Federal Highway Administration (FHWA), Association of Central Oklahoma Governments (ACOG)
Department of Public Safety (DPS), Oklahoma Transportation Authority (OTA)
Edmond -, Midwest City -, Moore -, Norman -, and Oklahoma City - Traffic Management
Oklahoma County Emergency Management, and Central Oklahoma Transit and Parking Authority (COTPA)

Function:

Providing overall Guidance for Regional ITS Planning, Provide Consistency with Statewide ITS Plan, Researching Best Practices and Newest Technologies, Identifying Funding Source, Identifying Kickstart Project, Combining, Integrating, and Presenting Results from Advisory Committees, Education of Agency Leaders, Development and Implementation of the ITS Regional Architecture

Products:

Oklahoma City Metropolitan ITS Regional Architecture

Incident Management Subcommittee

Committee Members:

ODOT (Planning, Traffic Engineering, Div. 3&4), ACOG, DPS, City Governments, COTPA, OKC Emergency Management, 911 ACOG, and Fire, Rescue and Law Enforcement

Function:

Short Term

Development of IM and Alternate Route MOUs,
Kickstart Project,
Initiation of "Steer - Clear" Legislation

Long Term

Development of IM Guide to formalize the Incident Management Process

Traveler Information Subcommittee

Committee Members:

ODOT (Planning, Traffic Engineering, Div. 3&4), ACOG, COTPA, University of Oklahoma, Media, Air Quality Team, OK Mesonet, Public Information Offices, OK Dept. of Tourism and Recreation, DPS, etc.

Function:

Public Education Campaign,
Collection, Preparation, and Dissemination of Traveler Information,
Coordination of Information Exchange

Technology and Operations Subcommittee

Committee Members:

ODOT (Planning, Traffic Engineering, Div. 3&4), ACOG, City Engineers, COTPA, and University of Oklahoma

Function:

Development of a Freeway Management System - Conceptual Design, Preparation of the Regional ITS Architecture
System Analysis and Project Level Engineering, Identification of Standards, and Documentation

COMPLIANCE WITH FEDERAL ITS RULES

To better integrate ITS initiatives into the overall metropolitan transportation planning process, the federal government proposed ITS rules in May 2000. These rules consist of several components:

- The **ITS Integration Strategy** – ensures conformity to the National ITS Architecture and Standards for all federally funded projects and supports the development of integrated technology. The Integration Strategy defines key policies and thus guides, manages, and determines funding of ITS investments
- The **Regional ITS Architecture** – provides detailed conceptual designs and operational procedures within the ITS Integration Strategy's vision. It can be developed region-wide or incrementally
- The **Systems Engineering Analysis** and **Project Implementation** – prescribes the use of the systems engineering process to select a project from alternatives accomplishing the same objective, by considering the total project life cycle for technical merit, cost, and responsiveness to customer needs. Systems Engineering Analysis further requires ITS projects to use applicable standards and interoperability tests, as officially adopted by the U.S. DOT

The proposed rules were enacted on April 8, 2001. According to the guidance published alongside these rules, the integration strategy, had to be developed and documented no later than the first update of the long-range transportation plan or the transportation improvement program that occurred two years following the effective date of the final rule. The regional architecture had to be developed four years subsequent to beginning to deploy ITS projects or four years from the effective date of the rule for those areas that are currently deploying ITS projects.

ITS INTEGRATION STRATEGY

It was determined that the ITS Early Deployment Plan fulfills all requirements of the first component of the federal ITS rules and therefore serves as the OCARTS area Integration Strategy. This determination was made during an informal meeting of ODOT, Federal Highway Administration (FHWA), and ACOG staff in early September of 2000. Specific reference to the EDP as the region's Integration Strategy was thereafter included in the 2025 OCARTS Plan.[c]

REGIONAL ITS ARCHITECTURE

During the informal September 2000 meeting with ODOT, FHWA, and ACOG staff, it was also determined that the EDP did not comply with all stated requirements of the second component and, without further enhancements, could not serve as the OCARTS area Regional ITS Architecture.

SYSTEMS ENGINEERING ANALYSIS

The OCARTS area has neither programmed any deployment of ITS nor undertaken the associated Systems Engineering Analysis. However, prior to the implementation of ITS improvements, the systems engineering process will be used to select projects from available alternatives.

[c] The 2025 OCARTS Plan – the Long Range Transportation Plan for the Oklahoma City metropolitan area – was formally adopted by the Intermodal Transportation Policy Committee on September 28, 2000.

DEVELOPMENT OF THE OCARTS REGIONAL ITS ARCHITECTURE

Successful ITS integration and interoperability require addressing both technical as well as institutional integration. "*Technical integration* of electronic systems is a complex issue that requires considerable up-front planning and meticulous execution for electronic information to be stored and accessed by various parts of a system. *Institutional integration* involves coordination between various agencies and jurisdictions to achieve seamless operations and/or interoperability."[d]

Intelligent Transportation Systems "are most effective and cost beneficial when systems are integrated and interoperable. The greatest benefits in terms of safety, efficiency, and costs are realized when electronic systems are systematically integrated to form a whole in which information is shared with all and systems are interoperable." [d]

To achieve institutional integration of systems, transportation agencies must agree on the benefits of ITS and the value of being part of an integrated system. They have to agree on roles, responsibilities, and shared operational strategies. Furthermore, they must agree on standards, technologies and operating procedures to ensure interoperability. The transportation agencies "must be fully committed to achieving institutional integration in order for integration to be successful. They also have to coordinate with agencies for which transportation is a key, but not a primary part of their business, such as emergency management and law enforcement agencies." [d]

To accomplish this kind of integration, OCARTS area stakeholders sought to define the operational and institutional network necessary. Therefore, the following chapter describes the development of the OCARTS area Regional ITS Architecture in detail. It begins with the discussion of the requirements of a regional architecture, followed by a brief review of the EDP in light of these requirements. A description of the Regional ITS Architecture development workshops and associated activities is given. Also included is an example of the typical components of an OCARTS member entity in the region's ITS Architecture.

REQUIREMENTS OF A REGIONAL ITS ARCHITECTURE

"The Regional ITS Architecture represents the development of a local implementation of the National ITS Architecture. The regional architecture is tailored to meet local needs, meaning that it does not address the entire National ITS Architecture and can also address services not included in the National ITS Architecture."[d]

The completion of the Regional ITS Architecture will ensure compliance with the federal ITS rules and serve as the basis for future ITS deployment within the region.

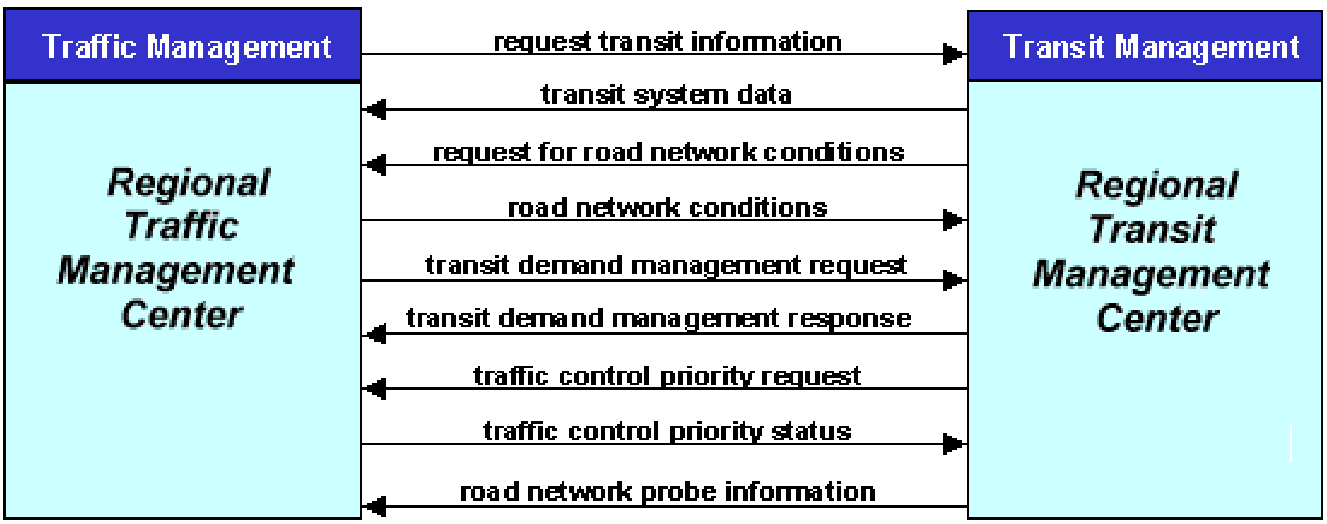
[d] Appendix A: Final Rule on ITS Architecture and Standards Conformity, developed by the Department of Transportation [4910-22-P] Federal Highway Administration, 23 CFR Parts 655 and 940, published in: [FHWA Docket No. FHWA-99-5899] RIN 2125-AE65

The Regional ITS Architecture has to contain the following:

- Description of the region
- Identification of the participating agencies and other stakeholders
- Description of roles and responsibilities of the participating entities
- "Architecture Flow-level"[e] description, including system functional and interface requirements, as defined in the National ITS Architecture, of how agencies, modes, and systems will interact and operate, if the architecture is to fulfill the identified user needs and promote ITS integration within a region
- Agreements needed for integrated operation across jurisdictions[f]
- Identification of applicable standards
- Description of sequence of projects necessary for implementation

To describe the level of detail required in a Regional ITS Architecture the following graphic might be helpful:

Figure 2: Example of Architecture Flows



Adapted from: The National ITS Architecture, Version 4.0, U.S. DOT

The Regional ITS Architecture builds upon the needs, goals, objectives, and ITS system assessment that are described in the region's ITS Integration Strategy. The regional architecture can be developed incrementally, if coordination with all other regional ITS projects is provided.

REVIEW OF THE OCARTS AREA ITS EARLY DEPLOYMENT PLAN

As previously stated, the OCARTS area ITS Early Deployment Plan did not comply with all requirements and could therefore not be used as the Regional ITS Architecture for the Central Oklahoma region.

[e] Architecture Flows, as described by the National ITS Architecture, are technology independent and function oriented to fulfill specific needs. They simply describe "what information" needs to be exchanged and "what functions" need to be performed, but do not prescribe "how" this is to be done.

[f] According to FHWA guidance, the formalization of these types of agreements is at the discretion of the region and participating stakeholders.

It was cooperatively determined by FHWA, ODOT and ACOG staff that the following components were missing and had to be completed, prior to fulfilling all requirements mentioned:

- The function-oriented architecture description, required for a regional architecture, is not contained in the EDP. Instead, the EDP provides only a description of technologies.
- In addition, agreements needed for integrated operation across jurisdictional boundaries are currently neither described nor initiated by the EDP.

REQUEST FOR REGIONAL ITS ARCHITECTURE WORKSHOPS

During the informal meeting with FHWA, ODOT, and ACOG staff in September 2000, it was suggested to utilize "Turbo Architecture" software in the development of the information flow diagrams, using the framework provided by the EDP as the baseline.

FHWA representatives further informed ODOT and ACOG staff of Regional ITS Architecture workshops that would aid in the draft of a regional architecture, as well as introduce the workshop attendees to the use of the Turbo Architecture software. After further research, ODOT, OCARTS area and Tulsa area MPO staff decided to apply for the workshops as part of their respective ITS Service Plan funding applications in FFY 2001.

REGIONAL ITS ARCHITECTURE TIER I WORKSHOP

As discussed during a meeting held in October 2000, ODOT, ACOG and the Indian Nations Council of Governments (INCOG) staff agreed to have one combined Regional ITS Architecture Tier I workshop that would call on stakeholders throughout the state. The purpose of the course was to provide attending entities and agencies with the information needed to begin the development of an ITS blueprint for coordinated ITS improvements in their respective region.

ODOT agreed to host this combined workshop on June 21, 2001. This one-day gathering of statewide transportation professionals introduced participants to the basic steps and concepts necessary to begin development of a regional ITS architecture.

The objectives of the Tier I Architecture workshop were to help participants:

- Understand the need for ITS integration in the local area
- Understand the need for a regional architecture
- Understand the process by which a regional architecture is developed
- Understand how the National ITS Architecture can assist in developing local architectures

The following agencies representing the OCARTS area participated in the Tier I workshop:

- Midwest City and Norman Traffic Management
- Norman Law Enforcement
- Oklahoma Department of Transportation – Planning Division, Traffic Division, Waterways Division, and District 4
- ODOT's Statewide ITS Consultant Team, including PB Farradyne, Transportation Engineering Consultants, and the University of Oklahoma
- Oklahoma Transportation Authority
- Federal Highway Administration – Oklahoma Division Office

The Regional ITS Architecture Tier I workshop called for the description of the planning boundary, the definition of the planning time horizon, the identification of the "Champion" who will lead the effort to develop the regional architecture, as well as the identification of next steps, such as an ITS Infrastructure Survey, necessary to develop a regional architecture.

ITS INFRASTRUCTURE SURVEY

To continue the effort begun with the Tier I workshop, the OCARTS area was expected to accomplish the following tasks with the assistance of the FHWA Division, Resource Center, and/or Headquarters staff:

- Follow through with the next steps outlined in the Tier I Workshop and obtain the needed inventory information identified by the FHWA Architecture Team
- Organize and facilitate additional stakeholder meetings to obtain the information needed to move to the Tier II
- Select a date for the Tier II workshop (usually 4-6 months after the initial Tier I) – contingent upon completion of all preparatory actions

Tasked to complete the Regional ITS Architecture development, the OCARTS area ITS Technology and Operations Subcommittee defined the OCARTS area boundary as the boundaries for the regional architecture and set the planning time horizon to ten years. In close coordination with subcommittee members and with the support of the FHWA sponsored Iteris[g] consultants, ACOG staff developed and sent out surveys to assemble an OCARTS area inventory of existing and planned local systems and transportation services during the month of July 2002. The compilation of the OCARTS area ITS Inventory involved:

- Creation of Stakeholder List
- Customization of survey forms
- Sending surveys and following-up
- Compiling returned information
- Conducting telephone interviews for additional information

[g] Current legislation requires conformance to the National ITS Architecture and Standards. Iteris works closely with FHWA and the U.S. Department of Transportation (USDOT) to develop processes by which regions of the country can develop integrated and interoperable Intelligent Transportation Systems. Iteris assists in the development of regional and project architectures that are consistent with the National ITS Architecture.

The Technology and Operations Subcommittee (TOSC) members assisted agencies within their jurisdiction with the completion of these ITS Surveys. The compiled information was put into a database and prepared for presentation at the subsequent subcommittee meeting, held on August 6, 2001. The committee members reviewed the compiled ITS survey results for completeness and coherency, before proceeding with the presentation of the entire OCARTS area ITS Inventory to the Steering Committee, ITTC, and ITPC. The surveys were grouped by area of interest:

- Freeway Management
- Arterial Traffic Management
- Emergency Management
- Public Transportation
- Regional Traveler Information
- Commercial Vehicle Operations
- Credentialling (of Commercial Vehicles)
- Construction and Maintenance
- Parking Management
- Archive Data
- At-Grade Rail Intersection
- Electronic Tolling

A total of 55 surveys had been sent of which 38 had been returned at the time of the TOSC meeting. TOSC members suggested including further stakeholders to complement the current survey results in the areas of Commercial Vehicle Operations, Credentialling, and Parking Management. ACOG staff agreed to obtain the additional information prior to the presentation of the ITS Inventory to the ITS Steering Committee.

At the August 8, 2001 meeting of the OCARTS area ITS Steering Committee, the OCARTS ITS Inventory was presented. The completed inventory contained information about existing and planned ITS services, needs, and information flows, as compiled by ACOG staff and the Technology and Operations Subcommittee. The Steering Committee reviewed and subsequently authorized the use of the compiled survey results[h] as base data for the development of the Regional ITS Architecture.

The compiled ITS Inventory was sent to the FHWA Architecture team and the Iteris consultants on August 17, 2001, in order to meet the deadline for the Regional ITS architecture Tier II workshop.

The Technology and Operations Subcommittee and Steering Committee members were encouraged to actively participate in the upcoming Regional ITS Architecture Tier II workshop.

REGIONAL ITS ARCHITECTURE TIER II WORKSHOP

The Tier II Architecture workshop was a 3-day event, hosted by ACOG on October 23 - 25, 2001. The objective of the training was to help participants develop a draft version of the regional architecture and to provide stakeholders with enough knowledge and insight to enable them to continue and complete the activity after the workshop.

[h] Ultimately, 48 out of 56 surveys were returned by OCARTS area stakeholders, thus resulting in an overwhelming response rate of 86%.

As initiated earlier by the Regional ITS Architecture Tier I workshop, this hands-on workshop was based on the compiled OCARTS ITS Inventory of existing and planned ITS infrastructure and services. The information was entered into a Turbo Architecture database by the FHWA Architecture Team and Iteris consultants and double-checked by ACOG staff for completeness prior to the actual workshop.

This rough draft of a regional architecture supplied the base for the Tier II "three-day customization" workshop that was attended by local stakeholders and professional city, county, and state staff, responsible for the planning and implementation of ITS improvements. Also invited was staff from local law enforcement agencies, fire departments, and emergency medical services to gain their input on desired integration and information exchange. The following agencies participated:

- Federal Highway Administration
- ODOT Planning Division, Maintenance Division, District 4, and Rail Division
- ODOT's Statewide ITS Consultant Team, PB Farradyne, Traffic Engineering Consultants, and the University of Oklahoma
- Oklahoma Department of Public Safety
- Oklahoma Transportation Authority
- Central Oklahoma Transportation and Parking Authority
- Edmond, Midwest City, Norman and Oklahoma City Traffic Management
- Norman and Oklahoma City Law Enforcement
- Edmond, Norman and Oklahoma City Fire Department
- Norman 911 Communications Center

Involved participants decided what local transportation systems needed to be interconnected to exchange and share information. The workshop resulted in an OCARTS area Regional ITS Architecture draft, consisting of the existing and proposed transportation systems and services, based on the National ITS Architecture, but customized to accommodate specific local needs. The architecture draft existed in electronic form as a Turbo Architecture database.

FINALIZATION OF THE OCARTS AREA REGIONAL ITS ARCHITECTURE

Although, the draft OCARTS area Regional ITS Architecture identified information exchanges, system and interface requirements and defined the roles and responsibilities of the participating agencies, a few loopholes were still present in the draft regional architecture.

FOLLOW-UP INTERVIEWS WITH STAKEHOLDERS AND FINE-TUNING OF ARCHITECTURE

The draft architecture needed to be reviewed for logical errors or erroneous one-way information and data exchanges. To accomplish this task, ACOG staff conducted an extensive flow-by-flow review of the OCARTS area Regional ITS Architecture to validate the connections and interfaces, as well as the "existing" or "planned" status of all included ITS components and services. On several occasions, ACOG staff sought the assistance from stakeholders to gain missing information or to choose between conflicting scenarios

After this all around review, the basic Regional ITS Architecture for the OCARTS area was completed in December 2002[i]. However, maintenance of the regional architecture will be ongoing as new systems or services are planned and implemented. Also, input will be sought from additional stakeholders including, but not limited to the following:

- National Weather Service and MESONET
- Wrecker and Towing Operators
- Highway Safety Office
- Media
- Event Promoters and Large Venues
- Tinker Air Force Base

REGIONAL ITS ARCHITECTURE COMPONENTS OF A MEMBER ENTITY

The basic OCARTS area Regional ITS Architecture was developed with the help of the Turbo Architecture[j] software. As a planning and integration tool, the application utilized user inputs and information from the National ITS Architecture databases to provide tabular and graphical outputs of regional or project architectures.

As previously indicated, the Turbo Architecture tool is not a complete end-to-end solution to fully develop ITS architectures. Stakeholder interaction, gathering local requirements and systems, and operational agreements are required beyond the data, diagrams, and reports that the tool provides. Nonetheless, the graphical depiction of the regional architectures makes the connections and data exchanges between ITS system components easier to follow.

Thus Attachment 1 shows the typical components of a member entity within the OCARTS area Regional ITS Architecture. Shown are the following subsystems, along with their existing and planned information, data, and systems connections:

- Local Municipality Traffic Management
- Local Municipality 911 Dispatch

Also shown is a subset of applicable standards in Attachment 2.[k] The standards prescribe non-proprietary, technical specifications of how the different components exchange data and information. This is especially important in light of the U.S. Department of Transportation (US DOT) ITS Standards Program working toward the widespread use of standards to encourage the interoperability of ITS systems.[l]

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[i] A copy of the OCARTS area Regional ITS Architecture is available at the ACOG office.

[j] Turbo Architecture is a standalone application, however, the data files generated by the software are Microsoft Access-compatible and can be manipulated using Microsoft Access.

[k] Data exchanges/architecture flows are sometimes mapped to several standards because communications protocol, data dictionary, and message set standards are all required to share information between systems. On the other hand, some architecture flows are not mapped to ITS standards at all, because of the use of proprietary or non-ITS (e.g., financial institution) information that is unlikely to be standardized or because the standardization of the particular architecture flow is in its infancy or has not yet begun.

[l] Through cooperative agreements with five Standards Development Organizations (SDO), the Standards Program is accelerating development of about 100 non-proprietary, industry-based, consensus ITS standards, and is encouraging stakeholder participation in the development process.

INTEGRATION WITH STATEWIDE ITS ACTIVITIES

The key-partners in ITS are the Federal Highway Administration, the Oklahoma Department of Transportation and Oklahoma Transportation Authority, the Oklahoma Department of Public Safety, as well as local traffic management, public safety and emergency service personnel.

All ITS activities are therefore closely coordinated with the appropriate federal, state, and local agencies involved in ITS planning and implementation.

INTEGRATION OF THE REGIONAL INTO THE STATEWIDE ITS ARCHITECTURE

In September 2001, the Oklahoma Department of Transportation (ODOT) contracted with a consultant team to begin the development of the statewide Intelligent Transportation Systems and Commercial Vehicle Operations plans and deployment programs.

ACOG is a stakeholder to the statewide ITS efforts and thus ensures close coordination with the OCARTS area ITS activities. Staff assisted in ODOT’s ITS consultant selection by reviewing the initial Request for Proposal (RFP), by participating in the individual interviews with the prospective consultants, as well as by attending Statewide ITS and CVISN meetings.

One of the tasks undertaken by the Statewide ITS consultant team calls for the development of an ITS Implementation Plan for the OCARTS area. This ITS Implementation Plan will define ITS projects, their priority, estimated project costs (both capital and operations), and provide a schedule for implementation. In addition, ODOT’s consultant team will integrate the OCARTS area ITS Implementation Plan into the Statewide ITS Plan. This implementation plan is built on the defined OCARTS area ITS Integration Strategy as outlined in the Early Deployment Plan, as well as on the completed Regional ITS Architecture.

ANTICIPATED FUTURE ITS ACTIVITIES

Since it is believed that ITS will remain critical to effectively combat congestion and incident related traffic problems, strong emphasis will continue to be placed on ITS in the OCARTS area.

CONTINUOUS MAINTENANCE OF THE REGIONAL ITS ARCHITECTURE

Over the past three years, the OCARTS area has been successful in developing the Regional ITS Architecture, the foundation for the deployment of ITS technologies in the region.

Now that the OCARTS area Regional ITS Architecture has been completed, ACOG staff will continue to update and make addition to the regional architecture, as more "players come on board" and as procedural changes dictate. Staff will also oversee the integration of the OCARTS area regional architecture into the Statewide ITS Architecture.

Furthermore, it is planned to begin using the updated software version of Turbo Architecture (2.0), which is supported by the latest national ITS Architecture (4.0). The revise National ITS Architecture includes the latest enhanced "Weather Coverage", created through defining two market packages – "Road Weather Data Collection and Weather Information Processing and Dissemination". To help with the transition, a Turbo Architecture software training course has been requested from the National Highway Institute.

Interagency Operational Agreements and Memoranda of Understanding, as well as standards for interoperability and phasing of projects are among the tasks that remain to be completed before the Regional ITS Architecture will fully comply with federal ITS rules.

OTHER FUTURE ITS ACTIVITIES

The consultant team of PB Farradyne and Traffic Engineering Consultants was hired to develop the OCARTS Area Incident Management Procedures Manual and Resource Guide (IM Guide), which is currently underway. The final IM Guide is anticipated to be completed by the end of year 2003.

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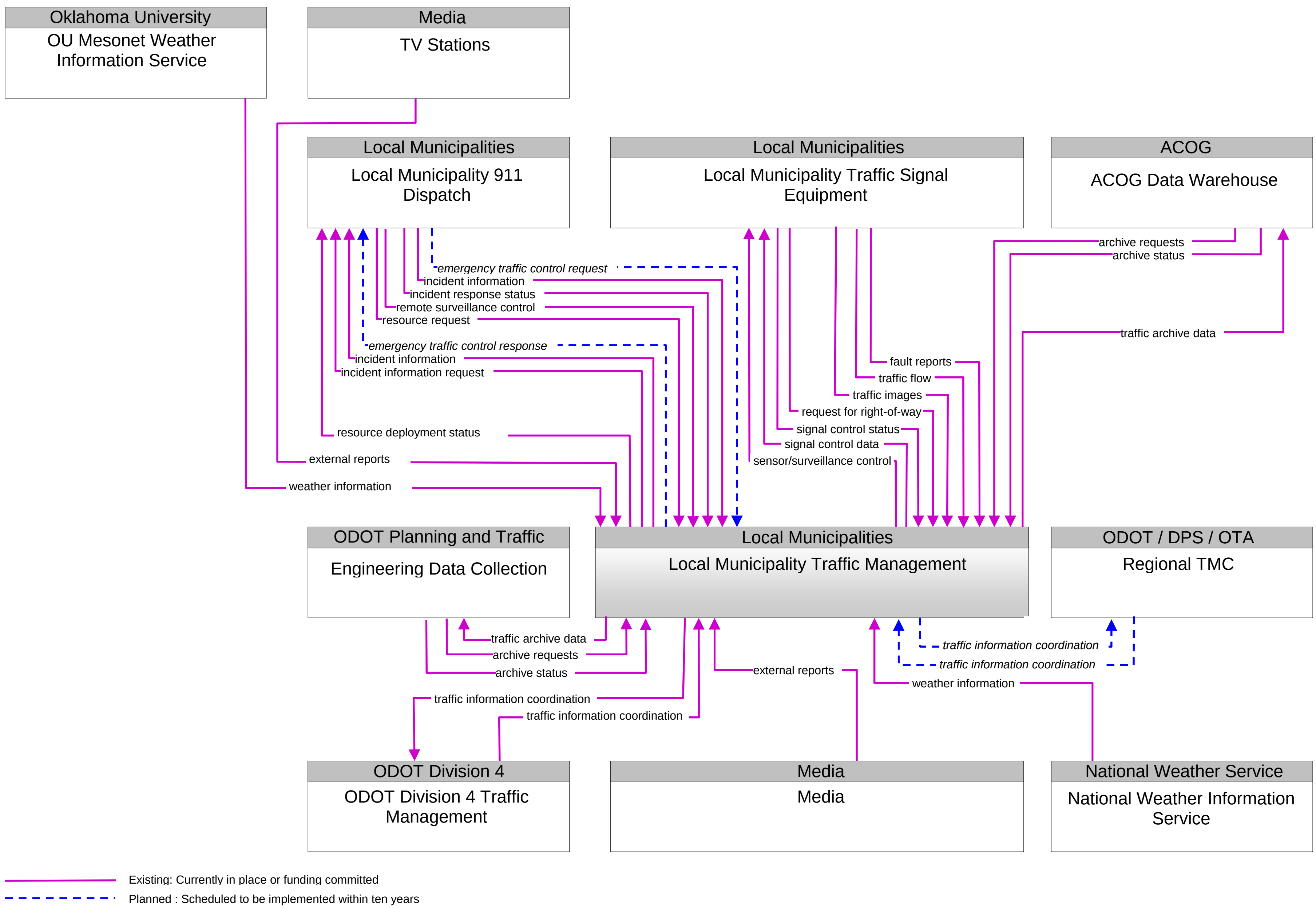
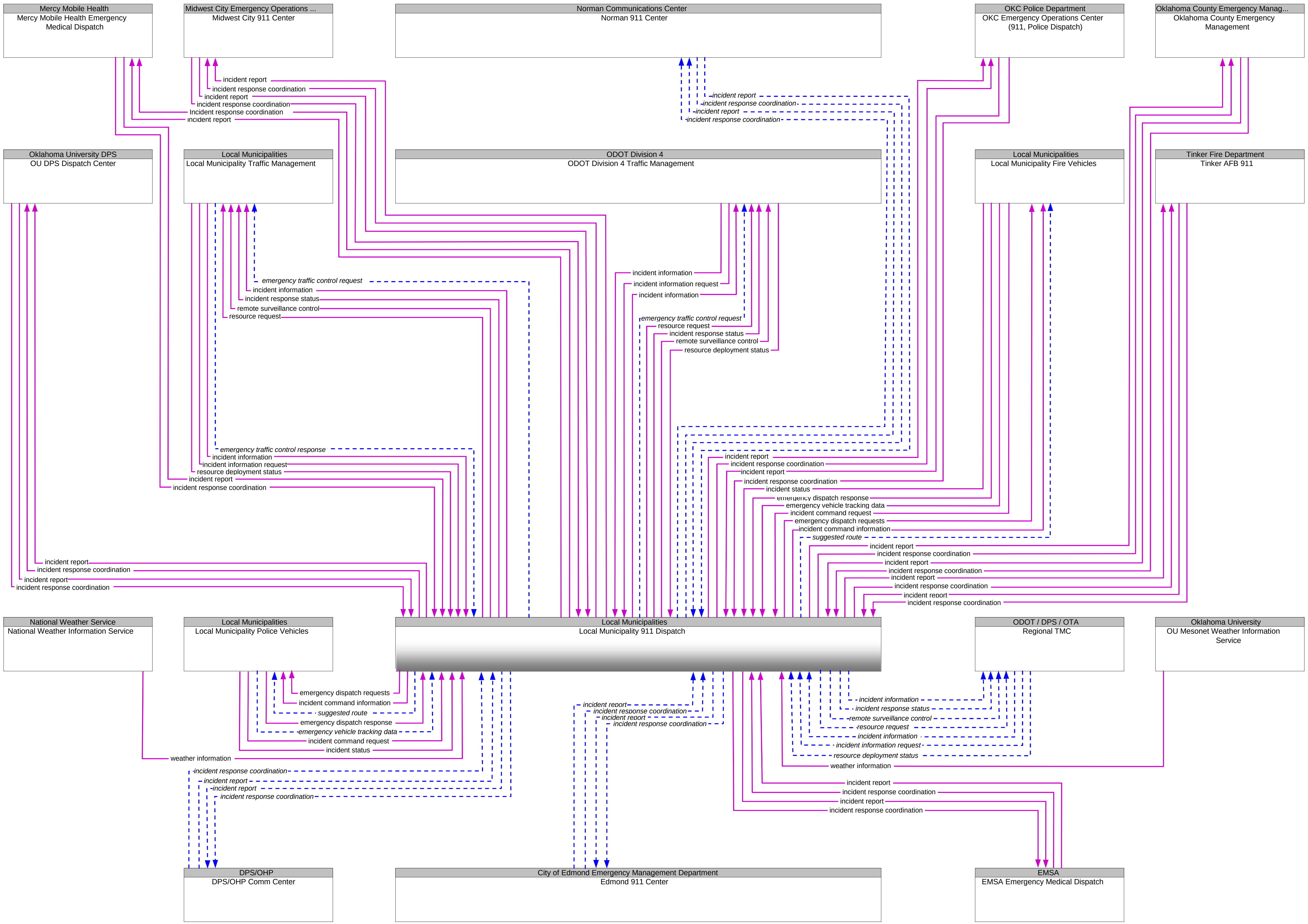
ATTACHMENT 1:
REGIONAL ITS ARCHITECTURE COMPONENTS
OF A MEMBER ENTITY

Abbreviations used in the following diagrams are explained below:

DPS/OHP Comm Center .... Department of Public Safety/Oklahoma Highway Patrol Communications Center
ODOT .... Oklahoma Department of Transportation
OKC .... City of Oklahoma City
OU DPS .... University of Oklahoma, Department of Public Safety
Regional TMC .... Regional Traffic Management Center
Tinker AFB .... Tinker Air Force Base


Oklahoma University
OU Mesonet Weather Information Service
Media
TV Stations
Local Municipalities
Local Municipality 911 Dispatch
Local Municipalities
Local Municipality Traffic Signal Equipment
ACOG
ACOG Data Warehouse
emergency traffic control request
incident information
incident response status
remote surveillance control
resource request
emergency traffic control response
incident information
incident information request
resource deployment status
external reports
weather information
archive requests
archive status
traffic archive data
fault reports
traffic flow
traffic images
request for right-of-way
signal control status
signal control data
sensor/surveillance control
ODOT Planning and Traffic
Engineering Data Collection
Local Municipalities
Local Municipality Traffic Management
ODOT / DPS / OTA
Regional TMC
traffic archive data
archive requests
archive status
traffic information coordination
traffic information coordination
external reports
weather information
traffic information coordination
traffic information coordination
ODOT Division 4
ODOT Division 4 Traffic Management
Media
Media
National Weather Service
National Weather Information Service
Existing: Currently in place or funding committed
Planned : Scheduled to be implemented within ten years



Mercy Mobile Health
Mercy Mobile Health Emergency Medical Dispatch
Midwest City Emergency Operations ...
Midwest City 911 Center
Norman Communications Center
Norman 911 Center
OKC Police Department
OKC Emergency Operations Center (911, Police Dispatch)
Oklahoma County Emergency Manag...
Oklahoma County Emergency Management
Oklahoma University DPS
OU DPS Dispatch Center
Local Municipalities
Local Municipality Traffic Management
ODOT Division 4
ODOT Division 4 Traffic Management
Local Municipalities
Local Municipality Fire Vehicles
Tinker Fire Department
Tinker AFB 911
National Weather Service
National Weather Information Service
Local Municipalities
Local Municipality Police Vehicles
Local Municipalities
Local Municipality 911 Dispatch
ODOT / DPS / OTA
Regional TMC
Oklahoma University
OU Mesonet Weather Information Service
DPS/OHP
DPS/OHP Comm Center
City of Edmond Emergency Management Department
Edmond 911 Center
EMSA
EMSA Emergency Medical Dispatch
incident report
incident response coordination
emergency traffic control request
emergency traffic control response
incident information
incident information request
incident response status
remote surveillance control
resource request
resource deployment status
emergency dispatch response
emergency dispatch requests
emergency vehicle tracking data
incident command request
incident command information
incident status
suggested route
weather information

ATTACHMENT 2: EXCERPT OF RELEVANT STANDARDS ACTIVITIES

LEAD SDO	STANDARD NAME	DOCUMENT ID
AASHTO	**Simple Transportation Management Framework (STMF)**	**NTCIP 1101**

Supports interfaces:

Source: Local Municipality Traffic Management — **Destination: Local Municipality Traffic Signal Equipment**

Flow: sensor and surveillance control

Flow: signal control data

Source: Local Municipality Traffic Signal Equipment — **Destination: Local Municipality Traffic Management**

Flow: fault reports

Flow: request for right-of-way

Flow: signal control status

Flow: traffic flow

LEAD SDO	STANDARD NAME	DOCUMENT ID
AASHTO	**Simple Transportation Management Protocol (STMP)**	**NTCIP 1103**

Supports interfaces:

Source: Local Municipality Traffic Management — **Destination: Local Municipality Traffic Signal Equipment**

Flow: sensor and surveillance control

Flow: signal control data

Source: Local Municipality Traffic Signal Equipment — **Destination: Local Municipality Traffic Management**

Flow: fault reports

Flow: request for right-of-way

Flow: signal control status

Flow: traffic flow

Source: Local Municipality Traffic Management — **Destination: Local Municipality Traffic Signal Equipment**

Flow: sensor and surveillance control

Flow: signal control data

Source: Local Municipality Traffic Signal Equipment — **Destination: Local Municipality Traffic Management**

Flow: fault reports

Flow: signal control status

Flow: traffic flow

AASHTO — Object Definitions for Actuated Traffic Signal Controller Units — NTCIP 1202

Supports interfaces:

Source: Local Municipality Traffic Management — **Destination: Local Municipality Traffic Signal Equipment**

Flow: signal control data

Source: Local Municipality Traffic Signal Equipment — **Destination: Local Municipality Traffic Management**

Flow: signal control status

AASHTO — Object Definitions for Environmental Sensor Stations & Roadside Weather Information System — NTCIP 1204

Supports interfaces:

Source: Local Municipality Traffic Management — **Destination: Local Municipality Traffic Signal Equipment**

Flow: sensor and surveillance control

IEEE — Security/Privacy of Vehicle/RS Communications including Smart Card Communications — IEEE P1556

Supports interfaces:

Source: EMSA Ambulances — **Destination: Local Municipality Traffic Signal Equipment**

Flow: local signal preemption request

Source: Local Municipality Fire Vehicles — **Destination: Local Municipality Traffic Signal Equipment**

Flow: local signal preemption request

Source: Local Municipality Fire Vehicles — **Destination: Midwest City Traffic Operations Signal Equipment**

Flow: local signal preemption request

Source: Local Municipality Fire Vehicles — **Destination: Norman Traffic Operations Signal Equipment**

Flow: local signal preemption request

Source: Local Municipality Fire Vehicles — **Destination: OKC Traffic Management Division Signal Equipment**

Flow: local signal preemption request

Supports interfaces:

Source: DPS/OHP Comm Center	**Destination: Local Municipality 911 Dispatch**
Flow: incident response coordination	
Source: EMSA Emergency Medical Dispatch	**Destination: Local Municipality 911 Dispatch**
Flow: incident response coordination	
Source: Midwest City 911 Center	**Destination: Local Municipality 911 Dispatch**
Flow: incident response coordination	
Source: Moore 911 Center	**Destination: Local Municipality 911 Dispatch**
Flow: incident response coordination	
Source: Norman 911 Center	**Destination: Local Municipality 911 Dispatch**
Flow: incident response coordination	
Source: OKC Emergency Operations Center (911, Police Dispatch)	**Destination: Local Municipality 911 Dispatch**
Flow: incident response coordination	
Source: Oklahoma County Emergency Management	**Destination: Local Municipality 911 Dispatch**
Flow: incident response coordination	
Source: Tinker AFB 911	**Destination: Local Municipality 911 Dispatch**
Flow: incident response coordination	

Abbreviations:

AASHTO - American Association of State Highway & Transportation Officials

NTCIP - National Transportation Communications for ITS Protocol

IEEE - Institute of Electrical and Electronics Engineers

RS Communication - Roadside Communication

ITE - Institute of Transportation Engineers

TCIP - Transit Communications Interface Profile

SDO - Standards Development Organization

SP - Spatial Representation

For further information on ITS Standards, visit: www.its-standards.net.