CHAMPAIGN-URBANA-SAVOY REGIONAL ITS ARCHITECTURE

FINAL REPORT

March 2005

Prepared by:

CUUATS
Champaign-Urbana Urbanized Area Transportation Study
A Program of the Champaign County Regional Planning Commission
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Prepared by:
Staff at the Champaign Urbana Urbanized Area Transportation Study (CUUATS)
A program of the Champaign County Regional Planning Commission (CCRPC)

In cooperation with CUUATS member agencies:
Champaign County
Champaign Urbana Mass Transit District
City of Champaign
City of Urbana
Illinois Department of Transportation
University of Illinois at Urbana-Champaign
Village of Savoy

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<th>Acronym</th>
<th>Description</th>
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<tr>
<td>AD</td>
<td>Archived Data Management</td>
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<td>APC</td>
<td>Automated Passenger Counters</td>
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<td>APTS</td>
<td>Advanced Public Transportation System</td>
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<td>AMESC</td>
<td>Arrow Medical Emergency Service Communication</td>
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<td>ATIS</td>
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<td>ATMS</td>
<td>Advanced Traffic Management System</td>
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<td>AVL</td>
<td>Automated Vehicle Location</td>
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<td>Computer Aided Dispatch</td>
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<td>Champaign County Regional Planning Commission</td>
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<td>Closed Circuit Television</td>
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<td>Champaign Urbana Mass Transit District</td>
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<td>CUSUA</td>
<td>Champaign Urbana Savoy Urbanized Area</td>
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<td>CUUATS</td>
<td>Champaign-Urbana Urbanized Area Transportation Study</td>
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<td>Commercial Vehicle Operations</td>
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<td>Data Transmission Network</td>
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<td>Dynamic Message Signs</td>
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<td>EM</td>
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<td>Emergency Services and Disaster Agency</td>
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<td>Federal Aviation Administration</td>
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<td>Federal Highway Administration</td>
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<tr>
<td>FTA</td>
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<td>FTP</td>
<td>File Transfer Protocol</td>
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<td>GPS</td>
<td>Global Positioning System</td>
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<td>Hazardous Materials</td>
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<td>ITS</td>
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<td>MCM</td>
<td>Maintenance and Construction Management</td>
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<td>PRO</td>
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<td>VMS</td>
<td>Variable Message Sign</td>
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<td>WZ</td>
<td>Work Zone</td>
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INTRODUCTION

Intelligent Transportation Systems, or ITS, is the use of intelligent systems for the management of transportation. Intelligent systems range from coordinated signal systems to remote monitoring and control. Architecture is a framework under which these systems are coordinated. The National ITS architecture defines ITS architecture as

“an architecture of interrelated systems that work together to deliver transportation services. An ITS architecture defines how systems functionally operate and the interconnection of information exchanges that must take place between these systems to accomplish transportation services.”

The purpose of ITS architecture plan is to provide a common framework for planning and integration of different transportation services in the region. It covers a wide spectrum of fields, from transportation management to emergency management. The current ITS architecture system has 4 levels:

- National Architecture
  - State Architectures
    - Regional Architectures
      - Project Architectures

The national ITS architecture is already in place. The state of Illinois is currently developing the state ITS architecture. The regional architecture applies to the Champaign-Urbana-Savoy urbanized area. This architecture will become part of the state architecture, which will become integrated into the national architecture. This integration will enable a coordinated and effective implementation of ITS projects on regional, state and national levels.

NEED FOR A REGIONAL ITS ARCHITECTURE PLAN

The goal of this effort is to develop a Regional ITS Architecture for the Champaign-Urbana-Savoy region in accordance with Federal Highway Administration (FHWA) and Federal Transit Administration (FTA) policies. The FHWA Rule and FTA Policy require that a region that is currently implementing ITS projects must develop a Regional ITS Architecture to guide their deployment by April 8, 2005. Regions without ITS will have to meet this requirement within four years of their first ITS project advancing to final design. The National ITS Architecture is used as a resource in developing the regional architecture.

METHODOLOGY

The Regional ITS Architecture Development Process Guidance Document created by the Federal Highway Administration outlines a systems engineering process for developing a regional ITS architecture that incorporates the following steps, as illustrated in the figure below.
At this time, the scope of this document focuses upon the first three steps in the architecture development process, these steps are:

**Step 1 – Get Started**: Any regional ITS architecture must begin with a focus on the institutions and people involved within the region and its borders. As the regions are defined both in time and space and the champion who will oversee the development are designated, the relevant stakeholders can be identified and the overall development effort planned to build a consensus based regional ITS architecture.

**Step 2 – Gather Data**: At this step, the existing and planned ITS systems in the region are inventoried, the roles and responsibilities of each stakeholder in developing, operating, and maintaining these ITS systems are defined, the ITS services that should be provided in the region are identified, and the contribution (in terms of functionality) that each system will make to provide these ITS services is documented.
Step 3 – Define Interfaces: Once the region’s ITS systems are identified and functionally defined, the existing and planned interfaces between these systems are then defined. The interconnects between systems at the highest level of information exchange are identified. Then, each interconnect is decomposed so that the information to be exchanged is defined.

The regional ITS architecture development process results in either a specific ITS project or a series of integrated, interoperable projects. The ITS architecture is a living document that will facilitate collaboration, integration, and interoperability between agency systems.

PROJECT OUTREACH

An initial list of 41 stakeholders was created for the region. A survey was mailed to all the stakeholders prior to the first workshop. At the first workshop, staff and stakeholders discussed the ITS process, and what their involvement would be in creating the architecture. After the first workshop, the list of stakeholders was narrowed down to 29, and a system inventory was conducted to identify existing and planned ITS systems for each agency.

After the first workshop, an Architectural Questionnaire was designed and mailed to all stakeholders on the list. Responding agencies had their data entered into the database and the resulting database reports were discussed with the main stakeholders. Formal and informal interviews of key stakeholders followed. A second workshop was held to discuss all the information provided and approve steps 1, 2 and 3 of the Regional ITS architecture.

GEOGRAPHIC BOUNDARY, TIME HORIZON AND SCOPE OF SERVICES

The ITS architecture has to be defined in terms of geographic outreach, time horizon and scope of services.

The geographic boundary for the regional ITS architecture is determined by the geographic jurisdiction of the core stakeholders, the metropolitan planning area, interaction with surrounding regional architectures, and scope of services to be provided. The core stakeholders involved in this project are the public works agencies of Champaign, Urbana and Village of Savoy, the University of Illinois, the law enforcement agencies and the emergency response agencies. Considering that there are no significant ITS elements in the surrounding regions, the geographic extent of this architecture was based on the metropolitan planning area and the geographic jurisdiction of the core stakeholders. The Regional ITS architecture for Region 3 in the state of Illinois is comprised of the Champaign-Urbana-Savoy urbanized area. The following map shows the geographic extent of the area covered by this architecture plan.

The time horizon is based on the planned and future projects and needs of the region. Typically, a time horizon of 5 to 15 years is set for a regional ITS architecture. For the Champaign County regional ITS architecture, a time horizon of 10 years, through 2015, was chosen. During this time period, the transportation needs of the region are expected to be focused on specific areas, and will not likely experience significant changes in terms of ITS.
The scope of services for this region is basic traffic, transit and emergency management, with future opportunities in data management and traffic information dissemination.

Figure 2: Geographic Boundary of the Regional ITS Architecture

STAKEHOLDERS

Stakeholders are agencies that own or operate elements that will be a part of the transportation system or involved in emergency management. Stakeholders can be transportation agencies, transit agencies, planning organizations, public safety agencies, fleet operators, travelers, private sectors, and other agencies such as universities and school districts. The number and the involvement of the stakeholders depends on the size of the region and the extent of the ITS architecture. For the Champaign-Urbana-Savoy regional ITS architecture, the major stakeholders were chosen from transportation agencies, transit agencies, public safety agencies, planning organizations and other agencies. The following list gives a list of stakeholders for this architecture:

Transportation Agencies

1. Champaign County Highway Department
Champions are the lead agencies in the development of regional ITS architecture. A champion should have knowledge of the ITS architecture in general and the existing and future scope of ITS projects for the region. A champion should also be part of the stakeholder list. The role of the champion(s) involves collection of data for the regional ITS architecture, development of the architecture, coordinating the different agencies involved in the
architecture and also maintaining the architecture. For the Champaign-Urbana Savoy Regional ITS architecture, CUUATS, a program of the Champaign County Regional Planning Commission, has been identified as the champion. IDOT District 5 has been identified as a future architecture champion.

INVENTORY SYSTEMS

Inventory systems refers to the physical elements owned or operated by the stakeholders that could be tools in the transportation and emergency services, and therefore become part of the ITS architecture plan. CUUATS conducted workshops and surveys among the stakeholders to identify the relevant inventory items and whether they are currently available, planned, or potential future resources in the region. The complete list of elements for each stakeholder, their national ITS architecture entity mapping and their status is given in appendix ‘A’. Three different inventory statuses were used to categorize the elements. The inventory statuses used were:

- **Existing** – this element currently exists and is functional
- **Planned** – this element is planned but not yet functional
- **Future** – this element is considered to be a good addition to the inventory

MARKET PACKAGES

Market packages are services that the different stakeholders provide for the region. The market packages terminology is part of the national ITS architecture. It is also referred to as ITS services. The list of ITS services for the region was arrived at based on the workshops and the surveys conducted by CUUATS, and they are shown in Figure 3. The national ITS architecture has a predefined list of market packages under which the regional ITS services are classified. The following list gives the different market packages as defined by the national ITS architecture. Appendix ‘B’ gives a complete list of market packages and their status.

OPERATIONAL CONCEPTS

Based on the user needs and the market packages, seven roles and responsibility areas are identified for the ‘Champaign Urbana Savoy Urbanized Area (CUSUA) Regional ITS Architecture’. The following list identifies the roles and responsibility areas:

1. Archived Data Systems for CUSUA
2. Emergency Management for CUSUA
3. Incident Management for CUSUA
4. Maintenance and Construction Management for CUSUA
5. Surface Street Management for CUSUA
6. Transit Services for CUSUA
7. Traveler Information for CUSUA
The market packages and stakeholders involved in each area and the roles and responsibilities of each stakeholder are discussed below.

1. Archived Data Systems for CUSUA
This area of operation involves the collection and storage of traffic data for the purpose of planning, research and analysis.

<table>
<thead>
<tr>
<th>Service Area</th>
<th>Market Package Name</th>
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<tbody>
<tr>
<td>Archived Data Management</td>
<td>ITS Data Mart</td>
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<td></td>
<td>ITS Data Warehouse</td>
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<tr>
<td>Public Transportation</td>
<td>Transit Vehicle Tracking</td>
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<td></td>
<td>Transit Fixed Route Operations</td>
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<td>Demand Response Transit Operations</td>
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<td>Transit Passenger and Fare Management</td>
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<td>Transit Security</td>
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<td>Transit Maintenance</td>
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<td></td>
<td>Transit Traveler information</td>
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<tr>
<td>Traveler Information</td>
<td>Broadcast Traveler Information</td>
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<td></td>
<td>Interactive Traveler Information</td>
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<tr>
<td>Traffic Management</td>
<td>Network Surveillance</td>
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<td>Surface Street Control</td>
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<td>Freeway Control</td>
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<td></td>
<td>Traffic Information Dissemination</td>
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<td>Traffic Incident Management System</td>
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<td>Standard Railroad Grade Crossing</td>
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<td></td>
<td>Advanced Railroad Grade Crossing</td>
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<td>Speed Monitoring</td>
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<tr>
<td>Emergency Management</td>
<td>Emergency Call-Taking and Dispatch</td>
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<td></td>
<td>Emergency Routing</td>
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<td></td>
<td>Roadway Service Patrols</td>
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<td>Transportation Infrastructure Protection</td>
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<td></td>
<td>Wide-Area Alert</td>
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<td></td>
<td>Disaster Response and Recovery</td>
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<tr>
<td></td>
<td>Evacuation and Reentry Management</td>
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</tbody>
</table>
Champaign-Urbana-Savoy Regional ITS Architecture

Figure 3: Market Packages Currently Applicable to the Regional ITS Architecture

**Market packages**
- Champaign County ITS Data Mart
- Savoy ITS Data Mart
- Urbana ITS Data Mart
- Champaign ITS Data Mart
- ITS Data Warehouse

**Stakeholders**
- Champaign County Highway Department
- Champaign County Regional Planning Commission
- City of Champaign Public Works
- City of Urbana Public Works
- Village of Savoy Public Works

**Roles and Responsibilities**

**Champaign County Highway Department**
- Shall collect traffic counts on the county highways
- Shall collect speed data on the county highways
- Shall archive the collected data for planning, research and analysis purposes
- Shall share collected data with other agencies for planning, research, analysis
- Shall share collected data with other agencies for further archiving

**Champaign County Regional Planning Commission**
- Shall collect traffic counts in the Champaign Urbana Savoy Urbanized area
- Shall archive the collected data for planning, research and analysis purposes
- Shall share the archived data with other agencies for planning, research and analysis purposes
- Shall collect archived data from other public works agencies
- Shall provide a central archive for traffic data for the Champaign Urbana Savoy urbanized area

**City of Champaign Public Works**
- Shall collect traffic counts on the City of Champaign roadways
- Shall archive the collected data for planning, research and analysis purposes
• Shall share the archived data with other agencies for planning, research and analysis
• Shall share collected data with other agencies for further archiving

City of Urbana Public Works
• Shall collect traffic counts on the City of Urbana roadways
• Shall archive the collected data for planning, research and analysis purposes
• Shall share the archived data with other agencies for planning, research and analysis
• Shall share collected data with other agencies for further archiving

Village of Savoy Public Works
• Shall collect traffic counts in the on the Village of Savoy roadways
• Shall archive the collected data for planning, research and analysis purposes
• Shall share the archived data with other agencies for planning, research and analysis
• Shall share collected data with other agencies for further archiving

2. Emergency Management for CUSUA
This area of operation deals with emergency call taking, emergency routing, disaster response, evacuation and reentry management and traffic control during emergencies.

**Market Packages**
• METCAD Emergency Call-Taking and Dispatch
• ISP Emergency Call-Taking and Dispatch
• Pro Emergency Call-Taking and Dispatch
• Arrow Emergency Call-Taking and Dispatch
• ISP Emergency Call-Taking and Dispatch
• ISP Emergency Routing
• Arrow Emergency Routing
• METCAD Emergency Routing
• ISP Emergency Routing
• Pro Emergency Routing
• Roadway Service Patrols
• Transportation Infrastructure Protection
• Wide Area Alert
• Disaster Response and Recovery
• Evacuation and Reentry Management

**Stakeholders**
• Ambulances
  - Arrow Ambulance
  - Pro Ambulance
• Champaign County ESDA
• Champaign County Highway Department
• Champaign County METCAD
• Champaign County Regional Planning Commission
• Champaign-Urbana Mass Transit District
• City of Champaign Public Works
• City of Urbana Public Works
• Fire Departments
  - Champaign Fire Department
  - Savoy Fire Department
  - Urbana Fire Department
• Hospitals
  - Carle Hospital
  - Provena Convenant
• Illinois Department of transportation
• Law Enforcement
  - Champaign County Sheriff Department
  - Champaign Police Department
  - Illinois State Police D-10 Pesotum
  - Urbana Police Department
  - UofI Police Department
• Unified Command
• University of Illinois
• Village of Savoy Public Works

Roles and Responsibilities

Ambulances
• Shall provide the call taking facility for emergency medical response
• Shall provide emergency routing for ambulances
• Shall coordinate with hospitals
• Shall assist in the implementation of emergency response plans
• Shall coordinate with other emergency response agencies

Champaign County ESDA
• Shall provide a emergency operations center
• Shall provide coordinated communications between emergency response agencies

Champaign County Highway Department
• Shall provide traffic control strategies during emergencies
• Shall assist in the implementation of emergency response plans
• Shall coordinate with emergency response agencies

Champaign County METCAD
• Shall provide the 9-1-1 service for the Champaign Urbana Savoy Urbanized area
• Shall provide dispatch services for the law enforcement and fire department agencies
• Shall provide emergency routing for response vehicles
• Shall update maps for emergency dispatch and routing
• Shall assist in the implementation of emergency response plans
• Shall coordinate with other emergency response agencies

Champaign County Regional Planning Commission
• Shall provide updated maps to METCAD for emergency dispatch and routing
• Shall provide wide-area alerts, disaster and evacuation information through information systems

Champaign Urbana Mass-Transit District
• Shall provide transit vehicles for evacuation of people during an emergency
• Shall coordinate with emergency response agencies
• Shall assist in the implementation of emergency response plans
• Shall provide wide-area alerts, disaster and evacuation information through information systems

City of Champaign Public Works
• Shall provide traffic control strategies during emergencies
• Shall assist in the implementation of emergency response plans
• Shall coordinate with emergency response agencies
• Shall provide wide-area alerts, disaster and evacuation information through information systems

City of Urbana Public Works
• Shall provide traffic control strategies during emergencies
• Shall assist in the implementation of emergency response plans
• Shall coordinate with emergency response agencies
• Shall provide wide-area alerts, disaster and evacuation information through information systems

Fire Departments
• Shall provide emergency fire response for the Champaign Urbana Savoy Urbanized area
• Shall coordinate with other emergency response agencies
• Shall assist in the implementation of emergency response plans

Hospitals
• Shall provide emergency medical care
• Shall coordinate care facility status with emergency response agencies
Illinois Department of Transportation
- Shall provide traffic control strategies during emergencies
- Shall assist in the implementation of emergency response plans
- Shall coordinate with emergency response agencies
- Shall provide wide-area alerts, disaster and evacuation information through information systems

Law Enforcement
- Shall provide emergency response for the Champaign Urbana Savoy Urbanized area
- Shall provide traffic control during emergencies
- Shall coordinate with other emergency response agencies
- Shall assist in the implementation of emergency response plans
- Shall provide wide-area alerts, disaster and evacuation information to other agencies

Unified Command
- Shall provide a central command for operations during emergencies
- Shall coordinate the emergency response agencies and public works agencies

University of Illinois
- Shall provide traffic control strategies during emergencies
- Shall assist in the implementation of emergency response plans
- Shall coordinate with emergency response agencies
- Shall provide wide-area alerts, disaster and evacuation information through information systems

Village of Savoy public Works
- Shall provide traffic control strategies during emergencies
- Shall monitor chemical sensors in the Village of Savoy area
- Shall assist in the implementation of emergency response plans
- Shall coordinate with emergency response agencies
- Shall provide wide-area alerts, disaster and evacuation information through information systems

3. Incident Management for CUSUA
This area of operation deals with roadway incident monitoring, response and traffic control.

Market Packages
- Urbana Traffic Incident Management System
- Champaign traffic Incident Management System

Stakeholders
- Champaign Fire Department
- Champaign Police Department
Roles and Responsibilities

Champaign Fire Department
• Shall provide emergency response during roadway incidents
• Shall coordinate with Champaign Police Department

Champaign Police Department
• Shall provide emergency response during roadway incidents
• Shall coordinate with City of Champaign Public Works and Champaign Fire Department
• Shall provide traffic control during incidents

City of Champaign Public Works
• Shall provide traffic surveillance for incidents through CCTV cameras
• Shall provide traffic control strategies during incidents
• Shall provide roadway maintenance response for incidents
• Shall coordinate with Champaign Police Department

Urbana Fire Department
• Shall provide emergency response during roadway incidents
• Shall coordinate with Urbana Police Department

Urbana Police Department
• Shall provide emergency response during roadway incidents
• Shall coordinate with City of Urbana Public Works and Urbana Fire Department
• Shall provide traffic control during incidents

City of Champaign Public Works
• Shall provide traffic surveillance for incidents through CCTV cameras
• Shall provide traffic control strategies during incidents
• Shall provide roadway maintenance response for incidents
• Shall coordinate with Urbana Police Department

4. Maintenance and Construction for CUSUA
This area of operation deals with the maintenance and construction operation of the roadways, work zone management and winter maintenance.

Market Packages
• Maintenance and Construction Vehicle and Equipment tracking
• Champaign Winter Maintenance
• UofI Winter Maintenance
• Urbana Winter Maintenance
• Champaign County Winter Maintenance
• Savoy Winter Maintenance
• IDOT Winter Maintenance
• Champaign Roadway Maintenance and Construction
• UofI Roadway Maintenance and Construction
• Urbana Roadway Maintenance and Construction
• Champaign County Roadway Maintenance and Construction
• Savoy Roadway Maintenance and Construction
• IDOT Roadway Maintenance and Construction
• Savoy Work Zone Management
• Urbana Work Zone Management
• IDOT Work Zone Management
• Champaign County Work Zone Management
• UofI Work Zone Management
• Champaign Work Zone Management
• Savoy Maintenance and Construction Activity Coordination
• Champaign Maintenance and Construction Activity Coordination
• Champaign County Maintenance and Construction Activity Coordination
• Urbana Maintenance and Construction Activity Coordination
• IDOT Maintenance and Construction Activity Coordination
• UofI Maintenance and Construction Activity Coordination

Stakeholders
• Champaign County Highway Department
• City of Champaign Public Works
• City of Urbana Public Works
• Illinois Department of Transportation
• University of Illinois
• Village of Savoy Public Works

Roles and Responsibilities
Champaign County Highway Department
• Shall provide snow removal for Champaign county highways
• Shall provide roadway maintenance and construction for Champaign County highways
• Shall respond to requests from emergency agencies for snow removal, roadway maintenance and construction
• Shall manage work zone traffic through the use of work zone signs and speed trailers
• Shall share snow removal, roadway maintenance and construction schedules with other highway, public works, transit and emergency agencies

City of Champaign Public Works
• Shall provide snow removal for city of Champaign roadways
• Shall provide roadway maintenance and construction for the City of Champaign roadways
• Shall track maintenance and construction vehicle location
• Shall respond to requests from emergency agencies for snow removal, roadway maintenance and construction
• Shall manage work zone traffic through the use of work zone signs and VMS
• Shall share snow removal, roadway maintenance and construction schedules with other highway, public works, transit and emergency agencies

City of Urbana Public Works
• Shall provide snow removal for the City of Urbana roadways
• Shall provide roadway maintenance and construction for the City of Urbana roadways
• Shall respond to requests from emergency agencies for snow removal, roadway maintenance and construction
• Shall manage work zone traffic through the use of work zone signs and VMS
• Shall share snow removal, roadway maintenance and construction schedules with other highway, public works, transit and emergency agencies

Illinois Department of Transportation
• Shall provide snow removal for IDOT roadways
• Shall provide roadway maintenance and construction for IDOT roadways
• Shall respond to requests from emergency agencies for snow removal, roadway maintenance and construction
• Shall manage work zone traffic through the use of work zone signs and VMS
• Shall share snow removal, roadway maintenance and construction schedules with other highway, public works and emergency agencies

University of Illinois
• Shall provide snow removal for University of Illinois roadways
• Shall provide roadway maintenance and construction for University of Illinois roadways
• Shall respond to requests from emergency agencies for snow removal, roadway maintenance and construction
• Shall manage work zone traffic through the use of work zone signs and VMS
• Shall share snow removal, roadway maintenance and construction schedules with other highway, public works, transit and emergency agencies

Village of Savoy Public Works
• Shall provide snow removal for the Village of Savoy roadways
• Shall provide roadway maintenance and construction for the Village of Savoy roadways
• Shall respond to requests from emergency agencies for snow removal, roadway maintenance and construction
• Shall manage work zone traffic through the use of work zone signs
• Shall share snow removal, roadway maintenance and construction schedules with other highway, public works, transit and emergency agencies

5. Surface Street Management for Champaign County
This area of operation deals with traffic monitoring and control, and traffic equipment monitoring and control.

Market Packages
• Urbana Network Surveillance
• UofI Network Surveillance
• Champaign Network Surveillance
• Savoy Network Surveillance
• Champaign County Network Surveillance
• IDOT Network Surveillance
• Champaign Surface Street Control
• Savoy Surface Street Control
• Urbana Surface Street Control
• UofI Surface Street Control
• Champaign County Surface Street Control
• IDOT Surface Street Control
• Urbana Traffic Information Dissemination
• IDOT Traffic Information Dissemination
• Champaign Traffic Information Dissemination
• Standard Railroad Grade Crossing
• Advanced Railroad Grade Crossing

Stakeholders
• Champaign County Highway Department
• City of Champaign Public Works
• City of Urbana Public Works
• Illinois Department of Transportation
• University of Illinois
• Village of Savoy Public Works

Roles and Responsibilities
Champaign County Highway Department
• Shall monitor traffic flow and speeds on the Champaign County highways
• Shall monitor the status of traffic control equipment on Champaign County roadways
• Shall control traffic counters, speed trailers and speed study equipment on Champaign County roadways

City of Champaign Public Works
• Shall monitor traffic flow and speeds on the City of Champaign roadways
• Shall monitor the status of traffic signals, detectors, counters, CCTV cameras and VMS equipment on the City of Champaign roadways
• Shall control traffic signals, detectors, counters, CCTV cameras and VMS on the City of Champaign roadways

City of Urbana Public Works
• Shall monitor traffic flow and speeds on the City of Champaign roadways
• Shall monitor the status of traffic signals, detectors, counters, CCTV cameras and VMS on the City of Urbana roadways
• Shall control traffic signals, detectors, counters, CCTV cameras and VMS on the City of Champaign roadways

Illinois Department of Transportation
• Shall monitor traffic flow and speeds on the IDOT roadways
• Shall monitor the status of traffic signals, detectors, counters and VMS equipment on the IDOT roadways
• Shall control traffic signals, detectors, counters, CCTV cameras and VMS on IDOT roadways
• Shall monitor railroad intersection operations
• Shall monitor the status of railroad intersection equipment
• Shall control railroad equipment operations

University of Illinois
• Shall monitor the status of traffic signals, and VMS on University of Illinois roadways
• Shall control traffic signals and VMS on University of Illinois roadways

Village of Savoy Public Works
• Shall monitor traffic flow and speeds on the Village of Savoy roadways
• Shall monitor the status of traffic control equipment on the Village of Savoy roadways
• Shall control traffic counters, speed trailers and speed study equipment on the Village of Savoy roadways

6. Transit Services for CUSUA
This area of operation covers all aspects of transit services for the region.
Market Packages

- Transit Vehicle Tracking
- Transit Fixed Route Operations
- Demand Response Transit Operations
- Transit Passenger and Fare Management
- Willard Transit Security
- CUMTD Transit Security
- Transit Maintenance
- Transit Traveler Information

Stakeholders

- Champaign Urbana Mass Transit District
- Willard Airport

Roles and Responsibilities

Champaign Urbana Mass Transit District
- Shall provide transit vehicle location tracking
- Shall manage fixed route operations for the Champaign Urbana Savoy urbanized area
- Shall provide demand response transit operations for the Champaign Urbana Savoy urbanized Area
- Shall collect and archive transit passenger load data for the Champaign Urbana Savoy urbanized area
- Shall monitor transit security surveillance on transit vehicles, transit stations and transit yards
- Shall coordinate with emergency response agencies during transit emergency response
- Shall monitor transit vehicle conditions for maintenance
- Shall provide next stop information onboard transit vehicles
- Shall provide schedule and arrival times for transit passengers at major transit stations
- Shall provide real time trip planning for transit passengers through website, SMS and desktop applications

Willard Airport
- Shall monitor the Willard CCTV Camera system
- Shall provide surveillance for the Willard airport
- Shall coordinate with emergency response agencies during transit emergency response

7. Traveler Information for CUSUA
This area of operation includes dissemination of traffic and maintenance and construction information to the public by means of media and website
**Market Packages**
- Champaign Traffic Information Dissemination
- IDOT Traffic Information Dissemination
- Urbana Traffic Information Dissemination
- Savoy Broadcast Traveler Information
- U of I Broadcast Traveler Information
- IDOT Broadcast Traveler Information
- Urbana Broadcast Traveler Information
- CCRPC Broadcast traveler Information
- Champaign Broadcast traveler Information
- Savoy Interactive Traveler Information
- IDOT Interactive Traveler Information
- Urbana Interactive Traveler Information
- Champaign Interactive Traveler Information

**Stakeholders**
- Champaign County Regional Planning Commission
- City of Champaign Public Works
- City of Urbana Public Works
- Illinois Department of Transportation
- University of Illinois
- Village of Savoy Public Works

**Roles and Responsibilities**

**Champaign County Regional Planning Commission**
- Shall collect maintenance and construction information from other public works and highway agencies for the Champaign Urbana Savoy Urbanized area
- Shall provide maintenance, construction, road closure and detour information in the Champaign Urbana Savoy Urbanized area to the public through website

**City of Champaign Public Works**
- Shall provide maintenance, construction, road closure and detour information, in the city of Champaign, to the public through website and media
- Shall provide traffic flow and speed data for travelers through website
- Shall share maintenance and construction information with other information service providers

**City of Urbana Public Works**
- Shall provide maintenance, construction, road closure and detour information, in the City of Urbana, to the public through website and media
- Shall provide traffic flow and speed data for travelers through website
• Shall share maintenance and construction information with other information service providers

Illinois Department of Transportation
• Shall provide maintenance, construction, road closure and detour information, on IDOT roadways, to the public through website and media
• Shall provide traffic flow and speed data for travelers through website
• Shall share maintenance and construction information with other information service providers

University of Illinois
• Shall provide maintenance, construction, road closure and detour information, on University of Illinois roadway, to the public through website
• Shall share maintenance and construction information with other information service providers

Village of Savoy Public Works
• Shall provide maintenance, construction, road closure and detour information, in the Village of Savoy, to the public through website
• Shall share maintenance and construction information with other information service providers
IMPLEMENTATION

Step 4 of the development of regional ITS architecture involves project sequencing, agency agreements and identification of ITS standards.

In this step, the list of ITS projects will be identified; the identified projects will then be prioritized for implementation. Any new areas of cooperation between stakeholders will be identified. Based on the identified areas of cooperation, a list of existing agreements between the stakeholders will be compiled and any new agreements required for project sequencing or information exchange will be written. Furthermore, standards will be developed for different ITS technologies currently existing or planned for the future. The use of uniform standards for ITS technologies will enable easy coordination and communication between the ITS elements.

The time line for this step is given in the figure below.

<table>
<thead>
<tr>
<th>TASK</th>
<th>2004</th>
<th>2005</th>
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</thead>
<tbody>
<tr>
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<tr>
<td>STEP 1</td>
<td>Identify need</td>
<td>Identify Stakeholders</td>
</tr>
<tr>
<td></td>
<td>September</td>
<td>October</td>
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</table>

USE AND MAINTENANCE OF THE ARCHITECTURE

The final steps in the process include using the regional architecture for implementing ITS projects and updating the architecture on a regular basis in coordination with the national and state ITS architectures. Any new ITS projects will be included in the architecture and the existing ITS projects will be implemented based on the project sequencing. The architecture has to be maintained and updated to keep up with the changing requirements, standards and terminologies of the national and state ITS architectures. This task will be done by the champions of this regional ITS architecture.

TURBO ARCHITECTURE

Based on all the information documented through this effort, CUUATS staff developed the Regional ITS Architecture database, utilizing the Turbo Architecture Version 3.0 software. This software, developed by FHWA to assist regions in developing Regional ITS Architectures, will allow CUUATS staff to easily maintain the project in the future and update progress as projects are built.
APPENDICES
APPENDIX A: STAKEHOLDERS AND INVENTORY
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This following list gives the elements owned or operated by stakeholder and their current status

**Arrow Ambulance**
1. Arrow AMSEC Dispatch Center Existing
2. Arrow Radio, Pager, Nextel and MDCs Existing

**Carle Foundation**
1. Carle Hospital Existing

**Champaign County ESDA**
1. ESDA EOC Existing

**Champaign County Highway Department**
1. Champaign County Accident Database Existing
2. Champaign County Maintenance and Construction Management Facilities Existing
3. Champaign County Maintenance and Construction Storage Existing
4. Champaign County MCV Radios and Nextel Existing
5. Champaign County MCV Salt Tracking Existing
6. Champaign County Pavement Management System Planned
7. Champaign County Roadway Signs Inventory Planned
8. Champaign County Salt Storage Existing
9. Champaign County Traffic Counters and Speed Study Equipment Planned
10. Champaign County WZ Signs and Speed Trailers Existing

**Champaign County METCAD**
1. METCAD 9-1-1 Center Existing

**Champaign County Regional Planning Commission**
1. CCRPC - CUUATS Existing
2. CCRPC - CUUATS FTP Site Future
3. CCRPC - CUUATS Traffic Counters Existing
4. CCRPC - GIS Consortium Existing
5. CCRPC Website Planned

**Champaign County Sheriff Department**
1. Champaign Sheriff Stations, Radios, MDCs and Cell Phones Existing

**Champaign Fire Department**
1. Champaign FD Signal Preemption Existing
2. Champaign FD EOC, Stations and PM Radios Existing
Champaign Police Department
1. Champaign PD Stations, Radios, Cell Phones and MDCs
   Existing

Champaign-Urbana Mass Transit District
1. CUMTD Administration and Operations Facility
   Existing
2. CUMTD Administration and Operations Facility Camera System
   Existing
3. CUMTD APC
   Existing
4. CUMTD AVL
   Existing
5. CUMTD Bus Garage Camera System
   Planned
6. CUMTD Illinois Terminal Surveillance Camera System
   Existing
7. CUMTD Onboard Security Systems
   Existing
8. CUMTD Onboard Signal Priority
   Future
9. CUMTD Onboard Traveler Information
   Existing
10. CUMTD Onboard Vehicle System Sensors
    Existing
11. CUMTD Real Time Stopwatch System
    Existing
12. CUMTD Voice and Data Radios
    Existing
13. CUMTD Website, SMS and Desktop Applications
    Existing

City of Champaign Public Works
1. Champaign Channel 5
   Existing
2. Champaign Parking System Information
   Existing
3. Champaign Maintenance and Construction Storage
   Existing
4. Champaign MCV GPS
   Future
5. Champaign MCV Radios and Cell Phones
   Existing
6. Champaign North Prospect CCTV Cameras
   Planned
7. Champaign Pavement Management System
   Existing
8. Champaign Public Works Building
   Existing
9. Champaign Public Works Activity Database
   Existing
10. Champaign Salt Storage
    Existing
11. Champaign Signals, Detectors and WZ Traffic Control
    Existing
12. Champaign VMS
    Future
13. Champaign Website
    Existing

City of Urbana Public Works
1. Urbana AM530 Radio Station
   Existing
2. Urbana Cunningham Ave Corridor CCTV Cameras
   Planned
3. Urbana Downtown Wireless Network
   Planned
4. Urbana Maintenance and Construction Storage
   Existing
5. Urbana MCV Radios and Cell Phones
   Existing
6. Urbana MCV Salt Tracking
   Existing
7. Urbana New Radio System
   Planned
8. Urbana Public Works Center
   Existing
9. Urbana Salt Storage
   Existing
10. Urbana Signals, Detectors and WZ Traffic Control | Existing
11. Urbana UPTV – Channel 6 | Existing
12. Urbana VMS | Planned
13. Urbana Website | Existing

**Data Transmission Network (DTN) Corporation**
1. Meteorlogix | Existing

**Federal Aviation Administration**
1. Willard - FAA | Existing

**Illinois Department of Transportation**
1. IDOT Champaign MCM and Storage Facilities | Existing
2. IDOT District 5 Operations | Existing
3. IDOT Highway-Rail Signal Data Link | Existing
4. IDOT MCV FM Band Radios | Existing
5. IDOT Permanent VMS | Future
6. IDOT Signals, Detectors, WZ Traffic Control Systems | Existing
7. IDOT Station One | Existing
8. IDOT Website | Existing

**Illinois State Police D-10 Pesotum**
1. ISP AVL System | Existing
2. ISP District 10 Call Taking Facility | Existing
3. ISP Radios and MDCs | Existing
4. ISP Website | Existing

**Pro Ambulance**
1. Pro Call Taking Facility | Existing
2. Pro Radios and Nextel | Existing

**Provena Convenant**
1. Provena Medical Center | Existing

**Regional Transit Group**
1. Regional Transit Hub | Future

**Savoy Fire Department**
1. Savoy FD Signal Preemption | Existing
2. Savoy FD Station and 2-way Radios | Existing

**Transportation Security Administration**
1. Willard - TSA | Existing

**Unified Command**
<table>
<thead>
<tr>
<th><strong>Champaign-Urbana-Savoy Regional ITS Architecture</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Unified Command Center</td>
</tr>
<tr>
<td><strong>University of Illinois</strong></td>
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<tr>
<td>1. UofI Facilities and Services</td>
</tr>
<tr>
<td>2. UofI MCV Radios and Cell Phones</td>
</tr>
<tr>
<td>3. UofI Traffic Signals and WZ Traffic Control</td>
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<tr>
<td>4. UofI VMS</td>
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<tr>
<td>5. UofI Website</td>
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<tr>
<td><strong>UofI Police Department</strong></td>
</tr>
<tr>
<td>1. UofI Campus Emergency Phone System</td>
</tr>
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<td>2. UofI Emergency Notification System</td>
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<tr>
<td>3. UofI PD Station, Radios and MDCs</td>
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<td>4. UofI PD VMS</td>
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<td><strong>Urbana Fire Department</strong></td>
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<tr>
<td>1. Urbana FD Signal Preemption</td>
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<td>2. Urbana FD Stations, Radios and Cell Phones</td>
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<td>3. Urbana FD Wireless Laptops</td>
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<td><strong>Urbana Police Department</strong></td>
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<td>1. Urbana PD Station, Radios and MDCs</td>
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<td><strong>US Census</strong></td>
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<td>1. Tiger Maps</td>
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<td><strong>Village of Savoy Public Works</strong></td>
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<td>1. Savoy Chemical Sensors</td>
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<td>2. Savoy EOC</td>
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<td>3. Savoy Maintenance and Construction Storage</td>
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<td>4. Savoy MCV Radio</td>
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<td>5. Savoy Public Works</td>
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<td>6. Savoy PW Activity Database</td>
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<td>7. Savoy Salt Storage</td>
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<td><strong>Willard Airport</strong></td>
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<tr>
<td>1. Willard CCTV System</td>
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APPENDIX B: MARKET PACKAGES
# LIST OF MARKET PACKAGES INCLUDED IN THE ARCHITECTURE

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<tr>
<th>Champaign County Network Surveillance [Instance] (ATMS01)</th>
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<td>Advanced Railroad Grade Crossing</td>
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<td>Transit Vehicle Tracking</td>
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Transit Fixed-Route Operations
Demand Response Transit Operations
Transit Passenger and Fare Management
CUMTD Transit Security [Instance] (APTS5) -- Existing
Willard Transit Security [Instance] (APTS5) -- Existing
Transit Maintenance
Transit Traveler Information
CCRPC Broadcast Traveler Information [Instance] (ATIS1) -- Future
Champaign Broadcast Traveler Information [Instance] (ATIS1) -- Future
IDOT Broadcast Traveler Information [Instance] (ATIS1) -- Future
Savoy Broadcast Traveler Information [Instance] (ATIS1) -- Existing
Uofi Broadcast Traveler Information [Instance] (ATIS1) -- Future
Urbana Broadcast Traveler Information [Instance] (ATIS1) -- Future
Champaign Interactive Traveler Information [Instance] (ATIS2) -- Future
IDOT Interactive Traveler Information [Instance] (ATIS2) -- Future
Savoy Interactive Traveler Information [Instance] (ATIS2) -- Future
Urbana Interactive Traveler Information [Instance] (ATIS2) -- Future
Arrow Emergency Call-Taking and Dispatch [Instance] (EM01) -- Existing
ISP Emergency Call-Taking and Dispatch [Instance] (EM01) -- Existing
METCAD Emergency Call-Taking and Dispatch [Instance] (EM01) -- Existing
Pro Emergency Call-Taking and Dispatch [Instance] (EM01) -- Existing
Arrow Emergency Routing [Instance] (EM02) -- Existing
ISP Emergency Routing [Instance] (EM02) -- Existing
METCAD Emergency Routing [Instance] (EM02) -- Existing
Pro Emergency Routing [Instance] (EM02) -- Existing
Roadway Service Patrols
Transportation Infrastructure Protection
Wide-Area Alert
Disaster Response and Recovery
Evacuation and Reentry Management
Champaign County ITS Data Mart [Instance] (AD1) -- Future
Champaign ITS Data Mart [Instance] (AD1) -- Future
Savoy ITS Data Mart [Instance] (AD1) -- Future
Urbana ITS Data Mart [Instance] (AD1) -- Future
ITS Data Warehouse
APPENDIX C: ARCHITECTURE FLOWS
APPENDIX D: FUNCTIONAL REQUIREMENTS
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