



Executive Summary

SOUTHEAST NEBRASKA REGIONAL ITS ARCHITECTURE FOR THE CITY OF LINCOLN

Prepared by:



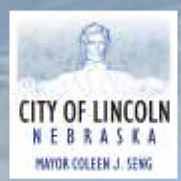
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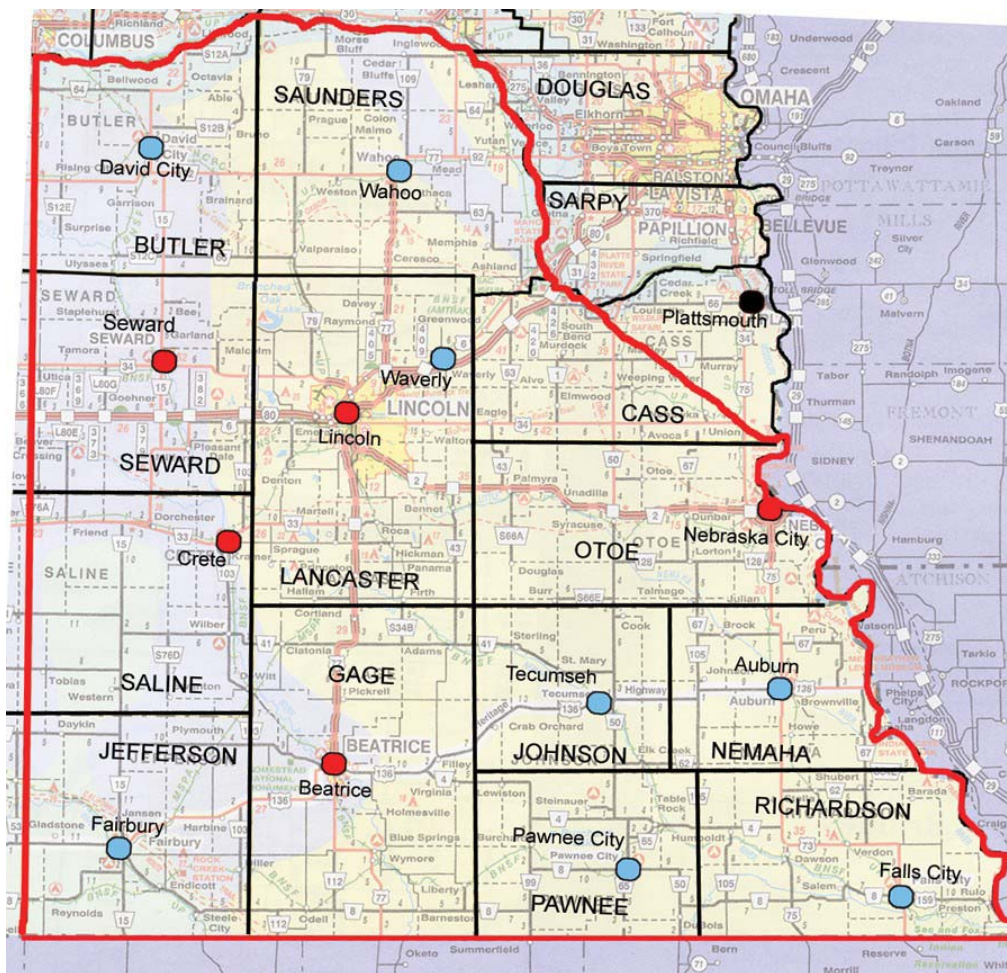
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1.0 INTRODUCTION

This project establishes a Regional Intelligent Transportation Systems (ITS) Architecture and develops an integrated ITS plan for Southeast Nebraska (SENEARCH). The Regional Architecture and Strategic Deployment Plan will provide a framework for current ITS elements in the region and a strategic approach for future ITS investments. The Iteris, Inc. project team is conducting this work under contract to the City of Lincoln in close consultation with the Federal Highway Administration (FHWA), the Nebraska Department of Roads (NDOR), and Lancaster County. The Southeast Nebraska Regional ITS Architecture includes major communities and interested organizations in 13 counties within NDOR District 1. A map of the Southeast Nebraska study area is shown in Figure ES-1.

Figure ES-1: Study Area for SE Nebraska Regional ITS Architecture



The SENEARCH is required by the FHWA and the Federal Transit Administration (FTA) to provide a framework so that planning and deployment of ITS solutions can take place in an organized and coordinated fashion throughout Southeast Nebraska to improve transportation safety, efficiency, and security. The overall objective of the project is to ensure that ITS investments in Southeast Nebraska:



- have established common communication protocols;
- avoid duplication of non-collaborative investments in infrastructure, hardware, and software;
- provide the ability to share data sources between agencies; and
- bring Southeast Nebraska into compliance with the nationally-established ITS standards and architecture

The project was conducted under the direction of the City of Lincoln Project Manager and a Project Steering Committee (PSC). The PSC members are outlined below:

- Virendra Singh, City of Lincoln, Project Manager
- Karl Fredrickson, City of Lincoln
- Randy Hoskins, City of Lincoln
- Scott Opfer, City of Lincoln
- Steve Garbe, NDOR
- Rich Ruby, NDOR
- Randy Peters, NDOR
- Doug Pillard, Lancaster County
- John J. Perry, FHWA, Ex-Officio Member
- William Kalt, FTA, Ex-Officio Member

The consultant project team consisted of Iteris, Inc., Olsson Associates, and TranSmart Technologies. Iteris provided overall project management and direction of all technical project activities. Olsson Associates lead project outreach, inventory, and agency agreement tasks. TranSmart Technologies assisted with agency agreements and the development of an initial Memorandum of Understanding (MOU) for a near-term project. Key project team members are outlined below:

- Abbas Mohaddes, Iteris, Co-Project Director
- Marc Porter, Iteris, Project Manager
- Mike Malone, Iteris, Deputy Project Manager
- Matt Weatherford, Iteris, Project Engineer
- Duane Eitel, Olsson Associates, Co-Project Director
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- Lonnie Burklund, Olsson Associates, Project Engineer
- Chris Carroll, Olsson Associates, Project Outreach Coordinator
- Sharon Radke, Olsson Associates, Project Outreach Advisor
- Joyce Ewing, Olsson Associates, Project Assistant
- Bridget Barrett, TranSmart Technologies, Project Engineer

This Executive Summary provides a high-level overview of the study process and key findings and recommendations of the project. The following information is presented in the remainder of this report:

- Stakeholder Involvement and Outreach
- Lead Agencies – ITS Champions
- Technical Approach
- Project Identification, Sequencing, and Agreements
- Architecture Maintenance



2.0 STAKEHOLDER INVOLVEMENT AND OUTREACH

The first deliverable was the *Stakeholder Outreach Plan*. The plan described a comprehensive program to identify, contact and engage a broad range of stakeholders throughout the Southeast Nebraska region. Once the Project Steering Committee defined the “region” as the 13 counties in Southeast Nebraska, stakeholder identification began. The stakeholder database eventually included over 350 individuals in federal, state, local and private organizations that provide transportation and/or emergency services.

After potential stakeholders were identified, stakeholder contact information was collected from various sources and input to a project database. Initial contact with potential stakeholders was by telephone and e-mail. Inventory information and follow-up contact were also typically by phone and e-mail; however, face-to-face meetings with stakeholders were also conducted.

Stakeholders attended four regional workshops held at the Walt Public Library in Lincoln. An additional workshop was conducted specifically for City of Lincoln, Lancaster County and University of Nebraska-Lincoln staff. The initial workshops educated attendees on ITS and their many applications. Building upon this knowledge, specific information on ITS in Southeast Nebraska was provided. Stakeholders learned ITS applications already being used and the many possibilities for the future. Workshop participants provided written and verbal input on transportation needs, ITS services to meet those needs, and on specific projects that would develop and implement the ITS services applicable to the SENEARCH Region.

Four project newsletters provided summaries of project deliverables and project status. The newsletters were mailed and e-mailed to persons in the stakeholder database and distributed at workshops.

A project website was developed and maintained to give stakeholders updates on the architecture as it was developed. Information on ITS, including a link to the national architecture website, also was provided. Feedback was provided via the website and on comment cards distributed at each workshop.

3.0 LEAD AGENCIES – ITS CHAMPIONS

As a result of the outreach effort, several stakeholders have been identified as “lead agencies” with key persons within their organization identified as “champions.” These champions will be instrumental in working with other stakeholders to shepherd SENEARCH projects during planning, design, implementation, operations and maintenance. Examples of ITS Champions include individuals representing county Emergency Managers, NDOR headquarters and District 1, rural school bus providers, rural transit providers, and various departments within the City of Lincoln and Lancaster County.

4.0 TECHNICAL APPROACH

The project was conducted through 12 tasks with multiple milestones and deliverables. The following is a brief overview of key elements of the technical project approach.

- **Task 0 – Project Management:** This task included day-to-day management of project activities, preparation and attendance at project status meetings, coordination with the Project Steering Committee, and maintenance of the administrative project website.



- **Task 1 – Build Consensus of Private/Public Support:** This task included the primary stakeholder involvement and outreach component of the project. Key activities including stakeholder identification and contact, stakeholder data base management, development of a project logo, development and distribution of project newsletters, development of PowerPoint presentations for outreach and educational meetings, and preparation of a final project CD for distribution to stakeholders.
- **Task 2 – Gather Data (Inventory and Needs):** The primary purpose of this task was to continue stakeholder outreach activities, build stakeholder awareness, obtain buy-in and support for the project, identify existing and planned ITS systems in the region, identify regional needs and determine ITS services that should be considered to address those needs.
- **Task 3 – Develop Operational Concepts and Functional Requirements:** The objectives of this task were to identify stakeholder roles and responsibilities in the implementation and operation of regional ITS systems and develop high-level definitions of what various systems should do.
- **Task 4 – Define Interfaces and Interconnects:** The objective of this task was to identify which systems are connected, or need to communicate, with other systems in the region and what type of information needs to be shared.
- **Task 5 – Prepare Communications Master Plan Update:** The communications plan update documented existing and planned communications infrastructure in the region and identified a communications network capable of supporting the planned ITS system for the region. The communications plan, which is independent from the Regional Architecture document, is a high-level document focusing on center-to-center and center-to-field communications needs.
- **Task 6 – Develop Project Sequencing:** The project sequencing task identified potential ITS projects for the region and developed suggested implementation time-frames based on factors including need, feasibility, enabling technology, and agency commitment.
- **Task 7 – Develop List of Agency Agreements:** After potential ITS projects were identified, it was necessary to outline agreements that may be necessary between agencies, particularly on projects that are complex or require coordination between multiple agencies or jurisdictions.
- **Task 8 – Develop List of Applicable Standards:** The objective of this task was to identify applicable standards for the various ITS technologies being considered in the region including information on importance, availability, and maturity.
- **Task 9 – Develop Maintenance Plan:** This task developed a recommended maintenance plan for the Regional ITS Architecture including implementation procedures and responsibilities.
- **Task 10 – Produce Final Architecture and Strategic Deployment Plan:** This task includes delivery of the final Regional ITS Architecture including all supporting documentation and data bases in electronic and hard copy formats.
- **Task 11 – Document Approval:** The objective of this task is to achieve FHWA review of the Final Regional ITS Architecture prior to the April 8, 2005 regulatory deadline. Presentations will also be made to various agencies throughout the region to obtain formal acceptance of the Architecture document and near-term Memorandums of Understanding (MOU).



5.0 PROJECT SEQUENCING AND AGREEMENTS

Table ES-1 provides a summary listing of the recommended SENEARCH projects. The projects are identified as near-term, mid-term or long-term. Definitions for project sequencing categories are:

- Near-Term: 0-4 years
- Mid-Term: 5-10 years
- Long-Term: > 10 years

The sequencing for each project is based on the relative urgency of the project-to-project stakeholders, how well the project fulfills identified regional needs, level of agency commitment, and the availability of cost-effective, enabling technologies.

Table ES-1 lists stakeholders associated with each project along with recommended agreements required for implementation and/or operation. Stakeholders may be organizations/agencies or departments within organizations/agencies. Please note that the Project Number contained within the following tables does not constitute priority. They are merely for reference only.

Table ES-1: Project Sequencing Summary

Project No.*	Project Title			Stakeholders	Recommended Agreements
	Near-Term	Mid-Term	Long-Term		
1	Flood Monitoring System			City of Lincoln	N/A
2	Flood Monitoring System			Lancaster County	N/A
3	NDOR District 1 District Operations Center			NDOR	N/A
4	City of Lincoln and NDOR Operations Coordination			City of Lincoln NDOR	MOU, OA
5	Dynamic Message Sign Expansion			NDOR	N/A
6	Dynamic Message Sign Expansion			City of Lincoln	N/A
7	Dynamic Message Sign Expansion			Lancaster County	N/A
8	Emergency Management Coordination			NDOR NSP NEMA City of Lincoln ARNG Local City, County and Agencies Local Media	MOU, OA
9	City of Lincoln Traffic Management Center			City of Lincoln	N/A
10	City of Lincoln Joint Operations Center			City of Lincoln Lancaster County Local Media	MOU, OA, IA
11	City of Lincoln Emergency Vehicle Improvements			City of Lincoln	N/A
12	City of Lincoln Traffic Signal Response Improvements			City of Lincoln	N/A
13	StarTran Automated Vehicle Location (AVL)			City of Lincoln – StarTran	N/A
14	StarTran Transit Information Improvements			City of Lincoln – StarTran	N/A
15	StarTran Transit Smart Card			City of Lincoln – StarTran	N/A



Project No.*	Project Title			Stakeholders	Recommended Agreements
	Near-Term	Mid-Term	Long-Term		
16	City of Lincoln Traffic Camera Expansion			City of Lincoln UNL	MOU
17	NDOR Traffic Camera Expansion			NDOR	NA
18	Regional Communications Improvements			NDOR Local City, County and Agencies Lancaster County City of Lincoln NSP NEMA	MOU, IA, OA
19	Urban Camera Coordination			City of Lincoln NDOR UNL	MOU, OA
20	Maintenance Vehicle Tracking			NDOR	N/A
21	Flood Monitoring System			NDOR	N/A
22	Automated Gate Closure			NDOR	N/A
23	Infrastructure Security Monitoring			Local City, County and Agencies NSP NDOR NEMA City of Lincoln Lancaster County	MOU, IA, OA
24	Local Emergency Management Computer Aided Dispatch			Local City, County and Agencies	MOU, IA, OA
25	Multi-Jurisdictional Transit Coordination			Local City, County and Agencies StarTran Lancaster County Transit Metro Area Transit (Omaha)	MOU, IA, OA
26	Local Emergency Vehicle Improvements			Local City, County and Agencies	MOU, IA, OA
27	Local Transit Operations Upgrade			Local City, County and Agencies Lancaster County	MOU, IA, OA
28	City of Lincoln Traveler Information System			City of Lincoln NDOR Media Information Service Providers	MOU, IA, OA
29	City of Lincoln Maintenance Vehicle Tracking			City of Lincoln	N/A
30	Parking and Event Management Improvements			City of Lincoln NDOR UNL	MOU, OA
31	Trailblazer Signage			NDOR	N/A
32	Local County Maintenance Vehicle Tracking			Local City, County and Agencies Lancaster County	MOU, IA, OA
33	City of Lincoln Smart Grade Crossing			City of Lincoln	N/A



Project No.*	Project Title			Stakeholders	Recommended Agreements
	Near-Term	Mid-Term	Long-Term		
34	City of Lincoln Automated Traffic Enforcement			City of Lincoln	N/A
35	Transit Signal Priority (TSP)			City of Lincoln	N/A
36	School Bus Tracking			StarTran Local City, County and Agencies Lincoln Public Schools Local School Districts Lancaster County	MOU, IA, OA
37	Local Transit Vehicle Tracking			Local City, County and Agencies Lancaster County	MOU, IA, OA
38	Portable Weigh-in-Motion			NDOR Local City, County and Agencies	MOU, IA, OA
39	Local Agency Smart Grade Crossing			City, Counties and Local Agencies	MOU, IA, OA
Notes: * Project Number is for reference only. No priority is assumed.					

A number of agreement types may be applicable to ITS projects. Various agreement types include:

- Handshake Agreement
- Memorandum of Understanding (MOU)
- Interagency Agreement (IA)
- Intergovernmental Agreement (IGA)
- Operational Agreement (OA)
- Funding Agreement (FA)
- Master Agreements (MA)
- No Agreements Required (N/A)

Most projects will start with a Memorandum of Understanding (MOU). Four projects involving multiple agencies or departments within agencies have been identified for immediate development of an MOU. These projects are listed in Table ES-2.

Table ES-2: Recommended Near-term MOU Projects

Project No.*	Project Description
19	Urban Camera Coordination
8	Emergency Management Coordination
9	City of Lincoln Joint Operations Center
30	Parking and Event Management Improvements
Notes: * Project Number is for reference only. No priority is assumed.	



6.0 ARCHITECTURE MAINTENANCE

The Southeast Nebraska ITS Architecture should be modified as plans and priorities change, ITS projects are implemented, and the ITS needs and services evolve in the region. The Architecture was developed with a ten-to-fifteen year time horizon, as reflected by the near-, medium- and long-term project time frames. As the architecture is updated, this timeframe will be extended further into the future as planned projects are deployed and new projects are identified. The goal of maintaining the architecture is to keep an up-to-date regional ITS architecture accessible and easily used for deploying ITS in Southeast Nebraska.

The key aspects of the Architecture maintenance process that will modify and change the architecture in a consistent manner are described below:

- **Maintenance Responsibility:** The Architecture Maintenance Team typically migrates from the Project Steering Committee. For the SENEARCH, it is recommended that the City/MPO lead the maintenance effort with support from other key stakeholders. The maintenance lead will not be finalized until after the March 3 Steering Committee meeting.
- **Maintenance Elements:** The parts of the Regional ITS Architecture to be maintained are referred to as the “baseline” architecture. These elements typically include the Description of Region, List of Stakeholders, Operational Concepts, List of ITS Elements, Interfaces between Elements, System Functional Requirements, Project Sequencing, List of Agreements, and Applicable ITS Standards.
- **Update Frequency:** The Architecture should be updated to support other transportation planning activities such as the Regional Long Range Transportation Plan (LRTP) or Transportation Improvement Program (TIP). The Maintenance Team will determine the exact dates and times of updates, but typically there will be a minor update annually with a major update every 2-3 years. The updates will occur annually in conjunction with the TIP process.
- **Identifying Needed Architecture Changes:** There are many actions that may trigger a need to update the Architecture. These include changes in project definition, changes in stakeholder names or agency composition, project additions/deletions, changes in project status or importance, changes in regional needs, changes to adjoining architectures, availability of new technologies, and changes in Federal or State funding policies or ITS priorities.
- **Change Management Process:** A change management process is recommended that is based on the more general Configuration Management (CM) process. Key steps in this process are Change Identification, Evaluation of Change Request, Change Approval, Update Architecture Baseline, and Notify Stakeholders of Change.

Consistent adherence to the architecture maintenance process will ensure effectiveness of the Regional ITS Architecture for many years.