US-75 ICM System Requirements

Dallas Integrated Corridor Management (ICM) Demonstration Project

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16. Abstract

This document is intended as a listing and discussion of the Requirements for the US-75 Integrated Corridor Management System (ICMS) Demonstration Project in Dallas. This document describes what the system is to do (the functional requirements), how well it is to perform (the performance requirements), and under what conditions (non-functional and performance requirements). This document does not define how the system is to be built; that is the providence of the design document. This document pulls together requirements from a number of sources including but not limited to the Concept of Operations, the initial Systems Requirements Document and constraints identified by the agencies. This document sets the technical scope of the system to be built for the Demonstration Project. It is the basis for verifying the system and sub-systems when delivered via the Verification Plan.

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Chapter 1.0 Introduction

This document is intended as a listing and discussion of the Requirements for the US-75 Integrated Corridor Management System (ICMS) Demonstration Project in Dallas. This document describes what the system is to do (the functional requirements), how well it is to perform (the performance requirements), and under what conditions (non-functional and performance requirements). This document does not define how the system is to be built; that is the providence of the design document. This document pulls together requirements from a number of sources including but not limited to the Concept of Operations, the initial Systems Requirements Document and constraints identified by the agencies. This document sets the technical scope of the system to be built for the Demonstration Project. It is the basis for verifying the system and sub-systems when delivered via the Verification Plan.

1.1 System Purpose

The purpose of the US-75 ICMS is to implement a multi-modal operations decision support tool enabled by real-time data pertaining to the operation of freeways, arterials, and public transit. The system will be shared between information systems and people involved in transportation operations and emergency response in the US-75 Corridor. The US-75 ICMS is intended to provide improved integration of operation procedures, including procedures that take advantage of the data sharing capabilities of the US-75 ICMS and facilitate improved emergency response, and traveler information.

1.2 System Scope

The US-75 ICMS will be a multi-agency, de-centralized operation which will utilize a set of regional systems to integrate the operations of the corridor. Currently, the agencies within the corridor have some cooperation and integration. The following figure provides an overview of the current systems, and level of integration. As discussed in our Concept of Operations and High-Level Systems Requirements document, the US-75 corridor operations will be de-centralized with DalTrans as the corridor central coordination point. At the DalTrans Transportation Management Center (TMC) there will be one dedicated ICM Coordinator for the corridor, who will insure the corridor agencies are responding to requests, and will monitor the overall performance of the corridor.

The "ICMS" will operate as a multi-modal operations decision support tool with a cooperative network of agencies which will operate the corridor in a coordinated manner to reduce congestion of the network, and improve the movement of people and goods within the

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corridor. The ICM Demonstration System will consist of the following new systems: a Decision Support subsystem; the Dallas SmartNET subsystem will provide graphical user interfaces for the agency operators; and a SmartFusion subsystem which will fuse the data for the ICMS. In addition, several Infrastructure projects have been proposed to fill in data infrastructure gaps in the corridor.

The SmartFusion subsystem will store the data within the ICM System; this data will come from current network data provided by the ICM Agencies in the corridor, and output data from the Decision Support subsystem including response plans and predictive conditions of the network. The Evaluation Subsubsystem will be used as a tool to evaluate the overall performance of the corridor; however, a real-time subset of the model may be integrated into the Decision Support subsystem for prediction of network conditions. The Decision Support subsystem will be used as a tool for coordination or responses to events, evaluation of current network conditions, and prediction of network conditions in order to proactively manage the corridor. Lastly, the SmartNET subsystem will be a tool which will allow the viewing, reporting, and sending of Incidents, Construction, Special Events, and static ITS data (location of components, transit schedules, etc.) The SmartNet subsystem will provide an web interface for approved users to interact with the data, provide a response/request interface to the Decision Support System, and will provide a data feed of current network conditions to the 511 system.

1.3 Definitions, acronyms, and abbreviations

ATIS – Advanced Traveler Information System

ATMS – Advanced Transportation Management System

ARDT – Arterial Detection Subsystem

CAD – Computer Aided Dispatch

CCTV – Closed Circuit Television

Con Ops – Concept of Operations

DalTrans – Dallas Transportation Management Center

DART – Dallas Area Rapid Transit

DMS – Dynamic Message Sign

DNT – Dallas North Tollway

DSS – Decision Support Subsystem

ETC – Electronic Toll Collection

HOV – High Occupancy Vehicle

ICM – Integrated Corridor Management

ICMS – Integrated Corridor Management System

INFR – Infrastructure

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ISP – Information Service Provider

ITS – Intelligent Transportation System

LBJ – Lyndon Bayne Johnson

LRT – Light Rail Transit

LRV – Light Rail Vehicle

MS/ETMC – Message Set for External TMC to TMC Communication

MOD – ICM Model Subsystem

NCTCOG – North Central Texas Council of Government

NTTA – North Texas Tollway Authority

P&R – Park & Ride

PARK – Parking Management

PDA – Personal Data Assistant

PGBT – President George Bush Turnpike

RTC – Regional Transportation Council

TMDD – Traffic Management Data Dictionary

TRE – Trinity Railway Express

TxDOT – Texas Department of Transportation

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Chapter 2.0 References

This section identifies all needed standards, policies, laws, concept of operations, and other reference material that supports the requirements.

The following references were used in developing the Requirements for the US-75 Integrated Corridor Management System.

References Specific to the US 75 Corridor

- Concept of Operations for the US-75 Integrated Corridor in Dallas, Texas, May 2009

- Dallas Area-Wide ITS Plan, Texas Transportation Institute, FHWA/ TxDOT-96/591-1F, July 1996, http://www.nortex-its.org/Library.htm

- Plan Summary Dallas Area-Wide Intelligent Transportation Systems Plan, Texas Transportation Institute, July 1996, http://www.nortex-its.org/Library.htm

- Draft NCTCOG Regional Data and Video Communication System – High-Level Design Report, Texas Department of Transportation, RDVCS-DR-1.0.0, June 2006, http://www.nortex-its.org/Library.htm

- Draft NCTCOG Regional Data and Video Communication System – System Requirement Specification, Texas Department of Transportation, RDVCS-SRS-1.0.0, June 2006, http://www.nortex-its.org/Library.htm .

- Draft NCTCOG Regional Data and Video Communication System – Agencies Assessment Summary, Texas Department of Transportation, RDVCS-AAS-1.0.0, June 2006, http://www.nortex-its.org/Library.htm

- Operational Concept Document for the DalTrans Transportation Management Center, Southwest Research Institute, January 2002, http://www.nortex-its.org/Library.htm

- Software Requirements Specifications (SRS) for the Dallas/ Ft. Worth Regional Center-to-Center Communications Network, Southwest Research Institute, December 2001, http://www.nortex-its.org/Library.htm

- Concept Of Operations Framework For The Dallas/Ft. Worth Regional Center-to-Center Communications Network, Version 1.0, Southwest Research Institute, November 2001, http://www.nortex-its.org/Library.htm

- Intelligent Transportation Systems Program for the North Texas Region: Communications Analysis and Recommendations, HNTB Corporation and Texas Transportation Institute, April 2000, http://www.nortex-its.org/Library.htm

- Scope of Work for the Design of a Regional Data and Video Communications System for the North Texas Region, Version 1.0, March 2002, http://www.nortex-its.org/Library.htm

- Intent to Share Information Survey, January 1999, http://www.nortex-its.org/Library.htm

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- Update Center-to-Center Concept of Operations and Requirements, March 2003

- Dallas Fort-Worth Regional ITS Architecture, http://www.nortex-its.org/Library.htm

- Analysis of Regional Comprehensive ITS Survey, January 1999

- Prioritization of Market Packages for the DFW Regional ITS Architecture, February 2005, http://nortex-its.org/Team_Meetings/2005/Prioritization%20of%20MP.doc.

- Update to Regional ITS Architecture and Prioritization, September 2004

- 2005 Partnership Program ITS Projects, Regional ITS Steering Committee, August 2005

- Application for Integrated Corridor Management in the US-75 Corridor, Dallas, Texas, May 2006

- 2025 Mobility Plan. North Central Council of Governments,

- Intelligent Transportation Systems Program, Partnership Program 3, Eastern Subregion Approved Listing, North Central Council of Governments, March 2006

Agency Operational Manuals
- Draft US-75 (North Central Expressway) Buffer-separated Concurrent-flow and Barrier-separated Reversible-flow HOV Lanes: Standard Operating Procedures, TxDOT and DART, June 2007

- Draft I-30 (Tom Landry Freeway) Buffer-separated Concurrent-flow and Barrier-separated Reversible-flow Managed HOV Lanes: Standard Operating Procedures, TxDOT and DART, June 2007

- I-635 (LBJ Freeway) Buffer-separated Concurrent-flow and Barrier-separated Reversible-flow HOV Lanes: Standard Operating Procedures, TxDOT and DART, July 2007

Systems Engineering
- "Building Quality Intelligent Transportation Systems Through Systems Engineering," Mitretek Systems, April 2002.

- "Developing Functional Requirements for ITS Projects," Mitretek Systems, April 2002.

- "Systems Engineering Guidebook for ITS," Federal Highway Administration, Version 3, January 2010

- Developing and Using a Concept of Operations in Transportation Management System, FHWA TMC Pooled-Fund Study (http://tmcpfs.ops.fhwa.dot.gov/cfprojects/new_detail.cfm?id=38&new=0)

- NCHRP Synthesis 307: Systems Engineering Processes for Developing Traffic Signal Systems.

- *INCOSE Systems Engineering Handbook, v3,* The International Council of Systems Engineering (INCOSE), Version 3, 2006, http://www.incose.org/

- *IEEE Guide for Information Technology - System Definition-Concept of Operations (ConOps) Document*, IEEE Std 1362-1998.

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ITS, Operations, Architecture, Other

- FHWA Rule 940, Federal Register/Vol. 66, No. 5/Monday, January 8, 2001/Rules and Regulations, Department of Transportation, Federal Highway Administration 23 CFR Parts 655 and 940, [FHWA Docket No. FHWA–99–5899] RIN 2125–AE65 Intelligent Transportation System Architecture and Standards.

- Regional ITS Architecture Guidance Document; "Developing, Using, and Maintaining an ITS Architecture for your Region; National ITS Architecture Team; October, 2001.

- "Regional Transportation Operations Collaboration and Coordination, a Primer for Working Together To Improve Transportation Safety, Reliability, and Security," Federal Highway Administration, FHWA-OP-03-008 (Washington, DC: 2002).

- "Performance Measures of Operational effectiveness for Highway Segments and Systems – A Synthesis of Highway Practice"; NCHRP Synthesis 311; Transportation Research Board (Washington DC: 2003).

- "Cooperative Agreements for Corridor Management," NCHRP Synthesis 337, Transportation Research Board, Washington, D.C., 2004 (Research Sponsored by the American Association of State Highway and Transportation Officials in Cooperation with the Federal Highway Administration).

Use Cases / Requirements

- Fowler, Martin, UML Distilled, A Brief Guide to the Standard Object Modeling Language, Third Edition, Pearson Education, 2004

- A. Cockburn. Writing Effective Use Cases. Addison-Wesley Longman Publishing Co., Inc., Boston, MA, USA, 2000.

- IEEE Guide to Developing System Requirements Specifications, Institute of Electrical and Electronics Engineers, 1998

Interface Control Documents

- Software Requirements Specifications (SRS) for the Dallas/ Ft. Worth Regional Center-to-Center Communications Network, Southwest Research Institute, December 2001, http://www.nortex-its.org/Library.htm

- The Interface Control Document (ICD) for Command and Control, a high-level Specification, Southwest Research Institute, December 2001http://www.nortex-its.org/General_References/Center-to-Center_docs/C2C-CICD-3.1.1.pdf

- The ICD for Status Interface, high-level specification, Southwest Research Institute, December 2001 http://www.nortex-its.org/General_References/Center-to-Center_docs/C2C-SICD-3.1.2.pdf

- The ICD for C2C, low-level implementation details, Southwest Research Institute, December 2001 http://www.nortex-its.org/General_References/Center-to-Center_docs/C2C-CICD-3.1.1.pdf

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- ICD for Status, low-level details, Southwest Research Institute, December 2001, http://www.nortex-its.org/General_References/Center-to-Center_docs/C2C-SICD-3.1.2.pdf
- ICD for the Regional Data and Video Communication system, In Development

2.1 System Overview

The US-75 Corridor is a major north-south radial corridor connecting downtown Dallas with many of the suburbs and cities north of Dallas. It contains a primary freeway, continuous frontage roads, a light-rail line, transit bus service, park-and-ride lots, major regional arterial streets, toll roads, bike trails, and significant intelligent transportation system (ITS) infrastructure.

Figure 0-1. US-75 Integrated Corridor

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Chapter 3.0 General System Description

As discussed in the Concept of Operations, the vision of the ICM project is to "Operate the US-75 Corridor in a true multimodal, integrated, efficient, and safe fashion where the focus is on the transportation customer", the management and operations of the corridor and the ICM will be a joint effort involving all the stakeholders. To effectively manage and operate the ICM concept, the US-75 Steering Committee recommended the creation of a central corridor decision-making body. This body – designated as the US 75 ICM Subcommittee – will consist of leadership level representatives from each of the stakeholders in the US-75 Corridor.

The daily operation of the corridor will be coordinated through the existing arrangements and information will be exchanged through the center-to-center project, the Dallas SmartNET subsystem, Subsystem which will distribute response plan requests generated by the Decision Support System, and utilize the center-to-center interface to communicate to the various agency systems. The central point of coordination for the corridor will be the DalTrans facility, with TxDOT, Dallas County, and DART co-located at the facility.

All operations among corridor networks and agencies (e.g., activation of specific ICM strategies) will be coordinated via the Dallas SmartNET Subsystem. The US 75 ICM Subcommittee will investigate and prepare corridor response plans and rules-based response procedures for various scenarios that can be expected to occur within the US-75 Corridor. The chairman of the committee will be responsible, with the other agency/service operations officers, for configuring the subcommittee with respect to its functions and staffing for all hours of operations. Staff will be assigned by the corridor stakeholders to support daily operations, develop response plans, and analyze system deficiencies and needs, and general administration. Performance measurement and monitoring will be the responsibility of the US 75 ICM Subcommittee. The agency/service members, led by the chairman, will be accountable to the centralized decision-making body and make reports as the decision-making body designates.

The US 75 ICM Subcommittee, working with NCTCOG will conduct desktop scenario sessions to prepare, train and refine response plans for incidents, special events, weather, and evacuations. All the agency/service operations officers and staff will know their respective roles and responsibilities for any of the various situations the corridor may face and will be aided by the Decision Support Subsystem.

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Traveler information via websites, DMS, and through the media and ISPs will be regional and corridor-based. Each traveler will be able to make route and modal shifts between networks easily due to real-time corridor information, and coordinated operations between networks. Using one network or another will be dependent on the preferences of the traveler, and not the nuances of each network. Travelers will be able to educate themselves about the corridor so they can identify their optimal travel alternatives and obtain the necessary tools to facilitate their use of corridor alternatives when conditions warrant.

The US-75 Corridor will be an integrated transportation system – managed and operated collectively – to maximize its efficiency to corridor travelers. All corridor assets will be attuned to obtain the goals and objectives of the corridor, as well as the goals of each individual traveler as their preferences prescribe. The corridor users will recognize the US-75 Corridor as a multimodal, integrated, efficient, and safe transportation system that provides them with multiple viable alternatives that they can select based on their specific travel circumstances and needs.

The operations and coordination of the corridor will utilize the Dallas SmartNET subsystem as part of the daily operation of the corridor, and will be coordinated through the existing arrangements between the agencies with information exchanged through the center-to-center project. The center-to-center interface is an ITS standards based system utilizing the TMDD and MS/ETMC. The Decision Support Subsystem will distribute response plan requests via the Dallas SmartNET subsystem.

Figure 3-1 is a high-level framework on how the system will interface to the various agencies. The system would utilize existing Center-to-Center standards based communication infrastructure. It would also be able to have direct connections to agencies not on the Center-to-Center network. The existing systems of each member agency would share ITS data with the corridor, and the Decision Support Subsystem would recommend responses to all affected agencies.

The Decision Support subsystem would be initially populated by response plans developed by the US-75 ICM Subcommittee utilizing the ICM model developed for the corridor analysis and strategy selection. The Decision Support subsystem would evaluate conditions against the response plans, and recommend new response plans as network conditions and responses are evaluated. The US-75 ICM Subcommittee will meet on a regular basis to do post-incident analysis and review any modification to response plans to improve the efficiency of the corridor.

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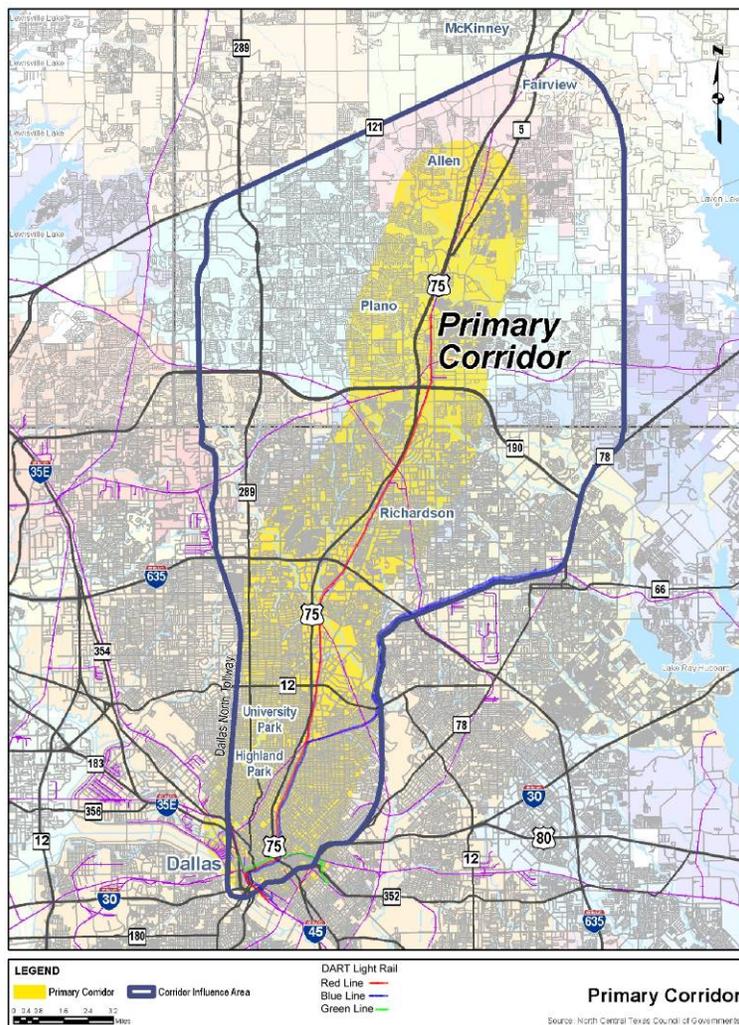
ICMS Context
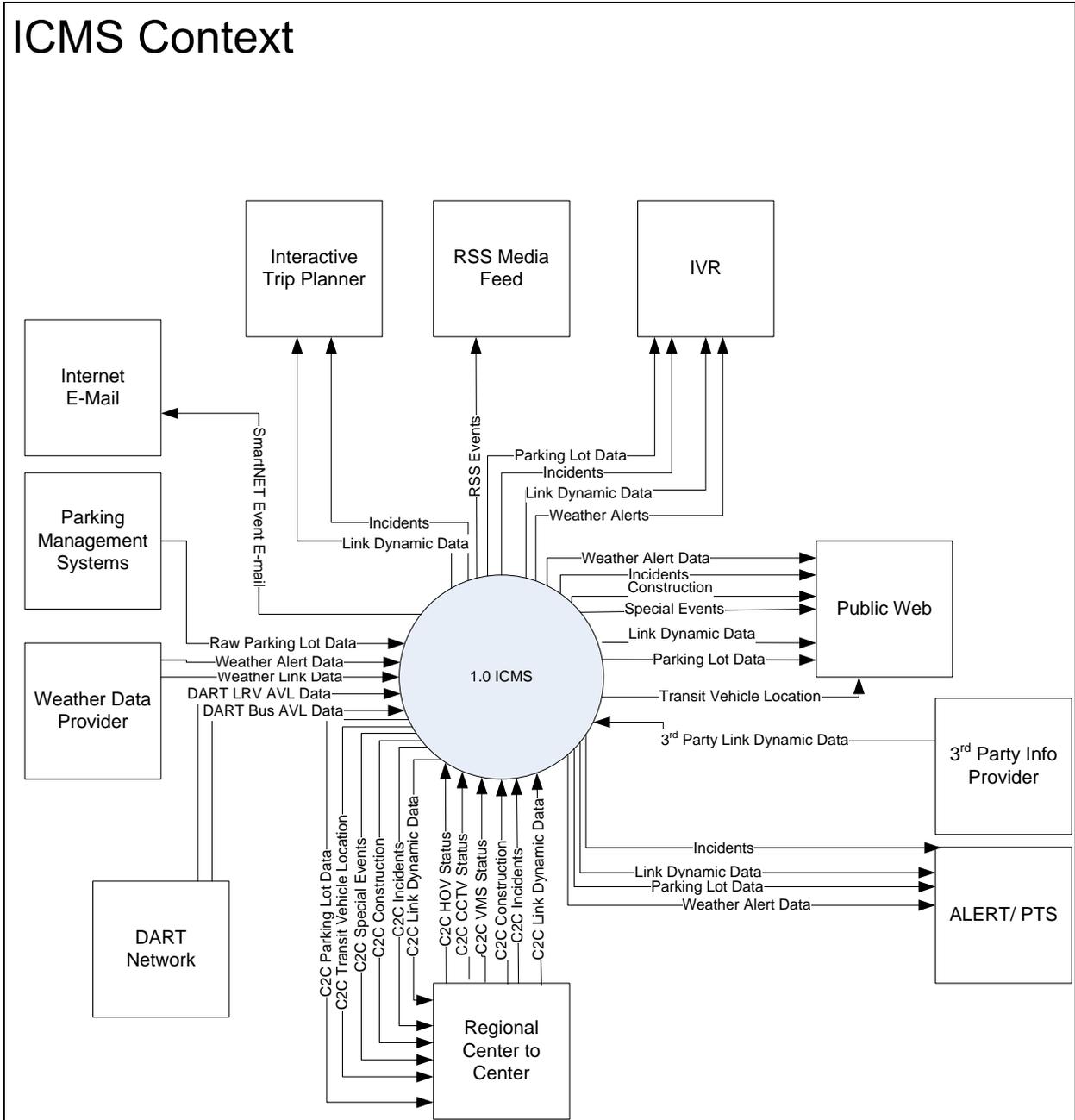
Figure 0-1. High-Level Integrated Corridor Management System Concept

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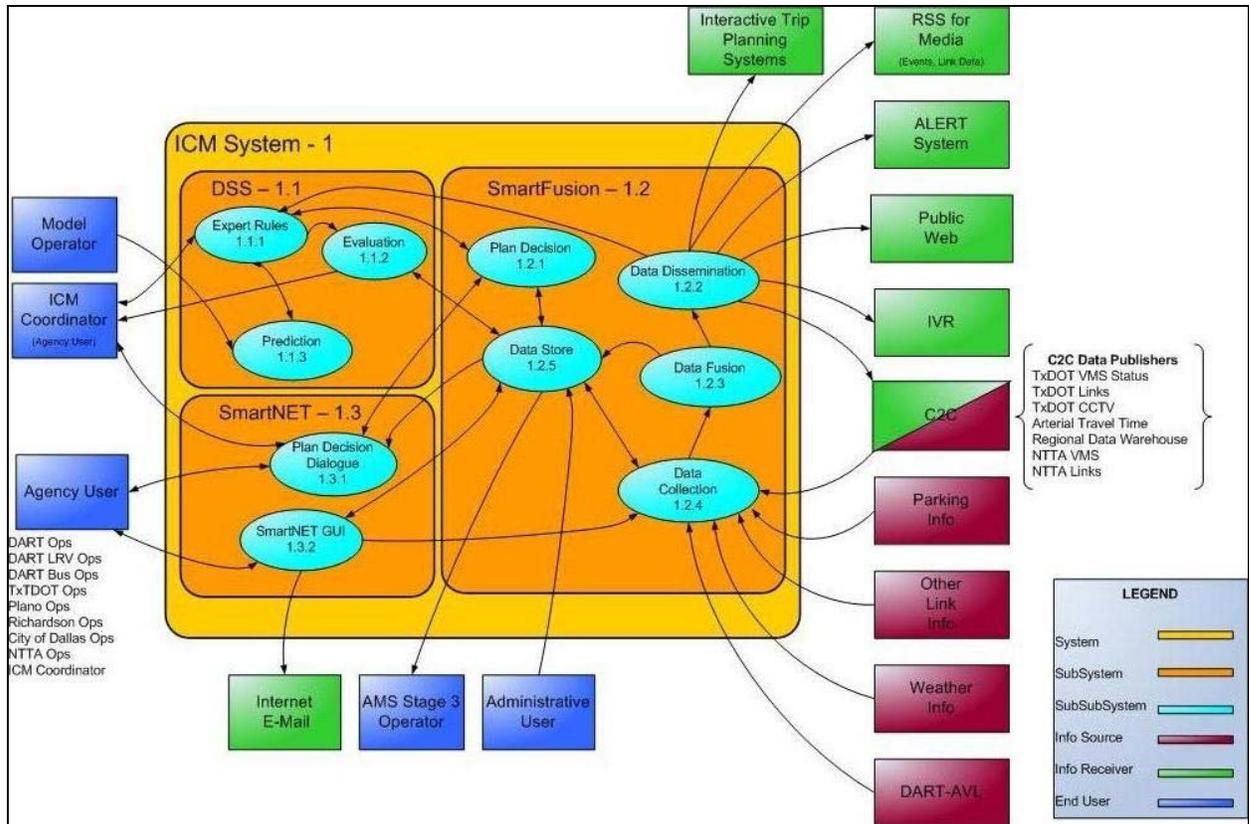
Figure 0-2. High-Level ICMS Conceptual Diagram

The Decision Support Subsystem (DSS) will send response plan requests via the Dallas SmartNET interface to communicate to the various agency operators. For instance, if TxDOT has an incident on the US-75 freeway, when the operator at the Daltrans facility inputs data in their ATMS incident management subsystem, the information from this subsystem would send basic information on the incident (such as location, number of lanes, severity) to the Dallas SmartNET subsystem via the regional Center-to-Center communication system. The DSS would receive the information from the Dallas SmartNET subsystem and would then query its database based on specific criteria (location, time of day, network conditions), and select pre-approved response plans. The DSS would send the response plan recommendations to all affected agencies via the Dallas SmartNET subsystem, and the public would be notified via the 511 system of the incident. The agencies in the corridor would accept, reject, or request a modification of the recommended response, based on current conditions within their network. As the conditions of the incident change, and the Dallas SmartNET system is updated, the DSS would also be notified and send out updated response requests, if needed. In addition, the DSS will send out updated responses based on other criteria. For instance, if an incident was occurring during the peak hours, and extended beyond. One potential response during the peak could be to increase

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the number of Light Rail Vehicles (LRV) in operation. If a certain time of day was reached before any updates were provided, the DSS may send DART an update that notifies them that additional LRT are not required.

3.1 System Performance Measures

Taking into account the vision, goals, and current conditions within the Corridor, the US-75 Steering Committee discussed "success" targets for several of the performance measures, their main concern was if the target was realistic, could be measured, and if enough data would be available. These "Performance Measures Success Thresholds," listed in Table 3.1-1, provide an indication that the corridor goals have been achieved. The listed performance levels/thresholds are long-term targets that reflect the future vision of how the corridor will operate. Upon deployment of the ICM, any movement toward the thresholds will indicate that ICM is having the desired effect. As data is collected in the next phase, and ICM model developed the targets will be validated and goals adjusted to ensure realistic and achievable targets are used.

Table 0-1. Corridor Performance Measure Targets – Demonstration Project

Performance Measure	Performance Measure Success Threshold
Travel Time Index	Reduce Index by 2% per year
Corridor Throughput	Increase overall throughput – increase person/trips per hour by 2%
Clearance time for an Incident (based on Jurisdiction and Corridor)	Emergency Responder Training - 75% of agencies trained on Incident Management response.
Response time	Response to Incidents - target is consistent response between jurisdictions (within 5 minutes)
Parking Lot Volume at Transit locations	Parking Lot Capacity – 90% utilization
Ridership per vehicle (Transit)	Increase of ridership – 2% (year to year increase)
Provide ATIS information to public on incident	Information to Regional 511 System – 10 minutes of Incident entered into SmartNET
Public Perception	Public Perception – Awareness of ICM and perceived benefits (survey based)
ICM Response Plan deployment	ICM Response Plan activated - 95% of plans were deployed correctly

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The performance measures and targets discussed above focus on assessing the overall effectiveness of the ICM and corridor operations for purposes of needs identification and improvement selections. Such parameters, however, are not conducive to day-to-day assessments of alternatives by travelers and are not sensitive to quickly changing conditions within the corridor.

Data collection for the performance measures (i.e., overall assessment) and operations measures will be identical, using the information collected by each of the individual network systems. However, their respective processing may be different. As mentioned previously, one of the focuses of the corridor is to utilize mesoscopic models to evaluate the strategies and assist with prioritization both as part of the Decision Support subsystem and the ICM Model subsystem.

3.2 Data Requirements

The Dallas ICM Demonstration Project will include several types of data both static and dynamic. The static data includes data which will not change very often, if at all, during this project. These types of data include roadway links and nodes, light rail routes and stations, location of existing infrastructure, and similar items.

Dynamic data includes things that have an impact on the current operations such as real-time traffic conditions information, current location of bus and LRT vehicles, and items which change rapidly and will assist the operators of the network in making decisions.

Both of these data types will be important to the operations of the ICM corridor, and will drive the response selection of the Decision Support System.

3.2.1 Data Sources

As discussed in section 3.2, each stakeholder has information and data flows that will be needed during the operation of the ICM demonstration. As part of the requirements definition, each data type and data source was identified to ensure that the necessary data is available for the systems being developed and deployed.

As shown in the attached data flow diagrams, these data elements include incidents, construction, special events information, performance data (speed, volume, occupancy, travel time, status, and weather), and Request/ Response interaction for the DSS response plan distribution.

Incidents, Construction, and Special Events in the system will be entered via two systems, the existing TxDOT Advanced Transportation Management System (ATMS), and the Dallas SmartNET system.

Performance data is provided by the various agency and new field infrastructure systems, including existing TxDOT ATMS, NTTA Systems, DART LRV and Bus AVL systems; and new Arterial Detection, Parking Management, and Weather Information systems.

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As discussed previously, the Decision Support System (DSS) will utilize the existing static data, events, and performance data in determining response plan recommendations for the corridor agencies. Once a response plan is recommended, the DSS will provide a feedback loop to the affected corridor stakeholders. The affected stakeholders will provide a response (agree, disagree) for the request, and provide this to the response back to the DSS for review by the ICM Coordinator.

3.3 Major System Constraints

This section summarizes the problems, issues and needs of the individual Networks and the Corridor as a whole. Using the inventory information and other gathered data, coupled with stakeholder discussions, this section addresses operational, technical, and, institutional deficiencies and constraints, As such, it provides insight into the types of problems being faced in the US-75 Corridor.

Within the US-75 Corridor, the challenges in efficient movement of people and goods can be classified in terms of 1) agency coordination, 2) available capacity, and 3) proactive operational and control strategies.

3.3.1 Network Challenges

Agency Coordination: First, the Corridor encompasses multiple modes of transportation and a variety of facilities. It also encompasses multiple operating agencies with various responsibilities for providing transportation services. These operating agencies include five cities, two counties, a state department of transportation, a transit authority, a regional tolling authority, a metropolitan planning organization and a large number of local emergency service providers. While the various agencies generally operate in a cooperative manner, there are limited systems and tools for integrated coordinated operation.

One example where data is exchanged is between Texas Department of Transportation (TxDOT), the Dallas 911 system, and Metro Traffic (one of the local information service providers). The TxDOT Dallas District ITS central system receives traffic incidents from Dallas related to incidents, events, or other actions is accomplished via email or telephone. There is not, however, a Corridor-wide automated mechanism for improved sharing of data, control strategies, and response plans.

For example, a major incident may occur on a freeway and block travel lanes for an hour or more. Drivers may reroute based on information from Dynamic Message Signs (DMS) or from Information Service Providers (ISPs). There exists an opportunity for a modal shift to transit, a travel schedule shift, or a route shift if there is a mechanism in place for the affected agencies to act. Even with recurrent congestion, there exists an opportunity for modal, schedule, or route shifts with exchange of information among agencies along with communication to travelers. Such exchange of information and an action plan can better balance available capacity either in time or space. In either case - recurrent or non-recurrent congestion - agencies would be able to manage travel in a more coordinated manner with improved exchange of information and a coordinated action plan taking into account available capacity from all modes.

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During 2005, the TxDOT freeway management system logged over 8,500 incidents on US-75 and over 5,000 incidents on I-635 within the Corridor boundaries. These incidents ranged in severity from debris in the roadway, to stalled vehicles, to major vehicle crashes with multiple lane closures.

Available Capacity: Second, the Corridor represents a highly-developed, urbanized area. As such, there is limited right-of-way remaining to expand the freeway and arterial streets. Therefore, the vehicle capacity is set, and the ability to handle future demand increases relies on moving more people on the given modes and effectively utilizing the existing capacity in real-time as both demand and capacity fluctuate.

Proactive Operational and Control Strategies: Third, maintaining mobility and safety in the Corridor will require proactive operational and control strategies implemented in an integrated manner among the agencies in the Corridor. Whether it is responding to the high travel demand each day or responding to special and planned events in the Corridor, there is a need to coordinate available capacity to match changes in demand. Furthermore, traveler information must be provided to inform users of travel alternatives to maximize their trips.

While the Corridor Stakeholders are in agreement that the principal mobility challenge in the Corridor is the daily traffic demand, there are a significant number of special events at venues in or near the Corridor that add additional challenges for mobility, safety, and wayfinding.

3.3.2 Network Needs

Many of the operational deficiencies within the US-75 Corridor were identified in the Concept of Operations, representing a major problem along most of the networks within the Corridor. Specific examples of additional needs relating to separate Network, as well as the Corridor as a whole are discussed below. These needs were established through a dedicated Corridor Stakeholder interviewing process, as well as by general input throughout the process of developing this Con Ops.

Arterial Network Needs addressed by the Demonstration Project

- Increased communications infrastructure between agency systems/centers (City of Richardson on TxDOT Fiber)
- Signal systems that better react to current travel conditions (rather than time-of-day) – i.e., deployment of traffic responsive signal systems along arterials throughout corridor (for signals along Greenville Avenue in Plano, Richardson and Dallas.)
- Collection and use of real-time traffic conditions along arterial (Arterial Travel Times)
- Improved incident management policies for incidents on arterials – different than freeways

Freeway Network Needs addressed by the Demonstration Project

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- Freeway travel data to distribute accurate traveler information
- Increased mediums for distributing freeway traveler information, e.g., automated emailing of incidents based on personalized travel preferences (Personalize Traveler System)
- Increased sharing of existing freeway travel speed data to other agency systems (Dallas SmartNET subsystem)
- Relaying freeway travel times to travelers (511 System)

Transit Network Needs addressed by the Demonstration Project

- Signal priority for bus transit vehicles (Plano and Richardson only)
- Increased coordination between DART and Cities for management and public information distribution relating to transit line closures (Dallas SmartNET, and 511 System)
- Need ability to alert customers about service disruptions, both pre-trip and en-route (511 system – website, IVR, and Personalized Traveler System)
- Need better parking management at park-n-ride facilities, e.g., traveler information about lots being full (Parking Management system, and 511 system)

Incident Management / Field Operation Needs addressed by the Demonstration Project

- Increased outreach/education for local police & fire in incident response procedures related to traffic management (via existing NCTCOG programs, and ICM Marketing)
- Increased coordination with incident responders to communicate operational decisions (Operators utilizing Dallas SmartNET subsystem)

Multi-Network Needs addressed by the Demonstration Project

- Additional mediums for distributing travel conditions to travelers en-route, e.g., via cell-phones or PDAs (511 System)
- Proven systems for predicting operating conditions in order to make operational decisions (Decision Support System).
- Ability to measure mode change when put into affect as traffic management tool
- Increased sharing of travel conditions along all networks (511 System, Dallas SmartNET subsystem)
- Access to real-time information about incidents, including what agencies and/or resources are at the incident scene (Dallas SmartNET subsystem)

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- Ability to effectively relay travel time and/or delay information for all modes to travelers en-route so that travel decisions can be made (511 System)
- Integration of existing bus location data (Dallas SmartNET subsystem)
- Public outreach and education to traveling public who's unaccustomed to use of alternate modes of travel, e.g., education program to explain use of park-n-ride lots and transit fare payment options. (ICM Marketing)

Institutional / Coordination Needs addressed by the Demonstration Project

- There currently is no clearly defined and agreed-upon performance measures for determining the effectiveness of multi/cross-network operational management (ICM Evaluation)
- Acquiring decision-maker/political support for ICM concepts, specifically the City Councils and RTC (ICM Marketing)

3.4 Assumptions and Dependencies

Since the practice and concepts of ICM are relatively new, several system, technology, and institutional assumptions were made in the development of the requirements. These assumptions may prove false once more is known, and ICM deployment is completed. However, based on the information we currently have on ICM and the corridor, these are our best assumptions.

3.4.1 System Assumptions for the Demonstration Project

- The Regional Center to Center will be sufficient for the data exchange needs of the ICM
- The Regional Center to Center will be deployed by some stakeholders
- The Regional Data Warehouse will be deployed
- The standards deployed as part of the Regional Center to Center will be sufficient in most cases for the data needed for the ICM System
- Communication links between all US 75 stakeholders are incomplete
- Current deployed infrastructure and systems will be utilized
- This is a research project, so some of the technology and systems deployed may need to be altered once operations have begun
- Utilize off-the-shelf solutions as much as possible
- Current and proposed infrastructure will be sufficient for the data requirements of the ICM, and the Decision Support subsystem

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3.4.2 Technology Assumptions for the Demonstration Project

- Utilize the existing Regional Center to Center system
- Existing systems will sufficient for the needs of the system
- DART Network will be deployed
- Regional Data and Video Sharing System will not be deployed
- Regional Center to Center plug-in will not be deployed for all stakeholders
- Current agency user authorization and authentication practices will be used
- Current agency information technology standards (hardware/ software) will be used
- Decision Support Subsystem will interface to the Dallas SmartNET subsystem for request and responses for Pre-approved Response Plans
- SmartNET and SmartFusion will utilize existing products with some modifications for interfaces and data
- ICMS will provide data to a Regional 511 system

3.4.3 Institutional Assumptions for the Demonstration Project

- An Operator at DalTrans will be the ICM Coordinator
- Funding will be available for ICM
- Agencies within the corridor will be willing to optimize the entire corridor, even if it impacts their individual network
- Regional Transportation Council and NCTCOG are supportive of the ICM and will provide funding, when needed

3.4.4 Data Quality Assumptions for the Demonstration Project

- Data provided to the ICMS will be timely
- Data provide to the ICMS will be spatially accurate
- Static Data updates from external feeds will be provided on a periodic basis for inclusion in the ICMS.
- The ICMS will validate data being received from external feeds.

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Chapter 4.0 User Needs

User needs identify the high-level ICM system needs; these user needs are developed to focus on the operational aspects of the ICM, and defining the functional requirements of the proposed ICM system. These needs are based upon the system goals and objectives, and the future operational conditions and scenarios defined in the Concept of Operations.

These needs were established through a dedicated Corridor Stakeholder interviewing process, as well as by general input throughout the process of developing this Concept of Operations. Utilizing the Operational Scenarios from the section above, User Needs were developed. The following needs represent the identified needs of the ICM system.

Table 0-1. User Needs for the US-75 Integrated Corridor Management System

New #	Updated User Needs	User Need Text
1	Need for Interactive communication among agencies	Corridor agencies need to work together in order to plan for incident remediation and efficiently execute actions to clear incidents in a timely manner, in order to improve the collective response to events.
2	Need to obtain current status of ITS devices in the corridor	Corridor agencies need to obtain current status of ITS devices and transportation network information (eg. speed, travel time) within the corridor in order to make informed decisions on actions to be made to improve performance
3	Need to provide current status of ITS devices to the corridor agencies	Corridor agencies need to provide current status of their ITS devices to other agencies within the corridor in order for corridor agencies to make informed decisions on actions to be made to improve performance
4	Need to provide current performance of the transportation network to corridor agencies	Corridor agencies need to provide current conditions of their transportation network (eg. speed, travel time) to other agencies within the corridor in order for corridor agencies to make informed decisions on actions to be made to improve performance of the corridor
5	Need to provide current performance of the transportation network to the public	Corridor agencies need to provide current conditions of the performance of the transportation network to the public in order to allow the public to make informed decisions
6	Need for interactive trip planning	To ensure that travelers within the corridor can make informed decisions, the corridor agencies need to provide a way to allow travelers to plan a trip. This could include various media, and multiple modes of travel

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New #	Updated User Needs	User Need Text
7	Need to provide travel time information to travelers	Corridor agencies need to provide travel time information to the public for planning trips and modifying trip plans enroute, in order to allow travelers to make informed decisions about their trips
8	Need to provide roadway event information to travelers	Corridor agencies need to provide event information to the public for planning trips and modifying trip plans enroute, in order to allow travelers to make informed decisions about their trips,
9	Need to provide transit event information to travelers	Corridor agencies need to provide transit information to the public for planning trips and modifying trip plans enroute, In order to allow travelers to make informed decisions about their trips,
10	Need to track inventory of ITS devices within the corridor	Corridor agencies need an inventory of devices including locations and availability to be shared among agencies in the corridor, In order to allow agencies to utilize ITS devices within the corridor,
11	Need to track ownership of ITS devices with the corridor	Corridor agencies need to be aware of ownership of ITS devices in the corridor in order to allow agency operators to make the appropriate contact when a need or issues arise for use of a device
12	Need to collect and store event data	Event data collected during daily operations of the corridor needs to be stored for analyzing the effectiveness of the corridor, response times to incidents, identifying areas of high occurrence, and for modeling
13	Need to collect and store ITS device status data	ITS device status information that is collected during daily operations of the corridor agencies needs to be stored for analyzing the effectiveness of the corridor strategies and response plans, and for modeling
14	Need to store pre-agreed incident response plans	Corridor agencies need a means to collect and store pre-agreed response plans in order to allow corridor agencies to understand collective roles and responsibilities, communicate effectively and improve response times in reacting to events within the corridor
15	Need to coordinate incident responses among agencies to ensure that conflicting responses are not enacted	Corridor agencies need to coordinate responses and understand roles and responsibilities as well as jurisdictional boundaries, such that conflicting responses are not enacted and the correct information is being provided to the public
16	Need to coordinate incident responses among agencies to ensure prompt response to events	Corridor Agencies need to coordinate responses such that agencies understand roles and responsibilities and jurisdictional boundaries in order to ensure prompt response to events and accurate information is provided to the public
17	Need to provide alternate route options to travelers	In order to reduce congestion, and improve efficiency of the entire corridor, alternate route options need to be provided to the traveling public to allow them to make informed decisions about their trips during peak travel times

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New #	Updated User Needs	User Need Text
18	Need to provide detour route options to travelers	In order to reduce congestion, and improve efficiency of the entire corridor, detour routes need to be provided to the public to allow them to make informed decisions about their trips due to roadway closures
19	Need to provide information on alternate modes of transportation to travelers	In order to reduce congestion, and improve efficiency of the entire corridor, alternate modes of travel options need to be provided to the public to allow them to make informed decisions when planning trips or enroute
20	Need to track and store history of enacted response plans	Corridor agencies need to be able to track and store history of actions associated with a pre-approved response plans, after they have been enacted, in order to determine if any changes are required to improve the response plans
21	Need to assess the impact of an enacted response plan on the transportation network	During the response to an event in the corridor, the corridor agencies and the ICM Coordinator need to be able to determine if the pre-planned response is effective and if the response is having the intended effect. This includes verifying what conditions exist after implementation of the response. If the operators of the systems determine that their response is not effective, they should be able to change components of their response plans or implement a new response plan
22	Need to maintain and modify enacted response plans	As an event progresses and conditions change, agency operators should be able to modify the current response, and communicate changes with other agencies within the corridor in order to effectively adjust to changing conditions and improve conditions in the corridor
23	Need to maintain and modify stored pre-approved response plans	Corridor agencies need to be able to make recommendations and modify pre-approved response plans, and communicate ideas with other agencies within the corridor, in order to improve response to conditions that will impact the corridor
24	Need to provide a ICMS which is 98% available and reliable	Due to the sources of data, and the current operations of the agency systems, the ICM System developed needs to provide a 98% availability and reliability.

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Chapter 5.0 Requirements Process

5.1 User Needs and Functional Breakdown

The first step in the development of detailed requirements for the ICM Demonstration was to identify the needs and goals and potential solutions that could be implemented under the constraints of the Demonstration Project. The constraints of the project include the high-level requirements developed and agreed by the US DOT as part of our proposal, the schedule (18 months for design, development, integration), and the project budget approved for the demonstration project.

5.2 Develop Requirements for Subsystems

Once user needs, use cases, and scenarios were completed, a conceptual design of the entire ICM system was developed. From this concept, subsystems for the corridor were identified.

5.3 Map User Needs to Subsystems

In order to ensure that all functional requirements were identified from the user needs and use cases, a mapping of the user needs to the ICM system and subsystems was completed, as shown in the table 5-1. In several cases, the user needs are not directly attributable to the subsystems within the ICM concept, will be impacted by the ICM system and are external to the concept.

Table 0-1. User Needs Traceability – Demo Projects

SubSystems (USER Needs)	Decision Support Subsystem	SmartFusion Subsystem	SmartNET Subsystem
1		X	X
2		X	
3		X	
4		X	X
5		X	
6		X	
7		X	
8		X	X
9		X	X
10			X

SubSystems (USER Needs)	Decision Support Subsystem	SmartFusion Subsystem	SmartNET Subsystem
11			X
12		X	
13			
14	X		
15	X		
16	X	X	X
17		X	X
18		X	X
19		X	X
20		X	
21	X		X
22	X	X	X
23	X	X	
24	X	X	X

5.4 ICMS Data Process

In order to further understand the process flow and data formats of the US-75 ICMS, the following diagram was created. The basic flow of information for the ICMS is:

1. Agencies provide current network information

2. Agencies store and process the information for their own systems,

3. The Agency information is then sent to the ICMS via the Regional Center to Center. The format and content of this data is required to meet the Regional Center to Center ICD, which is based on the TMDD and MS/ETMC standards as defined within the Regional Center to Center documents.

4. The ICMS SmartFusion subsystem is the first receiving component of the ICMS. The ICMS SmartFusion subsystem is a combination of short term storage used by the other ICMS systems, and long term used for modeling, and data validation.

5. The Decision Support subsystem processes this data utilizing a macroscopic model to calculate both current conditions and predictive conditions of the network in 30 minutes. Based on these two time horizons, the model compares results against both a set of pre-planned scenarios and develops its own potential response plans. The Decision Support subsystem then sends a response plan request, if it calculates one is needed.

6. In order to evaluate the performance of the ICMS, the Decision Support subsystem will be used on a regular basis to calculate the performance measures selected by the ICM steering committee. The Decision Support

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subsystem processes data utilizing models to calculate the performance measures. The data used in the model is received from the SmartFusion Subsystem. The Decision Support subsystem is also used in a real-time state for the Decision Support Subsystem.

7. The last component of the ICMS is the SmartNet subsystem. The SmartNet subsystem allows both agency users and external users to view the data within the ICMS. The SmartNet subsystem allows authorized users to view, edit, query and update data within the SmartFusion Data Store.

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DFD-1.0 ICMS Subsystems
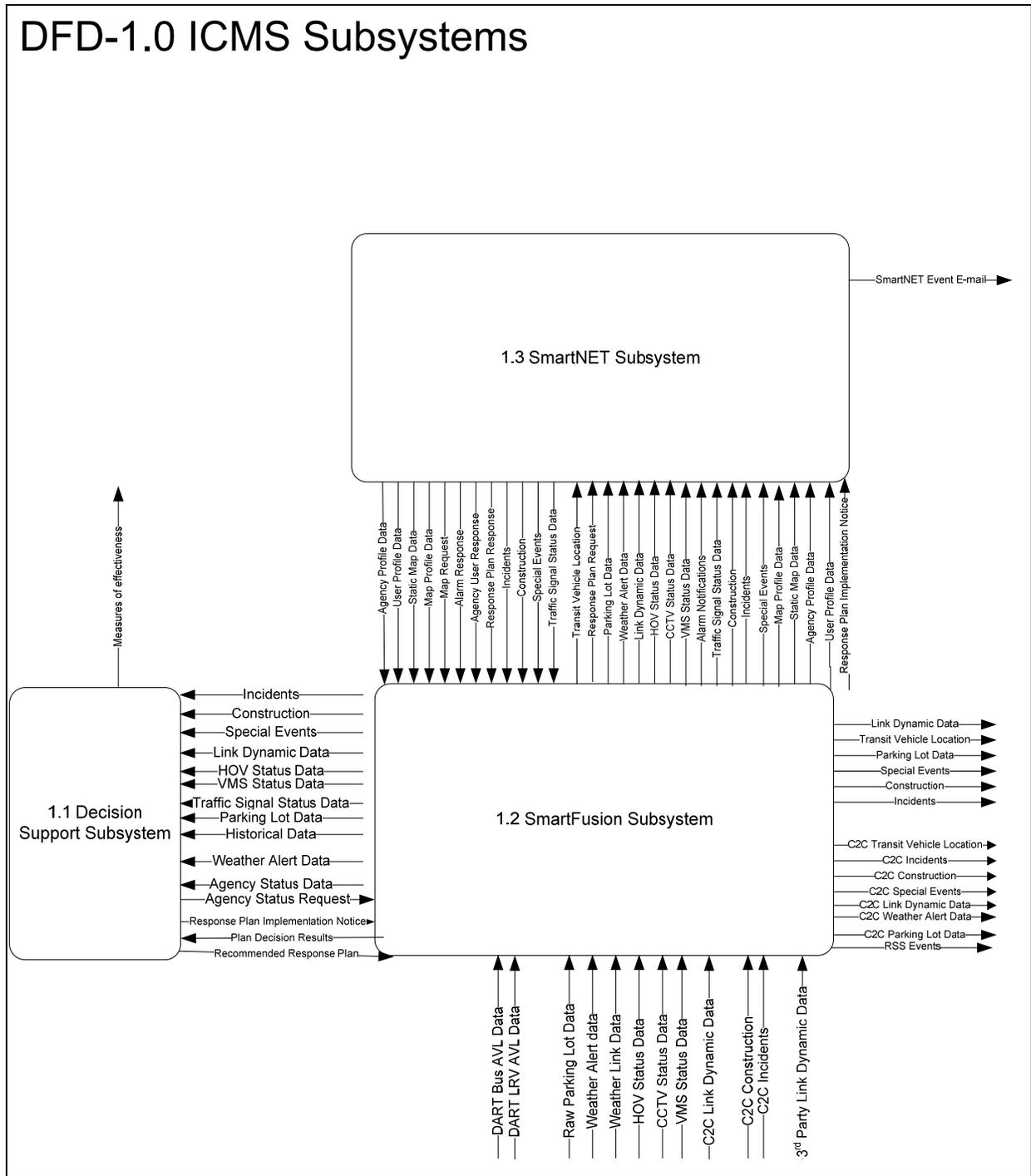
Figure 0-1. Data Flow Diagram – Level 0

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Chapter 6.0 Requirements

This section covers the functional, performance, interface, data, and hardware requirements. It also covers non-functional and enabling requirements, and constraints. For the requirements provided below, the requirement ID provides the level of requirement:

Level 1 – ICMS – 1.

Level 2 – ICMS Subsystem 1.X.

Level 3 – ICMS SubSubSystem 1.X.Y.

Level 4 – ICMS Requirement 1.X.Y.Z

Level 5 – ICMS Data Requirement 1.X.Y.Z.a

Requirement numbering rules

- System Requirements would be 1.0.0.10 to 1.0.0.n
- Subsystem Requirements would be 1.1.0.10 to 1.X.0.n
- Subsubsystem Requirements would be 1.1.1.10 to 1.X.X.n
- Data Element requirements would be children of Subsubsystem requirements 1.1.1.10.1 to 1.X.X.X.n
- First number is 10 - 1.0.0.10 with increments of 10 - 1.0.0.20, 1.0.0.30, etc

Requirement Types

- F = Functional
- I = Interface (interface between ICMS and external systems)
- D = Data (internal storage, send and receive of data within the ICMS)
- C = Constraint
- P = Performance
- H = Hardware

Verification Method

- **Analysis** = Analysis (Analysis is the use of established technical or mathematical models or simulations, algorithms, or other scientific principles and procedures to provide evidence that the item meets its stated requirements.)

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- **Inspect** = Inspection (Inspection is observation using one or more of the five senses, simple physical manipulation, and mechanical and electrical gauging and measurement to verify that the item conforms to its specified requirements.)

- **Demo** =Demonstrate (Demonstration is the actual operation of an item to provide evidence that it accomplishes the required functions under specific scenarios.)

- **Test** = Test(Test is the application of scientific principles and procedures to determine the properties or functional capabilities of items.)

Requirement Criticality

- H = High
- M = Medium
- L = Low

Assumptions and Dependencies

- All Design, Development and Deployment needs to be done by December 2011

- The Regional Center to Center will be sufficient for the data exchange needs of the ICM

- The Regional Center to Center will be partially deployed

- The Regional Data Warehouse will be deployed

- Communication links between all US 75 stakeholders are incomplete

- Current deployed infrastructure and systems will be utilized

- This is a research project, so some of the technology and systems deployed may need to be altered once operations has begun

- Current and proposed infrastructure will be sufficient for the data requirements of the ICM, and the real-time Decision Support Subsystem

- Utilize the existing Regional Center to Center system

- Existing systems will sufficient for the needs of the system

- DART Network will be deployed

- Regional Center to Center plug-in will be deployed for some partners

- Current agency specifications for equipment will be utilized

- Current agency user authorization and authentication practices will be used

- Current agency information technology standards (hardware/ software) will be used

- Decision Support Subsystem will include a web interface for agency's to utilize

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- An Operator at DalTrans will be the corridor coordinator

- Funding will be available for ICM

- Agencies within the corridor will be willing to optimize the entire corridor, even if it impacts their individual network

- Regional Transportation Council and NCTCOG are supportive of the ICM and will provide funding, when needed

6.1 ICMS High-Level "Business" Requirements

The first step in the requirements process is the development of the overall ICMS "business" requirements. The ICM Steering Committee developed the User Needs, Goals, and Vision for the corridor; these were then translated into applicable use cases, and high-level requirements for the ICM System as a whole. These requirements are fulfilled by existing and new systems, and are the requirements for the stakeholders to operate the corridor in an integrated manner.

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Requirement ID	Requirement Description	Type	User Needs	Source	Criticality	Verification Method	Included in Demo	Subsystem Allocation
1.0.0.10	The ICMS System shall provide interactive communication among agencies	Functional	1	Con Ops §4.2	High	Demonstrate	Yes	SmartNET Event GUI, Data Dissemination
1.0.0.20	The ICMS System shall receive current status of ITS devices in the corridor	Interface	2	Con Ops §4.2	High	Demonstrate	Yes	Data Collection
1.0.0.25	The ICMS System shall receive current status of the transportation network in the corridor	Interface	2	Con Ops §4.2	High	Demonstrate	Yes	Data Collection
1.0.0.30	The ICMS System shall send current status of ITS devices in the corridor to the corridor agencies	Interface	3	Con Ops §4.2	High	Demonstrate	Yes	Data Dissemination, SmartNET Event GUI
1.0.0.40	The ICMS System shall provide current performance of the corridor transportation network to corridor agencies	Data	4	Con Ops §4.2	Medium	Demonstrate	Yes	Data Dissemination, SmartNET Event GUI
1.0.0.50	The ICMS System shall provide current performance of the corridor transportation network to travelers	Functional	5	Con Ops §4.2	High	Demonstrate	Yes	Data Dissemination
1.0.0.60	The ICMS System shall provide information for corridor interactive trip planning to travelers	Interface	6	Con Ops §4.2	Medium	Demonstrate	Yes	Outside of ICM System - existing DART system

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Requirement ID	Requirement Description	Type	User Needs	Source	Criticality	Verification Method	Included in Demo	Subsystem Allocation
1.0.0.70	The ICMS System shall provide travel time information to travelers	Interface	7	Con Ops §4.2	Medium	Demonstrate	Yes	Data Dissemination, Data Fusion
1.0.0.80	The ICMS System shall provide roadway event information to travelers	Interface	8	Con Ops §4.2	High	Demonstrate	Yes	Data Dissemination, Data Collection & SmartNET
1.0.0.90	The ICMS System shall provide transit event information to travelers	Interface	9	Con Ops §4.2	High	Demonstrate	Yes	Data Dissemination, Data Collection & SmartNET
1.0.0.100	The ICMS System shall store inventory of ITS devices within the corridor	Functional	10	Con Ops §4.2	Medium	Demonstrate	Yes	SmartNET Event GUI , Data Store
1.0.0.110	The ICMS System shall store ownership of ITS devices within the corridor	Functional	11	Con Ops §4.2	Medium	Demonstrate	Yes	SmartNET Event GUI, Data Store
1.0.0.120	The ICMS System shall analyze stored event data to evaluate the effectiveness of the corridor strategies and response plans	Functional	12	Con Ops §4.2	High	Demonstrate	Yes	Data Collection, Data Fusion
1.0.0.130	The ICMS System shall analyze stored ITS device status data to evaluate the effectiveness of the corridor strategies and response plans	Functional	13	Con Ops §4.2	Medium	Demonstrate	Yes	Data Store, Evaluation
1.0.0.140	The ICMS System shall store pre-agreed incident response plans	Functional	14	Cons Ops 4.2	Medium	Demonstrate	Yes	Expert Rules

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Requirement ID	Requirement Description	Type	User Needs	Source	Criticality	Verification Method	Included in Demo	Subsystem Allocation
1.0.0.150	The ICMS System shall send to agency users incident response plans to ensure that conflicting responses are not enacted	Interface	15	Con Ops §4.2	High	Demonstrate	Yes	Expert Rules, Plan Decision, Plan Decision GUI
1.0.0.160	The ICMS System shall send agency users incident response plans to ensure prompt response to incidents	Interface	16	Con Ops §4.2	Medium	Demonstrate	Yes	Expert Rules, Plan Decision, Plan Decision GUI
1.0.0.170	The ICMS System shall provide travelers alternate route option information	Functional	17	Con Ops §4.2	Low	Demonstrate	Yes	SmartNET Event GUI, Data Dissemination
1.0.0.180	The ICMS System shall provide travelers detour route information	Functional	18	Con Ops §4.2	Low	Demonstrate	Yes	SmartNET Event GUI, Data Dissemination
1.0.0.190	The ICMS System shall provide travelers information on alternate modes of transportation	Functional	19	Con Ops §4.2	Medium	Demonstrate	Yes	SmartNET Event GUI, Data Dissemination
1.0.0.200	The ICMS System shall store history of enacted response plans	Functional	20	Con Ops §4.2	Medium	Demonstrate	Yes	Data Store, Plan Decision
1.0.0.210	The ICMS System shall evaluate the impact of enacted response plans on the corridor	Functional	21	Con Ops §4.2	Medium	Demonstrate	Yes	SmartNET, Expert Rules
1.0.0.220	The ICMS System shall send to agency users incident response plans	Interface	22	Con Ops §4.2	Medium	Demonstrate	Yes	Expert Rules, Plan Decision, Plan Decision GUI

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Requirement ID	Requirement Description	Type	User Needs	Source	Criticality	Verification Method	Included in Demo	Subsystem Allocation
1.0.0.230	The ICMS System shall store updated pre-approved response plans	Functional	23	Con Ops §4.2	Medium	Demonstrate	Yes	Data Store, Expert Rules
1.0.0.240	The ICMS System shall provide 98 percent availability	Performance	24	Con Ops §4.2	Low	Demonstrate	Yes	All
1.0.0.250	The ICMS System shall provide data latency of less than or equal to 10 minutes from a data source where a change is received	Performance	24	Con Ops §4.2	Low	Demonstrate	Yes	All
1.0.0.260	The ICMS System shall provide automated monitoring capabilities to alert operators of outages	Performance	24	Con Ops §4.2	Low	Demonstrate	Yes	All
1.0.0.270	The ICMS System shall provide failover capabilities within 45 minutes	Performance	24	Con Ops §4.2	Low	Demonstrate	Yes	All

6.2 Subsystem Technical Requirements

For each of the ICM subsystems, requirements were developed to provide high-level functions, data, interfaces, and performance requirements to complete the ICMS.   All of these subsystems are a part of the overall ICM System.

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6.2.1 Decision Support Subsystem Requirements

Req No	Requirement Text	Type	Parent Req	User Needs	Criticality	Verification	Source	In Demo
1.1.0.10	The Expert Rules Subsubsystem shall receive from the Data Store Subsubsystem pre-agreed incident response plans as defined in data dictionary table 2.9.1	Functional	1.0.0.140	14	Medium	Demonstrate	Con Ops §4.3	Yes
1.1.0.20	The Expert Rules Subsubsystem shall provide the ICM Coordinator the capability to add pre-agreed incident response plans for a specified incident to the Data Store Sub-subsystem	Functional	1.0.0.230	23	Medium	Demonstrate	Con Ops §4.3	Yes
1.1.0.30	The Expert Rules Subsubsystem shall provide the ICM Coordinator the capability to query pre-agreed incident response plans	Functional	1.0.0.140	14	Medium	Demonstrate	Con Ops §4.3	Yes
1.1.0.40	The Expert Rules Subsubsystem shall provide the ICM Coordinator the capability to edit pre-agreed incident response plans for a specified incident	Functional	1.0.0.230	23	Medium	Demonstrate	Con Ops §4.3	Yes
1.1.0.50	The Expert Rules Subsubsystem shall provide the ICM Coordinator the capability to delete pre-agreed incident response plans for specified events	Functional	1.0.0.230	23	Medium	Demonstrate	Con Ops §4.3	Yes

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Req No	Requirement Text	Type	Parent Req	User Needs	Criticality	Verification	Source	In Demo
1.1.0.60	The Decision Support Subsystem shall receive from the SmartFusion Subsystem Incidents as defined in data dictionary table 2.5.1	Data	1.0.0.25	2	Medium	Demonstrate	Con Ops §4.3	Yes
1.1.0.70	The Decision Support Subsystem shall receive from the SmartFusion Subsystem Construction as defined in data dictionary table 2.5.2	Data	1.0.0.25	2	Medium	Demonstrate	Con Ops §4.3	Yes
1.1.0.80	The Decision Support Subsystem shall receive from the SmartFusion Subsystem Special events as defined in data dictionary table 2.5.3	Data	1.0.0.25	2	Medium	Demonstrate	Con Ops §4.3	Yes
1.1.0.90	The Decision Support Subsystem shall receive from the SmartFusion Subsystem Link dynamic data as defined in data dictionary table 2.4.4	Data	1.0.0.25	2	Medium	Demonstrate	Con Ops §4.3	Yes
1.1.0.100	The Decision Support Subsystem shall receive from the SmartFusion Subsystem HOV Status data as defined in data dictionary table 2.4.4	Data	1.0.0.20	2	Medium	Demonstrate	Con Ops §4.3	Yes
1.1.0.110	The Decision Support Subsystem shall receive from the SmartFusion Subsystem VMS Status Data as defined in data dictionary table 2.1.1	Data	1.0.0.20	2	Medium	Demonstrate	Con Ops §4.3	Yes
1.1.0.120	The Decision Support Subsystem shall receive from the SmartFusion Subsystem Traffic signal status data as defined in data dictionary table	Data	1.0.0.20	2	Medium	Demonstrate	Con Ops §4.3	Yes

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Req No	Requirement Text	Type	Parent Req	User Needs	Criticality	Verification	Source	In Demo
	2.1.3							
1.1.0.130	The Decision Support Subsystem shall receive from the SmartFusion Subsystem parking lot data as defined in data dictionary table 2.4.1	Data	1.0.0.20	2	Medium	Demonstrate	Con Ops §4.3	Yes
1.1.0.170	The Decision Support Subsystem shall receive from the SmartFusion Subsystem the response plan decision result as defined in data dictionary table 2.9.3	Data	1.0.0.10	1	Medium	Demonstrate	Con Ops §4.3	Yes
1.1.0.180	The Decision Support Subsystem shall receive from the SmartFusion Subsystem agency status as defined in data dictionary table 2.7.1	Data	1.0.0.10	1	Medium	Demonstrate	Con Ops §4.3	Yes
1.1.0.190	The Decision Support Subsystem shall receive from the SmartFusion Subsystem historical data as defined in data dictionary table section 2.10	Data	1.0.0.130	20	Medium	Demonstrate	Con Ops §4.3	Yes
1.1.0.200	The Decision Support Subsystem shall send the SmartFusion Subsystem agency status requests	Data	1.0.0.10	1	Medium	Demonstrate	Con Ops §4.3	Yes
1.1.0.210	The Decision Support Subsystem shall send the SmartFusion Subsystem a response plan recommendation within fifteen	Data	1.0.0.160	15, 16	Medium	Demonstrate	Con Ops §4.3	Yes

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Req No	Requirement Text	Type	Parent Req	User Needs	Criticality	Verification	Source	In Demo
	minutes of notification to the ICM Coordinator							
1.1.0.220	The Decision Support Subsystem shall receive from the SmartFusion Subsystem weather alert data	Data	1.0.0.120	12	Medium	Demonstrate	Con Ops §4.3	Yes

6.2.2 SmartNet Subsystem Requirements

Req No	Requirement Text	Type	Parent Req	User Needs	Criticality	Verification	Source	In Demo
1.3.0.10	The SmartNET Subsystem shall provide Agency Users the capability to view current status of ITS devices in the corridor	Functional	1.0.0.30	3	High	Demonstrate	Con Ops §4.3	Yes
1.3.0.20	The SmartNET Subsystem shall provide Agency Users the capability to view current conditions in the corridor	Functional	1.0.0.40	4	High	Demonstrate	Con Ops §4.3	Yes
1.3.0.30	The SmartNET Subsystem shall send to internet E-mail SmartNET E-mail alerts	Interface	1.0.0.10	1	Medium	Demonstrate	Con Ops §4.3	Yes
1.3.0.40	The SmartNET Subsystem shall receive from the SmartFusion Subsystem incidents	Data	1.0.0.10	1	High	Demonstrate	Con Ops §4.3	Yes

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Req No	Requirement Text	Type	Parent Req	User Needs	Criticality	Verification	Source	In Demo
1.3.0.50	The SmartNET Subsystem shall receive from the SmartFusion Subsystem construction	Data	1.0.0.10	1	High	Demonstrate	Con Ops §4.3	Yes
1.3.0.60	The SmartNET Subsystem shall receive from the SmartFusion Subsystem special events	Data	1.0.0.10	1	High	Demonstrate	Con Ops §4.3	Yes
1.3.0.70	The SmartNET Subsystem shall receive from the SmartFusion Subsystem parking lot data	Data	1.0.0.10	1	Medium	Demonstrate	Con Ops §4.3	Yes
1.3.0.80	The SmartNET Subsystem shall receive from the SmartFusion Subsystem weather alert data	Data	1.0.0.10	1	High	Demonstrate	Con Ops §4.3	Yes
1.3.0.90	The SmartNET Subsystem shall receive from the SmartFusion Subsystem link dynamic data	Data	1.0.0.10	1	Medium	Demonstrate	Con Ops §4.3	Yes
1.3.0.100	The SmartNET Subsystem shall receive from the SmartFusion Subsystem HOV status data	Data	1.0.0.30	3	Medium	Demonstrate	Con Ops §4.3	Yes
1.3.0.110	The SmartNET Subsystem shall receive from the SmartFusion Subsystem CCTV status data	Data	1.0.0.30	3	Medium	Demonstrate	Con Ops §4.3	Yes

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Req No	Requirement Text	Type	Parent Req	User Needs	Criticality	Verification	Source	In Demo
1.3.0.120	The SmartNET Subsystem shall receive from the SmartFusion Subsystem VMS status data	Data	1.0.0.30	3	Medium	Demonstrate	Con Ops §4.3	Yes
1.3.0.130	The SmartNET Subsystem shall receive from the SmartFusion Subsystem traffic signal status data	Data	1.0.0.30	3	High	Demonstrate	Con Ops §4.3	Yes
1.3.0.140	The SmartNET Subsystem shall receive from the SmartFusion Subsystem a response plan recommendation	Data	1.0.0.220	22	High	Demonstrate	Con Ops §4.3	Yes
1.3.0.150	The SmartNET Subsystem shall send to the SmartFusion Subsystem incidents	Data	1.0.0.10	1	High	Demonstrate	Con Ops §4.3	Yes
1.3.0.160	The SmartNET Subsystem shall send to the SmartFusion Subsystem construction	Data	1.0.0.10	1	High	Demonstrate	Con Ops §4.3	Yes
1.3.0.170	The SmartNET Subsystem shall send to the SmartFusion Subsystem special events	Data	1.0.0.10	1	High	Demonstrate	Con Ops §4.3	Yes
1.3.0.180	The SmartNET Subsystem shall send to the SmartFusion Subsystem response plan responses	Data	1.0.0.220	22	High	Demonstrate	Con Ops §4.3	Yes

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Req No	Requirement Text	Type	Parent Req	User Needs	Criticality	Verification	Source	In Demo
1.3.0.190	The SmartNET Subsystem shall receive from the SmartFusion Subsystem transit vehicle location data	Data	1.0.0.30	3	High	Demonstrate	Con Ops §4.3	Yes
1.3.0.200	The SmartNET Subsystem shall send to the SmartFusion Subsystem agency profile data	Data	1.0.0.220	22	High	Demonstrate	Con Ops §4.3	Yes
1.3.0.210	The SmartNET Subsystem shall send to the SmartFusion Subsystem user profile data	Data	1.0.0.220	22	High	Demonstrate	Con Ops §4.3	Yes
1.3.0.220	The SmartNET Subsystem shall receive from the SmartFusion Subsystem agency profile data	Data	1.0.0.220	22	High	Demonstrate	Con Ops §4.3	Yes
1.3.0.230	The SmartNET Subsystem shall receive from the SmartFusion Subsystem user profile data	Data	1.0.0.220	22	High	Demonstrate	Con Ops §4.3	Yes
1.3.0.240	The SmartNET Subsystem shall receive from the SmartFusion Subsystem an alarm notification	Data	1.0.0.10	1	High	Demonstrate	Con Ops §4.3	Yes
1.3.0.250	The SmartNET Subsystem shall receive from the SmartFusion Subsystem map profile data	Data	1.0.0.10	1	High	Demonstrate	Con Ops §4.3	Yes

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Req No	Requirement Text	Type	Parent Req	User Needs	Criticality	Verification	Source	In Demo
1.3.0.260	The SmartNET Subsystem shall receive from the SmartFusion Subsystem static map data	Data	1.0.0.10	1	High	Demonstrate	Con Ops §4.3	Yes
1.3.0.270	The SmartNET Subsystem shall send to the SmartFusion Subsystem map profile data	Data	1.0.0.10	1	High	Demonstrate	Con Ops §4.3	Yes
1.3.0.280	The SmartNET Subsystem shall send to the SmartFusion Subsystem a static map request	Data	1.0.0.10	1	High	Demonstrate	Con Ops §4.3	Yes
1.3.0.290	The SmartNET Subsystem shall send to the SmartFusion Subsystem an alarm response	Data	1.0.0.10	1	High	Demonstrate	Con Ops §4.3	Yes
1.3.0.300	The SmartNET Subsystem shall receive from the SmartFusion Subsystem a response plan request	Data	1.0.0.220	22	High	Demonstrate	Con Ops §4.3	Yes
1.3.0.310	The SmartNET Subsystem shall send to the SmartFusion Subsystem an agency user response	Data	1.0.0.220	22	High	Demonstrate	Con Ops §4.3	Yes
1.3.0.320	The SmartNET Subsystem shall send to the SmartFusion Subsystem traffic signal status data	Data	1.0.0.30	3	High	Demonstrate	Con Ops §4.3	Yes

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Req No	Requirement Text	Type	Parent Req	User Needs	Criticality	Verification	Source	In Demo
1.3.0.330	The SmartNET Subsystem shall send to the SmartFusion Subsystem static map data	Data	1.0.0.100	10	High	Demonstrate	Con Ops §4.3	Yes

6.2.3 SmartFusion Requirements

Req No	Requirement Text	Type	Parent Req	User Needs	Criticality	Verification	Source	In Demo
1.2.0.10	The SmartFusion Subsystem shall receive from the Regional Center to Center interface CCTV status in the corridor as defined in C2C-SICD-4.3.0	Interface	1.0.0.20	2	High	Demonstrate	Con Ops §4.3	Yes
1.2.0.15	The SmartFusion Subsystem shall receive from the Regional Center to Center interface VMS Status in the corridor as defined in C2C-SICD-4.3.0	Interface	1.0.0.20	2	High	Demonstrate	Con Ops §4.3	Yes
1.2.0.18	The SmartFusion Subsystem shall receive from the Regional Center to Center interface HOV Status in the corridor as defined in C2C-SICD-4.3.0	Interface	1.0.0.20	2	High	Demonstrate	Con Ops §4.3	Yes
1.2.0.20	The SmartFusion Subsystem shall receive from the DART Network bus AVL data in the corridor	Interface	1.0.0.25	2	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.0.25	The SmartFusion Subsystem shall receive from the DART Network light rail vehicle AVL data in the	Interface	1.0.0.25	2	Medium	Demonstrate	Con Ops §4.3	Yes

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Req No	Requirement Text	Type	Parent Req	User Needs	Criticality	Verification	Source	In Demo
	corridor							
1.2.0.30	The SmartFusion Subsystem shall receive from the weather data interface weather link data in the corridor	Interface	1.0.0.25	2	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.0.35	The SmartFusion Subsystem shall receive from the weather data interface weather alert data in the corridor	Interface	1.0.0.20	2	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.0.40	The SmartFusion Subsystem shall receive from the Parking Management System Interface parking lot data in the corridor as defined in data dictionary table 2.4.1	Interface	1.0.0.20	2	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.0.50	The SmartFusion Subsystem shall receive current link dynamic data in the corridor from the Regional Center to Center interface as defined in C2C-SICD-4.3.0	Interface	1.0.0.20	2	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.0.70	The SmartFusion Subsystem shall receive from 3rd Party information providers link dynamic data in the corridor	Interface	1.0.0.20,	2	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.0.90	The SmartFusion Subsystem shall receive from the Regional Center to Center interface incident data as defined in C2C-SICD-4.3.0	Interface	1.0.0.25	2	High	Demonstrate	Con Ops §4.3	Yes

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Req No	Requirement Text	Type	Parent Req	User Needs	Criticality	Verification	Source	In Demo
1.2.0.95	The SmartFusion Subsystem shall receive from the Regional Center to Center interface construction data as defined in C2C-SICD-4.3.0	Interface	1.0.0.25	2	High	Demonstrate	Con Ops §4.3	Yes
1.2.0.100	The SmartFusion Subsystem shall receive from the SmartNET Subsystem incident data	Data	1.0.0.25	2	High	Demonstrate	Con Ops §4.3	Yes
1.2.0.105	The SmartFusion Subsystem shall receive from the SmartNET Subsystem construction data	Data	1.0.0.25	2	High	Demonstrate	Con Ops §4.3	Yes
1.2.0.108	The SmartFusion Subsystem shall receive from the SmartNET Subsystem special event data	Data	1.0.0.25	2	High	Demonstrate	Con Ops §4.3	Yes
1.2.0.290	The SmartFusion Subsystem shall receive from the SmartNET Subsystem traffic signal status data	Data	1.0.0.20	2	High	Demonstrate	Con Ops §4.3	Yes
1.2.0.110	The SmartFusion Subsystem shall send to the Regional Center to Center interface parking lot data as defined in C2C-SICD-4.3.0	Interface	1.0.0.50	5	High	Demonstrate	Con Ops §4.3	Yes
1.2.0.115	The SmartFusion Subsystem shall send to the Regional Center to Center interface transit vehicle location data as defined in C2C-SICD-4.3.0	Interface	1.0.0.50	5	High	Demonstrate	Con Ops §4.3	Yes
1.2.0.120	The SmartFusion Subsystem shall send to the Regional Center to Center interface link dynamic data as defined in C2C-SICD-4.3.0	Interface	1.0.0.70	7	Medium	Demonstrate	Con Ops §4.3	Yes

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Req No	Requirement Text	Type	Parent Req	User Needs	Criticality	Verification	Source	In Demo
1.2.0.125	The SmartFusion Subsystem shall send to the Regional Center to Center interface transit vehicle location data as defined in C2C-SICD-4.3.0	Interface	1.0.0.70	7	Medium	Demonstrate	Con Ops 4.3	Yes
1.2.0.130	The SmartFusion Subsystem shall send to the Regional Center to Center interface incident data as defined in C2C-SICD-4.3.0	Interface	1.0.0.90	9	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.0.135	The SmartFusion Subsystem shall send to the Regional Center to Center interface construction data as defined in C2C-SICD-4.3.0	Interface	1.0.0.90	9	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.0.138	The SmartFusion Subsystem shall send to the Regional Center to Center interface special event data as defined in C2C-SICD-4.3.0	Interface	1.0.0.90	9	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.0.140	The SmartFusion Subsystem shall send to the Public Web weather alert data	Interface	1.0.0.90	9	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.0.150	The SmartFusion Subsystem shall send to the Public Web incident data	Interface	1.0.0.90	9	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.0.155	The SmartFusion Subsystem shall send to the Public Web construction data	Interface	1.0.0.90	8, 9	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.0.158	The SmartFusion Subsystem shall send to the Public Web special event data	Interface	1.0.0.90	8, 9	Medium	Demonstrate	Con Ops §4.3	Yes

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Req No	Requirement Text	Type	Parent Req	User Needs	Criticality	Verification	Source	In Demo
1.2.0.160	The SmartFusion Subsystem shall send to the Public Web link dynamic data	Interface	1.0.0.70	7	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.0.165	The SmartFusion Subsystem shall send to the Public Web parking lot data	Interface	1.0.0.70	7	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.0.170	The SmartFusion Subsystem shall send to the Interactive Voice Response Telephone system link dynamic data	Interface	1.0.0.70	7	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.0.180	The SmartFusion Subsystem shall send to the Interactive Voice Response Telephone system incident data	Interface	1.0.0.90	9	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.0.200	The SmartFusion Subsystem shall send to the Interactive Voice Response Telephone system weather alert data	Interface	1.0.0.50	5	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.0.210	The SmartFusion Subsystem shall send to the RSS Media feed RSS Events	Interface	1.0.0.90	9	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.0.220	The SmartFusion Subsystem shall send to the interactive trip planner incident data	Interface	1.0.0.60	6	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.0.240	The SmartFusion Subsystem shall send to the interactive trip planner link dynamic data	Interface	1.0.0.60	6	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.0.250	The SmartFusion Subsystem shall send to ALERT system, link dynamic data	Interface	1.0.0.50	5	Medium	Demonstrate	Con Ops §4.3	Yes

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Req No	Requirement Text	Type	Parent Req	User Needs	Criticality	Verification	Source	In Demo
1.2.0.420	The SmartFusion Subsystem shall store weather alert data	Functional	1.0.0.130	13	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.0.270	The SmartFusion Subsystem shall send to ALERT system, parking lot data	Interface	1.0.0.90	9	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.0.280	The SmartFusion Subsystem shall send to ALERT system, weather alert data	Interface	1.0.0.90	9	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.0.300	The SmartFusion Subsystem shall send to the Public Web, parking lot data	Interface	1.0.0.90	8	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.0.310	The SmartFusion Subsystem shall send to the Public Web, transit vehicle location data	Interface	1.0.0.70	7	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.0.320	The SmartFusion Subsystem shall send to Interactive Voice Response Telephone system, parking lot data	Interface	1.0.0.90	9	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.0.330	The SmartFusion Subsystem shall store incident data	Functional	1.0.0.120	12	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.0.340	The SmartFusion Subsystem shall store construction data	Functional	1.0.0.120	12	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.0.350	The SmartFusion Subsystem shall store special event data	Functional	1.0.0.120	12	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.0.360	The SmartFusion Subsystem shall store CCTV status data	Functional	1.0.0.130	13	Medium	Demonstrate	Con Ops §4.3	Yes

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Req No	Requirement Text	Type	Parent Req	User Needs	Criticality	Verification	Source	In Demo
1.2.0.370	The SmartFusion Subsystem shall store VMS Status data	Functional	1.0.0.130	13	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.0.380	The SmartFusion Subsystem shall store HOV Status data	Functional	1.0.0.130	13	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.0.390	The SmartFusion Subsystem shall store link dynamic data	Functional	1.0.0.130	13	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.0.400	The SmartFusion Subsystem shall store parking lot data	Functional	1.0.0.130	13	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.0.410	The SmartFusion Subsystem shall store transit vehicle location data	Functional	1.0.0.130	13	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.0.420	The SmartFusion Subsystem shall store weather alert data	Functional	1.0.0.130	13	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.0.430	The SmartFusion Subsystem shall aggregate incident data	Functional	1.0.0.40	4	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.0.440	The SmartFusion Subsystem shall aggregate construction data	Functional	1.0.0.40	4	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.0.450	The SmartFusion Subsystem shall aggregate special event data	Functional	1.0.0.40	4	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.0.460	The SmartFusion Subsystem shall aggregate CCTV status data	Functional	1.0.0.40	4	Medium	Demonstrate	Con Ops §4.3	Yes

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Req No	Requirement Text	Type	Parent Req	User Needs	Criticality	Verification	Source	In Demo
1.2.0.470	The SmartFusion Subsystem shall aggregate VMS Status data	Functional	1.0.0.40	4	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.0.480	The SmartFusion Subsystem shall aggregate HOV Status data	Functional	1.0.0.40	4	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.0.490	The SmartFusion Subsystem shall aggregate link dynamic data	Functional	1.0.0.40	4	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.0.500	The SmartFusion Subsystem shall aggregate parking lot data	Functional	1.0.0.40	4	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.0.510	The SmartFusion Subsystem shall aggregate transit vehicle location data	Functional	1.0.0.40	4	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.0.520	The SmartFusion Subsystem shall aggregate weather alert data	Functional	1.0.0.40	4	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.0.530	The SmartFusion Subsystem shall store pre-agreed incident response plans	Functional	1.0.0.140	14	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.0.540	The SmartFusion Subsystem shall store history of enacted response plans	Functional	1.0.0.200	20	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.0.550	The SmartFusion Subsystem shall aggregate traffic signal status data	Functional	1.0.0.20	2	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.0.560	The SmartFusion Subsystem shall send to the Decision Support Subsystem VMS status data	Functional	1.0.0.40	4	Medium	Demonstrate	Con Ops §4.3	Yes

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Req No	Requirement Text	Type	Parent Req	User Needs	Criticality	Verification	Source	In Demo
1.2.0.570	The SmartFusion Subsystem shall send to the Decision Support Subsystem CCTV status data	Functional	1.0.0.40	4	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.0.580	The SmartFusion Subsystem shall send to the Decision Support Subsystem HOV status data	Functional	1.0.0.40	4	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.0.590	The SmartFusion Subsystem shall send to the Decision Support Subsystem incident data	Functional	1.0.0.40	4	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.0.600	The SmartFusion Subsystem shall send to the Decision Support Subsystem link dynamic data	Functional	1.0.0.40	4	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.0.610	The SmartFusion Subsystem shall send to the Decision Support Subsystem parking lot data	Functional	1.0.0.40	4	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.0.620	The SmartFusion Subsystem shall send to the Decision Support Subsystem weather alert data	Functional	1.0.0.40	4	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.0.630	The SmartFusion Subsystem shall send to the Decision Support Subsystem traffic signal status data	Functional	1.0.0.40	4	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.0.640	The SmartFusion Subsystem shall send to the Decision Support Subsystem transit vehicle location data	Functional	1.0.0.40	4	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.0.650	The SmartFusion Subsystem shall send to the SmartNET Subsystem static map data	Data	1.0.0.100	10	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.0.660	The SmartFusion Subsystem shall receive from the SmartNET Subsystem static map data	Data	1.0.0.100	10	Medium	Demonstrate	Con Ops §4.3	Yes

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Req No	Requirement Text	Type	Parent Req	User Needs	Criticality	Verification	Source	In Demo
1.2.0.670	The SmartFusion Subsystem shall store static map data	Functional	1.0.0.100	10	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.0.680	The SmartFusion Subsystem shall store traffic signal status	Functional	1.0.0.130	13	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.0.690	The SmartFusion Subsystem shall store map profile data	Functional	1.0.0.10	1	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.0.700	The SmartFusion Subsystem shall store agency profile data	Functional	1.0.0.220	22	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.0.710	The SmartFusion Subsystem shall store user profile data	Functional	1.0.0.220	22	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.0.720	The SmartFusion Subsystem shall store alarm notifications	Functional	1.0.0.10	1	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.0.730	The SmartFusion Subsystem shall receive from the SmartNET Subsystem a map request	Data	1.0.0.100	10	Medium	Demonstrate	Con Ops §4.3	Yes

6.3 SubSubSystem Technical Requirements

For each of the ICM SubSubSystems, requirements were developed to provide high-level functions, data, interfaces, and performance requirements to complete the ICMS.   All of these SubSubSystems are a part of the overall ICM System.

For the Decision Support Subsystem, the following SubSubSystem Requirements were developed.

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6.3.1 Expert Rules SubSubSystem Requirements

Req No	Requirement Text	Type	Parent Req	User Needs	Criticality	Verification	Source	In Demo
1.1.1.10	The Expert Rules Subsubsystem Shall generate a response plan recommendation based on existing network conditions in the ICM corridor	Functional	1.1.0.210	15, 16	Low	Demonstrate	Con Ops §4.3	Yes
1.1.1.20	The Expert Rules Subsubsystem shall provide to the Prediction Subsubsystem the response plan recommendation within two minutes after the ICM Coordinator confirms the response plan	Performance	1.0.0.120, 1.0.0.130	12, 13	Medium	Test	Con Ops §4.3	Yes
1.1.1.30	The Expert Rules Subsubsystem Shall send to the Plan Decision Subsubsystem a response plan recommendation	Functional	1.1.0.210	15, 16	Low	Demonstrate	Con Ops §4.3	Yes
1.1.1.40	The Expert Rules Subsubsystem shall provide the Evaluation Subsubsystem the response plan recommendation after the ICM Coordinator confirms the response plan	Functional	1.1.0.210	15, 16	Low	Demonstrate	Con Ops §4.3	Yes
1.1.1.60	The Expert Rules Subsubsystem shall receive from the Plan Decision Subsubsystem a plan decision result	Functional	1.1.0.210	15, 16	Low	Demonstrate	Con Ops §4.3	Yes

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Req No	Requirement Text	Type	Parent Req	User Needs	Criticality	Verification	Source	In Demo
1.1.1.80	The Expert Rules Subsubsystem shall receive from the Data Dissemination Subsubsystem VMS status data	Data	1.1.0.110	2	Medium	Demonstrate	Con Ops §4.3	Yes
1.1.1.90	The Expert Rules Subsubsystem shall receive from the Data Dissemination Subsubsystem Traffic Signal status data	Data	1.1.0.120	2	Medium	Demonstrate	Con Ops §4.3	Yes
1.1.1.100	The Expert Rules Subsubsystem shall receive from the Data Dissemination Subsubsystem HOV status data	Data	1.1.0.100	2	Medium	Demonstrate	Con Ops §4.3	Yes
1.1.1.110	The Expert Rules Subsubsystem shall receive from the Data Dissemination Subsubsystem link dynamic data	Data	1.1.0.90	2	Medium	Demonstrate	Con Ops §4.3	Yes
1.1.1.150	The Expert Rules Subsubsystem shall receive from the Data Dissemination Subsubsystem parking lot data	Data	1.1.0.130	2	Medium	Demonstrate	Con Ops §4.3	Yes
1.1.1.160	The Expert Rules Subsubsystem shall receive from the Data Dissemination Subsubsystem weather alert data	Data	1.1.0.220	2	Medium	Demonstrate	Con Ops §4.3	Yes
1.1.1.190	The Expert Rules Subsubsystem shall receive from the Data Dissemination Subsubsystem incident data	Data	1.1.0.60	2	Medium	Demonstrate	Con Ops §4.3	Yes

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Req No	Requirement Text	Type	Parent Req	User Needs	Criticality	Verification	Source	In Demo
1.1.1.200	The Expert Rules Subsubsystem shall receive from the Data Dissemination Subsubsystem construction data	Data	1.1.0.70	2	Medium	Demonstrate	Con Ops §4.3	Yes
1.1.1.210	The Expert Rules Subsubsystem shall receive from the Data Dissemination Subsubsystem special event data	Data	1.1.0.80	2	Medium	Demonstrate	Con Ops §4.3	Yes
1.1.1.240	The Expert Rules Subsubsystem shall receive from the Plan Decision Subsubsystem agency status	Data	1.1.0.180	1	Medium	Demonstrate	Con Ops §4.3	Yes
1.1.1.250	The Expert Rules Subsubsystem shall send to the Prediction Subsubsystem link dynamic data	Data	1.1.0.90	2	Medium	Demonstrate	Con Ops §4.3	Yes
1.1.1.260	The Expert Rules Subsubsystem shall send to the Prediction Subsubsystem traffic signal status data	Data	1.1.0.120	2	Medium	Demonstrate	Con Ops §4.3	Yes
1.1.1.270	The Expert Rules Subsubsystem shall send to the Prediction Subsubsystem incidents	Data	1.1.0.60	2	Medium	Demonstrate	Con Ops §4.3	Yes
1.1.1.280	The Expert Rules Subsubsystem shall send to the Prediction Subsubsystem construction	Data	1.1.0.70	2	Medium	Demonstrate	Con Ops §4.3	Yes
1.1.1.290	The Expert Rules Subsubsystem shall send to the Prediction Subsubsystem special events	Data	1.1.0.80	2	Medium	Demonstrate	Con Ops §4.3	Yes

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Req No	Requirement Text	Type	Parent Req	User Needs	Criticality	Verification	Source	In Demo
1.1.1.300	The Expert Rules Subsubsystem shall send to the Prediction Subsubsystem VMS status data	Data	1.1.0.110	2	Medium	Demonstrate	Con Ops §4.3	Yes
1.1.1.310	The Expert Rules Subsubsystem shall send to the Prediction Subsubsystem HOV status data	Data	1.1.0.100	2	Medium	Demonstrate	Con Ops §4.3	Yes
1.1.1.320	The Expert Rules Subsubsystem shall send to the Prediction Subsubsystem weather alert data	Data	1.1.0.220	2	Medium	Demonstrate	Con Ops §4.3	Yes
1.1.1.330	The Expert Rules Subsubsystem shall send to the Prediction Subsubsystem parking lot data	Data	1.1.0.130	2	Medium	Demonstrate	Con Ops §4.3	Yes
1.1.1.340	The Expert Rules Subsubsystem shall receive from the Prediction Subsubsystem predicted network conditions	Data	1.0.0.120	12, 13	Medium	Demonstrate	Con Ops §4.3	Yes
1.1.1.350	The Expert Rules Subsubsystem shall send to the Evaluation Subsubsystem link dynamic data	Data	1.1.0.90	2	Medium	Demonstrate	Con Ops §4.3	Yes
1.1.1.360	The Expert Rules Subsubsystem shall send to the Evaluation Subsubsystem incidents	Data	1.1.0.60	2	Medium	Demonstrate	Con Ops §4.3	Yes
1.1.1.370	The Expert Rules Subsubsystem shall send to the Evaluation Subsubsystem construction	Data	1.1.0.70	2	Medium	Demonstrate	Con Ops §4.3	Yes

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Req No	Requirement Text	Type	Parent Req	User Needs	Criticality	Verification	Source	In Demo
1.1.1.380	The Expert Rules Subsubsystem shall send to the Evaluation Subsubsystem special events	Data	1.1.0.80	2	Medium	Demonstrate	Con Ops §4.3	Yes
1.1.1.390	The Expert Rules Subsubsystem shall send to the Evaluation Subsubsystem traffic signal status data	Data	1.1.0.120	2	Medium	Demonstrate	Con Ops §4.3	Yes
1.1.1.400	The Expert Rules Subsubsystem shall send to the Evaluation Subsubsystem VMS status data	Data	1.1.0.110	2	Medium	Demonstrate	Con Ops §4.3	Yes
1.1.1.410	The Expert Rules Subsubsystem shall send to the Evaluation Subsubsystem HOV status data	Data	1.1.0.100	2	Medium	Demonstrate	Con Ops §4.3	Yes
1.1.1.420	The Expert Rules Subsubsystem shall send to the Evaluation Subsubsystem weather alert data	Data	1.1.0.220	2	Medium	Demonstrate	Con Ops §4.3	Yes
1.1.1.430	The Expert Rules Subsubsystem shall send to the Evaluation Subsubsystem parking lot data	Data	1.1.0.130	2	Medium	Demonstrate	Con Ops §4.3	Yes
1.1.1.440	The Expert Rules Subsubsystem shall calculate measures of effectiveness	Data	1.0.0.120	12	Medium	Demonstrate	Con Ops §4.3	Yes

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Req No	Requirement Text	Type	Parent Req	User Needs	Criticality	Verification	Source	In Demo
1.1.1.450	The Expert Rules Subsubsystem shall send the Evaluation Subsubsystem agency status	Data	1.1.0.180	1	Medium	Demonstrate	Con Ops §4.3	Yes
1.1.1.460	The Expert Rules Subsubsystem shall send the Plan Decision Subsubsystem agency status request	Data	1.1.0.200	15, 16	Low	Demonstrate	Con Ops §4.3	Yes
1.1.1.470	The Expert Rules Subsubsystem shall send the Evaluation Subsubsystem a summary of the predicted network conditions	Data	1.0.0.120, 1.0.0.130	12, 13	Medium	Demonstrate	Con Ops §4.3	Yes
1.1.1.480	The Expert Rules Subsubsystem shall evaluate the ICM network conditions to compute the performance measures	Functional	1.0.0.150	15	High	Demonstrate	Con Ops §4.3	Yes
1.1.1.490	The Expert Rules Subsubsystem shall select a response plan recommendation based on the response plan list	Functional	1.1.0.210	15	High	Demonstrate	Con Ops §4.3	Yes
1.1.1.500	The Expert Rules Subsubsystem shall coordinate with the Plan Decision Subsubsystem the response plan recommendation	Functional	1.1.0.210	15	High	Demonstrate	Con Ops §4.3	Yes
1.1.1.510	The Expert Rules Subsubsystem shall send the Prediction Subsubsystem	Functional	1.0.0.130	13	Medium	Demonstrate	Con Ops §4.3	Yes

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Req No	Requirement Text	Type	Parent Req	User Needs	Criticality	Verification	Source	In Demo
	O/D matrix data							
1.1.1.520	The Expert Rules Subsubsystem shall send the Prediction Subsubsystem static network data	Functional	1.0.0.130	13	Medium	Demonstrate	Con Ops §4.3	Yes

6.3.2 Prediction SubSubSystem Requirements

Req No	Requirement Text	Type	Parent Req	User Needs	Criticality	Verification	Source	In Demo
1.1.3.10	The Prediction Subsubsystem shall receive from the Expert Rules Subsubsystem link dynamic data	Data	1.1.0.90	2	Medium	Demonstrate	Con Ops §4.3	Yes
1.1.3.20	The Prediction Subsubsystem shall receive from the Expert Rules Subsubsystem traffic signal data	Data	1.1.0.120	2	Medium	Demonstrate	Con Ops §4.3	Yes
1.1.3.30	The Prediction Subsubsystem shall receive from the Expert Rules Subsubsystem incidents	Data	1.1.0.60	2	Medium	Demonstrate	Con Ops §4.3	Yes
1.1.3.40	The Prediction Subsubsystem shall receive from the Expert Rules Subsubsystem construction	Data	1.1.0.70	2	Medium	Demonstrate	Con Ops §4.3	Yes

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Req No	Requirement Text	Type	Parent Req	User Needs	Criticality	Verification	Source	In Demo
1.1.3.50	The Prediction Subsubsystem shall receive from the Expert Rules Subsubsystem special events	Data	1.1.0.80	2	Medium	Demonstrate	Con Ops §4.3	Yes
1.1.3.60	The Prediction Subsubsystem shall receive from the Expert Rules Subsubsystem VMS status data	Data	1.1.0.110	2	Medium	Demonstrate	Con Ops §4.3	Yes
1.1.3.70	The Prediction Subsubsystem shall receive from the Expert Rules Subsubsystem HOV status data	Data	1.1.0.100	2	Medium	Demonstrate	Con Ops §4.3	Yes
1.1.3.80	The Prediction Subsubsystem shall receive from the Expert Rules Subsubsystem weather alert data	Data	1,1,0.220	2	Medium	Demonstrate	Con Ops §4.3	Yes
1.1.3.90	The Prediction Subsubsystem shall receive from the Expert Rules Subsubsystem parking lot data	Data	1.1.0.130	2	Medium	Demonstrate	Con Ops §4.3	Yes
1.1.3.100	The Prediction Subsubsystem shall receive from the Expert Rules Subsubsystem response plan	Data	1.0.0.130	13	Medium	Demonstrate	Con Ops §4.3	Yes
1.1.3.110	The Prediction Subsubsystem shall compute predicted network conditions	Functional	1.0.0.120	12, 13	Medium	Demonstrate	Con Ops §4.3	Yes

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Req No	Requirement Text	Type	Parent Req	User Needs	Criticality	Verification	Source	In Demo
1.1.3.120	The Prediction Subsubsystem shall send to the Expert Rules Subsubsystem predicted network conditions	Data	1.0.0.120	12, 13	Medium	Demonstrate	Con Ops §4.3	Yes
1.1.3.130	The Prediction Subsubsystem shall accept from the Expert Rules Subsubsystem the recommended incident reponse plan within two minutes after the ICM Coordinator confirms the response plan	Data	1.1.0.210	15, 16	Medium	Demonstrate	Con Ops §4.3	Yes
1.1.3.140	The Prediction Subsubsystem shall receive from the Expert Rules Subsubsystem static network data	Functional	1.0.0.130	13	Medium	Demonstrate	Con Ops §4.3	Yes
1.1.3.150	The Prediction Subsubsystem shall receive from the Expert Rules Subsubsystem O/D matrix data	Functional	1.0.0.130	13	Medium	Demonstrate	Con Ops §4.3	Yes

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6.3.3 Evaluation SubSubSystem Requirements

Req No	Requirement Text	Type	Parent Req	User Needs	Criticality	Verification	Source	In Demo
1.1.2.10	The Evaluation Subsubsystem shall receive from the Expert Rules Subsubsystem agency status	Data	1.1.0.180	2	Medium	Demonstrate	Con Ops §4.3	Yes
1.1.2.20	The Evaluation Subsubsystem shall accept from the Expert Rules Subsubsystem the recommended incident reponse plan within two minutes after the ICM Coordinator confirms the response plan	Functional	1.1.0.210	15, 16	Medium	Demonstrate	Con Ops §4.3	Yes
1.1.2.40	The Evaluation Subsubsystem shall receive from the Expert Rules Subsubsystem link dynamic data	Data	1.1.0.90	2	Medium	Demonstrate	Con Ops §4.3	Yes
1.1.2.50	The Evaluation Subsubsystem shall receive from the Expert Rules Subsubsystem incidents	Data	1.1.0.60	2	Medium	Demonstrate	Con Ops §4.3	Yes
1.1.2.60	The Evaluation Subsubsystem shall receive from the Expert Rules Subsubsystem construction	Data	1.1.0.70	2	Medium	Demonstrate	Con Ops §4.3	Yes
1.1.2.70	The Evaluation Subsubsystem shall receive from the Expert Rules Subsubsystem special events	Data	1.1.0.80	2	Medium	Demonstrate	Con Ops §4.3	Yes

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Req No	Requirement Text	Type	Parent Req	User Needs	Criticality	Verification	Source	In Demo
1.1.2.80	The Evaluation Subsubsystem shall receive from the Expert Rules Subsubsystem traffic signal status data	Data	1.1.0.120	2	Medium	Demonstrate	Con Ops §4.3	Yes
1.1.2.90	The Evaluation Subsubsystem shall receive from the Expert Rules Subsubsystem VMS status data	Data	1.1.0.110	2	Medium	Demonstrate	Con Ops §4.3	Yes
1.1.2.100	The Evaluation Subsubsystem shall receive from the Expert Rules Subsubsystem HOV status data	Data	1.1.0.100	2	Medium	Demonstrate	Con Ops §4.3	Yes
1.1.2.110	The Evaluation Subsubsystem shall receive from the Expert Rules Subsubsystem weather alert data	Data	1.1.0.220	2	Medium	Demonstrate	Con Ops §4.3	Yes
1.1.2.120	The Evaluation Subsubsystem shall receive from the Expert Rules Subsubsystem parking lot data	Data	1.1.0.130	2	Medium	Demonstrate	Con Ops §4.3	Yes
1.1.2.130	The Evaluation Subsubsystem shall receive from the Expert Rules Subsubsystem a summary of the predicted network conditions	Data	1.0.0.120, 1.0.0.130	12, 13	Medium	Demonstrate	Con Ops §4.3	Yes
1.1.2.140	The Evaluation Subsubsystem shall receive from the Expert Rules Subsubsystem a response	Data	1.0.0.120, 1.0.0.130	12, 13	Medium	Demonstrate	Con Ops §4.3	Yes

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Req No	Requirement Text	Type	Parent Req	User Needs	Criticality	Verification	Source	In Demo
	plan recommendation							
1.1.2.150	The Evaluation Subsubsystem shall evaluate the ICM network to calculate measures of effectivness of the corridor	Functional	1.0.0.120, 1.0.0.130	12, 13	Medium	Demonstrate	Con Ops §4.3	Yes
1.1.2.160	The Evaluation Subsubsystem shall receive from the Data Store Subsubsystem historical data	Data	1.0.0.120, 1.0.0.130	12, 13	Medium	Demonstrate	Con Ops §4.3	Yes

For the SmartFusion Subsystem, the following SubSubSystem Requirements were developed.

6.3.4 Data Collection SubSubSystem Requirements

Req No	Requirement Text	Type	Parent Req	User Needs	Criticality	Verification	Source	In Demo
1.2.4.10	The Data Collection Subsubsystem shall receive from the regional center to center interface VMS status data as defined in C2C-SICD-4.3.0	Interface	1.2.0.15	2	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.4.20	The Data Collection Subsubsystem shall receive from the regional center to center interface CCTV status data as defined in C2C-SICD-4.3.0	Interface	1.2.0.10	2	High	Demonstrate	Con Ops §4.3	Yes

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Req No	Requirement Text	Type	Parent Req	User Needs	Criticality	Verification	Source	In Demo
1.2.4.30	The Data Collection Subsubsystem shall receive from the regional center to center interface HOV status data as defined in C2C-SICD-4.3.0	Interface	1.2.0.18	2	High	Demonstrate	Con Ops §4.3	Yes
1.2.4.40	The Data Collection Subsubsystem shall receive from the regional center to center interface incident data as defined in C2C-SICD-4.3.0	Interface	1.2.0.90	2	High	Demonstrate	Con Ops §4.3	Yes
1.2.4.50	The Data Collection Subsubsystem shall receive from the regional center to center interface construction data as defined in C2C-SICD-4.3.0	Interface	1.2.0.100	2	High	Demonstrate	Con Ops §4.3	Yes
1.2.4.60	The Data Collection Subsubsystem shall receive from the regional center to center interface link dynamic data as defined in C2C-SICD-4.3.0	Interface	1.2.0.50	2	High	Demonstrate	Con Ops §4.3	Yes
1.2.4.100	The Data Collection Subsubsystem shall receive from the SmartNET GUI Subsubsystem incident data	Interface	1.2.0.100	2	High	Demonstrate	Con Ops §4.3	Yes
1.2.4.110	The Data Collection Subsubsystem shall receive from the SmartNET GUI Subsubsystem construction data	Interface	1.2.0.110	2	High	Demonstrate	Con Ops §4.3	Yes

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Req No	Requirement Text	Type	Parent Req	User Needs	Criticality	Verification	Source	In Demo
1.2.4.120	The Data Collection Subsubsystem shall receive from the SmartNET GUI Subsubsystem special event data	Interface	1.2.0.120	2	High	Demonstrate	Con Ops §4.3	Yes
1.2.4.130	The Data Collection Subsubsystem shall receive from the SmartNET GUI Subsubsystem traffic signal status data	Interface	1.2.0.290	2	High	Demonstrate	Con Ops §4.3	Yes
1.2.4.140	The Data Collection Subsubsystem shall receive from the DART Network Interface DART Bus AVL data	Interface	1.2.0.20	2	High	Demonstrate	Con Ops §4.3	Yes
1.2.4.150	The Data Collection Subsubsystem shall receive from the DART Network Interface DART LRV AVL data	Interface	1.2.0.25	2	High	Demonstrate	Con Ops §4.3	Yes
1.2.4.160	The Data Collection Subsubsystem shall receive from the weather provider interface weather alert data	Interface	1.2.0.35	2	High	Demonstrate	Con Ops §4.3	Yes
1.2.4.170	The Data Collection Subsubsystem shall receive from the weather provider interface weather link data	Interface	1.2.0.30	2	High	Demonstrate	Con Ops §4.3	Yes
1.2.4.180	The Data Collection Subsubsystem shall receive from third party information provider link dynamic data	Interface	1.2.0.70	2	High	Demonstrate	Con Ops §4.3	Yes

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Req No	Requirement Text	Type	Parent Req	User Needs	Criticality	Verification	Source	In Demo
1.2.4.200	The Data Collection Subsubsystem shall receive from the Parking Management System Interface parking lot data	Interface	1.2.0.40	2	High	Demonstrate	Con Ops §4.3	Yes
1.2.4.220	The Data Collection Subsubsystem shall validate link volume data using historical data and expected values	Functional	1.2.0.50	2	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.4.230	The Data Collection Subsubsystem shall validate weather alert data using historical data and expected values	Functional	1.2.0.35	2	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.4.260	The Data Collection Subsubsystem shall validate incident data using historical data and expected values	Functional	1.2.0.90	2	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.4.270	The Data Collection Subsubsystem shall validate special event data using historical data and expected values	Functional	1.2.0.120	2	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.4.275	The Data Collection Subsubsystem shall validate construction data using historical data and expected values	Functional	1.2.0.100	2	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.4.280	The Data Collection Subsubsystem shall validate parking lot data using historical data and expected values	Functional	1.2.0.40	2	Medium	Demonstrate	Con Ops §4.3	Yes

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Req No	Requirement Text	Type	Parent Req	User Needs	Criticality	Verification	Source	In Demo
1.2.4.290	The Data Collection Subsubsystem shall validate weather link data using historical data and expected values	Functional	1.2.0.35	2	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.4.300	The Data Collection Subsubsystem shall validate VMS status data using historical data and expected values	Functional	1.2.0.15	2	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.4.310	The Data Collection Subsubsystem shall validate CCTV status data using historical data and expected values	Functional	1.2.0.10	2	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.4.320	The Data Collection Subsubsystem shall validate traffic signal status data using historical data and expected values	Functional	1.2.0.290	2	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.4.330	The Data Collection Subsubsystem shall validate HOV status data using historical data and expected values	Functional	1.2.0.18	2	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.4.340	The Data Collection Subsubsystem shall confirm DART Bus AVL data using historical data and expected values	Functional	1.2.0.20	2	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.4.350	The Data Collection Subsubsystem shall confirm DART LRV AVL data using historical data and expected values	Functional	1.2.0.25	2	Medium	Demonstrate	Con Ops §4.3	Yes

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Req No	Requirement Text	Type	Parent Req	User Needs	Criticality	Verification	Source	In Demo
1.2.4.360	The Data Collection Subsubsystem shall translate link dynamic data received from the Regional Center to Center into the ICMS data format	Functional	1.2.0.50	2	High	Demonstrate	Con Ops §4.3	Yes
1.2.4.380	The Data Collection Subsubsystem shall translate HOV Status data received from the Regional Center to Center into the ICMS data format	Functional	1.2.0.18	2	High	Demonstrate	Con Ops §4.3	Yes
1.2.4.390	The Data Collection Subsubsystem shall translate CCTV Status data received from the Regional Center to Center into the ICMS data format	Functional	1.2.0.10	2	High	Demonstrate	Con Ops §4.3	Yes
1.2.4.400	The Data Collection Subsubsystem shall translate VMS Status data received from the Regional Center to Center into the ICMS data format	Functional	1.2.0.15	2	High	Demonstrate	Con Ops §4.3	Yes
1.2.4.410	The Data Collection Subsubsystem shall translate Incident data received from the Regional Center to Center into the ICMS data format	Functional	1.2.0.90	2	High	Demonstrate	Con Ops §4.3	Yes
1.2.4.420	The Data Collection Subsubsystem shall translate Construction data received from the Regional Center to Center into the	Functional	1.2.0.95	2	High	Demonstrate	Con Ops §4.3	Yes

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Req No	Requirement Text	Type	Parent Req	User Needs	Criticality	Verification	Source	In Demo
	ICMS data format							
1.2.4.450	The Data Collection Subsubsystem shall remove redundant Incident data received from SmartNET GUI when same incident was received from the Regional Center to Center interface	Functional	1.2.0.90	2	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.4.460	The Data Collection Subsubsystem shall remove redundant construction data received from SmartNET GUI when same construction was received from the Regional Center to Center interface	Functional	1.2.0.95	2	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.4.480	The Data Collection Subsubsystem shall send the Data Fusion Subsubsystem incident data	Data	1.2.0.90	2	High	Demonstrate	Con Ops §4.3	Yes
1.2.4.490	The Data Collection Subsubsystem shall send the Data Fusion Subsubsystem construction data	Data	1.2.0.95	2	High	Demonstrate	Con Ops §4.3	Yes
1.2.4.500	The Data Collection Subsubsystem shall send the Data Fusion Subsubsystem special events data	Data	1.2.0.108	2	High	Demonstrate	Con Ops §4.3	Yes

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Req No	Requirement Text	Type	Parent Req	User Needs	Criticality	Verification	Source	In Demo
1.2.4.510	The Data Collection Subsubsystem shall send the Data Fusion Subsubsystem CCTV status data	Data	1.2.0.10	2	High	Demonstrate	Con Ops §4.3	Yes
1.2.4.520	The Data Collection Subsubsystem shall send the Data Fusion Subsubsystem VMS Status data	Data	1.2.0.15	2	High	Demonstrate	Con Ops §4.3	Yes
1.2.4.530	The Data Collection Subsubsystem shall send the Data Fusion Subsubsystem HOV status data	Data	1.2.0.18	2	High	Demonstrate	Con Ops §4.3	Yes
1.2.4.540	The Data Collection Subsubsystem shall send the Data Fusion Subsubsystem traffic signal status data	Data	1.2.0.290	2	High	Demonstrate	Con Ops §4.3	Yes
1.2.4.550	The Data Collection Subsubsystem shall send the Data Fusion Subsubsystem weather link data	Data	1.2.0.30	2	High	Demonstrate	Con Ops §4.3	Yes
1.2.4.560	The Data Collection Subsubsystem shall send the Data Fusion Subsubsystem parking lot data	Data	1.2.0.40	2	High	Demonstrate	Con Ops §4.3	Yes
1.2.4.570	The Data Collection Subsubsystem shall send the Data Fusion Subsubsystem link dynamic data	Data	1.2.0.50	2	High	Demonstrate	Con Ops §4.3	Yes

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Req No	Requirement Text	Type	Parent Req	User Needs	Criticality	Verification	Source	In Demo
1.2.4.580	The Data Collection Subsubsystem shall send the Data Fusion Subsubsystem weather alert data	Data	1.2.0.35	2	High	Demonstrate	Con Ops §4.3	Yes
1.2.4.590	The Data Collection Subsubsystem shall send the Data Fusion Subsubsystem DART LRV AVL data	Data	1.2.0.25	2	High	Demonstrate	Con Ops §4.3	Yes
1.2.4.600	The Data Collection Subsubsystem shall send the Data Fusion Subsubsystem DART Bus AVL data	Data	1.2.0.20	2	High	Demonstrate	Con Ops §4.3	Yes
1.2.4.640	The Data Collection Subsubsystem shall translate link dynamic data received from third party information providers into the ICMS data format	Functional	1.2.0.70	2	High	Demonstrate	Con Ops §4.3	Yes
1.2.4.660	The Data Collection Subsubsystem shall translate DART LRV AVL Data received from the DART Network interface into ICMS format	Functional	1.2.0.25	2	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.4.670	The Data Collection Subsubsystem shall translate DART Bus AVL Data received from the DART Network interface into ICMS format	Functional	1.2.0.20	2	Medium	Demonstrate	Con Ops §4.3	Yes

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Req No	Requirement Text	Type	Parent Req	User Needs	Criticality	Verification	Source	In Demo
1.2.4.680	The Data Collection Subsubsystem shall translate weather link data received from weather information provider into ICMS format	Functional	1.2.0.30	3	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.4.690	The Data Collection Subsubsystem shall translate weather alert data from weather information provider into ICMS format	Functional	1.2.0.35	3	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.4.700	The Data Collection Subsubsystem shall translate parking lot data received from Parking Management System into ICMS format	Functional	1.2.0.40	2	Medium	Demonstrate	Con Ops §4.3	Yes

6.3.5 Data Fusion SubSubSystem Requirements

ReqNo	Requirement Text	Type	Parent Req	User Needs	Criticality	Verification	Source	In Demo
1.2.3.340	The Data Fusion Subsubsystem shall receive from the Data Collection Subsubsystem VMS Status data	Data	1.2.0.470	3	Low	Test	Con Ops §4.3	Yes
1.2.3.370	The Data Fusion Subsubsystem shall receive from the Data Collection Subsubsystem CCTV	Data	1.2.0.460	3	Low	Test	Con Ops §4.3	Yes

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ReqNo	Requirement Text	Type	Parent Req	User Needs	Criticality	Verification	Source	In Demo
	Status data							
1.2.3.380	The Data Fusion Subsubsystem shall receive from the Data Collection Subsubsystem Traffic Signal Status data	Data	1.2.0.550	3	Low	Test	Con Ops §4.3	Yes
1.2.3.390	The Data Fusion Subsubsystem shall receive from the Data Collection Subsubsystem DART Bus AVL data	Data	1.2.0.510	3	Low	Test	Con Ops §4.3	Yes
1.2.3.400	The Data Fusion Subsubsystem shall receive from the Data Collection Subsubsystem DART LRV AVL data	Data	1.2.0.510	3	Low	Test	Con Ops §4.3	Yes
1.2.3.410	The Data Fusion Subsubsystem shall receive from the Data Collection Subsubsystem link dynamic time data	Data	1.2.0.490	4	Low	Test	Con Ops §4.3	Yes
1.2.3.450	The Data Fusion Subsubsystem shall receive from the Data Collection Subsubsystem incidents	Data	1.2.0.430	4	Low	Test	Con Ops §4.3	Yes
1.2.3.460	The Data Fusion Subsubsystem shall receive from the Data Collection Subsubsystem construction	Data	1.2.0.440	4	Low	Test	Con Ops §4.3	Yes
1.2.3.470	The Data Fusion Subsubsystem shall receive from the Data Collection Subsubsystem special	Data	1.2.0.450	4	Low	Test	Con Ops §4.3	Yes

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ReqNo	Requirement Text	Type	Parent Req	User Needs	Criticality	Verification	Source	In Demo
	events							
1.2.3.480	The Data Fusion Subsubsystem shall receive from the Data Collection Subsubsystem weather alert data	Data	1.2.0.520	4	Low	Test	Con Ops §4.3	Yes
1.2.3.490	The Data Fusion Subsubsystem shall receive from the Data Collection Subsubsystem weather link data	Data	1.2.0.490	4	Low	Test	Con Ops §4.3	Yes
1.2.3.500	The Data Fusion Subsubsystem shall receive from the Data Collection Subsubsystem HOV status data	Data	1.2.0.480	3	Low	Test	Con Ops §4.3	Yes
1.2.3.510	The Data Fusion Subsubsystem shall receive from the Data Collection Subsubsystem parking lot data	Data	1.2.0.500	3	Low	Test	Con Ops §4.3	Yes
1.2.3.520	The Data Fusion Subsubsystem shall send the Data Store Subsubsystem parking lot data	Data	1.2.0.500	3	Low	Test	Con Ops §4.3	Yes
1.2.3.530	The Data Fusion Subsubsystem shall send the Data Dissemination Subsubsystem parking lot data	Data	1.2.0.500	5, 19	Low	Test	Con Ops §4.3	Yes

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ReqNo	Requirement Text	Type	Parent Req	User Needs	Criticality	Verification	Source	In Demo
1.2.3.540	The Data Fusion Subsubsystem shall send the Data Dissemination Subsubsystem transit vehicle location	Data	1.2.0.510	5, 19	Low	Test	Con Ops §4.3	Yes
1.2.3.550	The Data Fusion Subsubsystem shall send the Data Store Subsubsystem transit vehicle location	Data	1.2.0.510	4	Low	Test	Con Ops §4.3	Yes
1.2.3.580	The Data Fusion Subsubsystem shall send the Data Dissemination Subsubsystem incidents	Data	1.2.0.430	8, 9	Low	Test	Con Ops §4.3	Yes
1.2.3.590	The Data Fusion Subsubsystem shall send the Data Store Subsubsystem incidents	Data	1.2.0.430	4	Low	Test	Con Ops §4.3	Yes
1.2.3.600	The Data Fusion Subsubsystem shall send the Data Store Subsubsystem construction	Data	1.2.0.440	4	Low	Test	Con Ops §4.3	Yes
1.2.3.610	The Data Fusion Subsubsystem shall send the Data Dissemination Subsubsystem construction	Data	1.2.0.440	8, 9	Low	Test	Con Ops §4.3	Yes
1.2.3.620	The Data Fusion Subsubsystem shall send the Data Dissemination Subsubsystem special events	Data	1.2.0.450	8, 9	Low	Test	Con Ops §4.3	Yes
1.2.3.630	The Data Fusion Subsubsystem shall send the Data Store Subsubsystem special	Data	1.2.0.450	4	Low	Test	Con Ops §4.3	Yes

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ReqNo	Requirement Text	Type	Parent Req	User Needs	Criticality	Verification	Source	In Demo
	events							
1.2.3.640	The Data Fusion Subsubsystem shall send the Data Store Subsubsystem VMS Status data	Data	1.2.0.470	3	Low	Test	Con Ops §4.3	Yes
1.2.3.650	The Data Fusion Subsubsystem shall send the Data Dissemination Subsubsystem VMS Status data	Data	1.2.0.470	3	Low	Test	Con Ops §4.3	Yes
1.2.3.660	The Data Fusion Subsubsystem shall send the Data Dissemination Subsubsystem CCTV Status data	Data	1.2.0.460	3	Low	Test	Con Ops §4.3	Yes
1.2.3.670	The Data Fusion Subsubsystem shall send the Data Store Subsubsystem CCTV Status data	Data	1.2.0.460	3	Low	Test	Con Ops §4.3	Yes
1.2.3.680	The Data Fusion Subsubsystem shall send the Data Store Subsubsystem traffic signal status data	Data	1.2.0.550	3	Low	Test	Con Ops §4.3	Yes
1.2.3.690	The Data Fusion Subsubsystem shall send the Data Dissemination Subsubsystem traffic signal status data	Data	1.2.0.550	3	Low	Test	Con Ops §4.3	Yes

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ReqNo	Requirement Text	Type	Parent Req	User Needs	Criticality	Verification	Source	In Demo
1.2.3.700	The Data Fusion Subsubsystem shall send the Data Dissemination Subsubsystem HOV status data	Data	1.2.0.480	3	Low	Test	Con Ops §4.3	Yes
1.2.3.710	The Data Fusion Subsubsystem shall send the Data Store Subsubsystem HOV status data	Data	1.2.0.480	3	Low	Test	Con Ops §4.3	Yes
1.2.3.720	The Data Fusion Subsubsystem shall send the Data Store Subsubsystem weather alert data	Data	1.2.0.520	3	Low	Test	Con Ops §4.3	Yes
1.2.3.730	The Data Fusion Subsubsystem shall send the Data Dissemination Subsubsystem weather alert data	Data	1.2.0.520	3	Low	Test	Con Ops §4.3	Yes
1.2.3.740	The Data Fusion Subsubsystem shall send the Data Dissemination Subsubsystem link dynamic data	Data	1.2.0.490	4, 6, 7	Low	Test	Con Ops §4.3	Yes
1.2.3.750	The Data Fusion Subsubsystem shall send the Data Store Subsubsystem link dynamic data	Data	1.2.0.490	4	Low	Test	Con Ops §4.3	Yes
1.2.3.890	The Data Fusion Subsubsystem shall receive from the Data Store Subsubsystem historic link dynamic data	Data	1.2.0.490	4	Low	Test	Con Ops §4.3	Yes

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ReqNo	Requirement Text	Type	Parent Req	User Needs	Criticality	Verification	Source	In Demo
1.2.3.910	The Data Fusion Subsubsystem shall merge Weather link data into link dynamic data	Functional	1.2.0.490	4	Low	Test	Con Ops §4.3	Yes

6.3.6 Data Dissemination SubSubSystem Requirements

Req No	Requirement Text	Type	Parent Req	User Needs	Criticality	Verification	Source	In Demo
1.2.2.10	The Data Dissemination Subsubsystem shall receive from the Data Fusion Subsubsystem weather alert data	Data	1.2.0.140	4	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.2.20	The Data Dissemination Subsubsystem shall receive from the Data Fusion Subsubsystem link dynamic data	Data	1.2.0.120	7, 4	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.2.30	The Data Dissemination Subsubsystem shall receive from the Data Fusion Subsubsystem incidents	Data	1.2.0.130	4, 8, 9	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.2.40	The Data Dissemination Subsubsystem shall receive from the Data Fusion Subsubsystem construction	Data	1.2.0.135	4, 8, 9	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.2.50	The Data Dissemination Subsubsystem shall receive from the Data Fusion Subsubsystem special events	Data	1.2.0.138	4, 8, 9	Medium	Demonstrate	Con Ops §4.3	Yes

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Req No	Requirement Text	Type	Parent Req	User Needs	Criticality	Verification	Source	In Demo
1.2.2.60	The Data Dissemination Subsubsystem shall receive from the Data Fusion Subsubsystem parking lot data	Data	1.2.0.110	4, 8, 9	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.2.70	The Data Dissemination Subsubsystem shall receive from the Data Fusion Subsubsystem VMS status data	Data	1.2.0.560	4, 8, 9	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.2.80	The Data Dissemination Subsubsystem shall receive from the Data Fusion Subsubsystem CCTV status data	Data	1.2.0.630	4, 8, 9	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.2.90	The Data Dissemination Subsubsystem shall receive from the Data Fusion Subsubsystem traffic signal status data	Data	1.2.0.640	4, 8, 9	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.2.100	The Data Dissemination Subsubsystem shall receive from the Data Fusion Subsubsystem Transit Vehicle Location	Data	1.2.0.580	4, 8, 9	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.2.120	The Data Dissemination Subsubsystem shall receive from the Data Fusion Subsubsystem HOV status data	Data	1.2.0.580	4	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.2.130	The Data Dissemination Subsubsystem shall remove incidents received from the Regional Center to Center interface	Functional	1.2.0.130	4	Medium	Demonstrate	Con Ops §4.3	Yes

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Req No	Requirement Text	Type	Parent Req	User Needs	Criticality	Verification	Source	In Demo
1.2.2.140	The Data Dissemination Subsubsystem shall remove construction received from the Regional Center to Center interface	Functional	1.2.0.135	4	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.2.160	The Data Dissemination Subsubsystem shall translate Transit Vehicle Location into the Regional Center to Center format as defined in C2C-SICD-4.3.0	Functional	1.2.0.125	4	Low	Demonstrate	Con Ops §4.3	Yes
1.2.2.180	The Data Dissemination Subsubsystem shall translate link dynamic data into the Regional Center to Center format as defined in C2C-SICD-4.3.0	Functional	1.2.0.120	4	Low	Demonstrate	Con Ops §4.3	Yes
1.2.2.190	The Data Dissemination Subsubsystem shall translate incidents into the Regional Center to Center format as defined in C2C-SICD-4.3.0	Functional	1.2.0.130	4	Low	Demonstrate	Con Ops §4.3	Yes
1.2.2.200	The Data Dissemination Subsubsystem shall translate construction into the Regional Center to Center format as defined in C2C-SICD-4.3.0	Functional	1.2.0.135	4	Low	Demonstrate	Con Ops §4.3	Yes
1.2.2.210	The Data Dissemination Subsubsystem shall translate special events to the Regional Center to Center format as defined in C2C-SICD-4.3.0	Functional	1.2.0.138	4	Low	Demonstrate	Con Ops §4.3	Yes

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Req No	Requirement Text	Type	Parent Req	User Needs	Criticality	Verification	Source	In Demo
1.2.2.220	The Data Dissemination Subsubsystem shall publish to the Regional Center to Center interface Transit Vehicle Location as defined in C2C-SICD-4.3.0	Interface	1.2.0.125	4	Low	Demonstrate	Con Ops §4.3	Yes
1.2.2.240	The Data Dissemination Subsubsystem shall publish to the Regional Center to Center interface Incidents as defined in C2C-SICD-4.3.0	Interface	1.2.0.130	4	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.2.250	The Data Dissemination Subsubsystem shall publish to the Regional Center to Center interface construction as defined in C2C-SICD-4.3.0	Interface	1.2.0.135	4	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.2.260	The Data Dissemination Subsubsystem shall publish to the Regional Center to Center interface special events as defined in C2C-SICD-4.3.0	Interface	1.2.0.138	4	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.2.270	The Data Dissemination Subsubsystem shall publish to the Regional Center to Center interface link dynamic data as defined in C2C-SICD-4.3.0	Interface	1.2.0.120	4	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.2.280	The Data Dissemination Subsubsystem shall publish to the Interactive Voice Response telephone system incidents	Interface	1.2.0.180	8, 9	Medium	Demonstrate	Con Ops §4.3	Yes

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Req No	Requirement Text	Type	Parent Req	User Needs	Criticality	Verification	Source	In Demo
1.2.2.300	The Data Dissemination Subsubsystem shall publish to the Interactive Voice Response telephone system link dynamic data	Interface	1.2.0.170	5, 7, 17, 18, 19	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.2.310	The Data Dissemination Subsubsystem shall publish to the Interactive Voice Response telephone system weather alert data	Interface	1.2.0.200	17, 18, 19	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.2.320	The Data Dissemination Subsubsystem shall publish to the public web interface weather alert data	Interface	1.2.0.140	17, 18, 19	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.2.330	The Data Dissemination Subsubsystem shall publish to the public web interface incidents	Interface	1.2.0.150	8, 9	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.2.340	The Data Dissemination Subsubsystem shall publish to the public web interface constuction	Interface	1.2.0.155	8, 9	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.2.350	The Data Dissemination Subsubsystem shall publish to the public web interface special events	Interface	1.2.0.158	8, 9	Medium	Demonstrate	Con Ops §4.3	Yes

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Req No	Requirement Text	Type	Parent Req	User Needs	Criticality	Verification	Source	In Demo
1.2.2.360	The Data Dissemination Subsubsystem shall publish to the public web interface link dynamic data	Interface	1.2.0.160	5, 7, 17, 18, 19	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.2.370	The Data Dissemination Subsubsystem shall publish to the public web interface parking lot data	Interface	1.2.0.165	17, 18, 19	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.2.400	The Data Dissemination Subsubsystem shall publish to the ALERT system incident data	Interface	1.2.0.260	8, 9	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.2.410	The Data Dissemination Subsubsystem shall publish to the ALERT system link dynamic data	Interface	1.2.0.250	5, 7, 18, 19	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.2.420	The Data Dissemination Subsubsystem shall publish to the ALERT system parking lot data	Interface	1.2.0.270	17, 18, 19	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.2.430	The Data Dissemination Subsubsystem shall publish to the ALERT/PTS system weather alert data	Interface	1.2.0.280	17, 18, 19	Medium	Demonstrate	Con Ops §4.3	Yes

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Req No	Requirement Text	Type	Parent Req	User Needs	Criticality	Verification	Source	In Demo
1.2.2.450	The Data Dissemination Subsubsystem shall publish to the RSS Media feed incident data	Interface	1.2.0.210	8, 9	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.2.460	The Data Dissemination Subsubsystem shall publish to the interactive trip planner interface incidents	Interface	1.2.0.220	6	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.2.480	The Data Dissemination Subsubsystem shall publish to the interactive trip planner interface link dynamic data	Interface	1.2.0.240	6	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.2.490	The Data Dissemination Subsubsystem shall send to the Expert Rules Subsubsystem traffic signal status data	Data	1.2.0.630	12, 13	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.2.500	The Data Dissemination Subsubsystem shall send to the Expert Rules Subsubsystem link dynamic data	Data	1.2.0.600	12, 13	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.2.520	The Data Dissemination Subsubsystem shall send to the Expert Rules Subsubsystem incidents	Data	1.2.0.590	12, 13	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.2.540	The Data Dissemination Subsubsystem shall send to the Expert Rules Subsubsystem VMS status data	Data	1.2.0.560	12, 13	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.2.550	The Data Dissemination Subsubsystem shall send to the Expert Rules Subsubsystem HOV status	Data	1.2.0.580	12, 13	Medium	Demonstrate	Con Ops §4.3	Yes

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Req No	Requirement Text	Type	Parent Req	User Needs	Criticality	Verification	Source	In Demo
	data							
1.2.2.560	The Data Dissemination Subsubsystem shall send to the Expert Rules Subsubsystem weather alert data	Data	1.2.0.620	12, 13	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.2.570	The Data Dissemination Subsubsystem shall send to the Expert Rules Subsubsystem parking lot data	Data	1.2.0.610	12, 13	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.2.580	The Data Dissemination Subsubsystem shall publish to the Regional Center to Center interface parking lot data as defined in C2C-SICD-4.3.0	Data	1.2.0.110	12, 13	Medium	Demonstrate	Con Ops §4.3	Yes

6.3.7 Data Store SubSubSystem Requirements

Req No	Requirement Text	Type	Parent Req	User Needs	Criticality	Verification	Source	In Demo
1.2.5.10	The Data Store Subsubsystem shall receive VMS status data from the Data Fusion Subsubsystem	Data	1.2.0.370	13	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.5.20	The Data Store Subsubsystem shall receive CCTV status data from the Data Fusion Subsubsystem	Data	1.2.0.360	13	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.5.30	The Data Store Subsubsystem shall receive HOV status data from the Data Fusion Subsubsystem	Data	1.2.0.380	13	Medium	Demonstrate	Con Ops §4.3	Yes

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Req No	Requirement Text	Type	Parent Req	User Needs	Criticality	Verification	Source	In Demo
1.2.5.40	The Data Store Subsubsystem shall receive Transit Vehicle Location from the Data Fusion Subsubsystem	Data	1.2.0.410	13	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.5.50	The Data Store Subsubsystem shall receive Static Map Data from the Data Fusion Subsubsystem	Data	1.2.0.670	10	Medium	Inspection	Con Ops §4.3	Yes
1.2.5.60	The Data Store Subsubsystem shall receive link dynamic data from the Data Fusion Subsubsystem	Data	1.2.0.390	13	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.5.70	The Data Store Subsubsystem shall receive Parking Lot Data from the Data Fusion Subsubsystem	Data	1.2.0.400	13	Medium	Inspection	Con Ops §4.3	Yes
1.2.5.80	The Data Store Subsubsystem shall receive Traffic Signal Status Data from the Data Fusion Subsubsystem	Data	1.2.0.680	13	Medium	Inspection	Con Ops §4.3	Yes
1.2.5.90	The Data Store Subsubsystem shall receive Map Profile Data from the SmartNET GUI Subsubsystem	Data	1.2.0.690	1	Medium	Inspection	Con Ops §4.3	Yes
1.2.5.100	The Data Store Subsubsystem shall store HOV status data from the corridor	Functional	1.2.0.380	13	Medium	Inspection	Con Ops §4.3	Yes
1.2.5.120	The Data Store Subsubsystem shall receive Request Map from the SmartNET GUI	Datal	1.2.0.730	10	Medium	Inspection	Con Ops §4.3	Yes

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Req No	Requirement Text	Type	Parent Req	User Needs	Criticality	Verification	Source	In Demo
	Subsubsystem							
1.2.5.130	The Data Store Subsubsystem shall store parking lot data from the corridor	Functional	1.2.0.400	13	Medium	Inspection	Con Ops §4.3	Yes
1.2.5.140	The Data Store Subsubsystem shall receive Agency Profile Data from the SmartNET GUI Subsubsystem	Data	1.2.0.700	22	Medium	Inspection	Con Ops §4.3	Yes
1.2.5.150	The Data Store Subsubsystem shall store Agency Profile Data	Functional	1.2.0.700	22	Medium	Inspection	Con Ops §4.3	Yes
1.2.5.170	The Data Store Subsubsystem shall receive Incidents from the Data Fusion Subsubsystem	Data	1.2.0.330	12	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.5.180	The Data Store Subsubsystem shall receive construction from the Data Fusion Subsubsystem	Data	1.2.0.340	12	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.5.190	The Data Store Subsubsystem shall receive special events from the Data Fusion Subsubsystem	Data	1.2.0.350	12	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.5.200	The Data Store Subsubsystem shall send construction to the SmartNET GUI Subsubsystem	Data	1.2.0.340	12	Medium	Demonstrate	Con Ops §4.3	Yes

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Req No	Requirement Text	Type	Parent Req	User Needs	Criticality	Verification	Source	In Demo
1.2.5.210	The Data Store Subsubsystem shall send special events to the SmartNET GUI Subsubsystem	Data	1.2.0.350	12	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.5.220	The Data Store Subsubsystem shall send CCTV status to the SmartNET GUI Subsubsystem	Data	1.2.0.360	13	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.5.230	The Data Store Subsubsystem shall send VMS status data received from the regional center to center interface to the SmartNET GUI Subsubsystem	Data	1.2.0.370	13	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.5.240	The Data Store Subsubsystem shall send HOV status data received from the regional center to center interface to the SmartNET GUI Subsubsystem	Data	1.2.0.380	13	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.5.250	The Data Store Subsubsystem shall send Transit Vehicle Location to the SmartNET GUI Subsubsystem	Data	1.2.0.410	13	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.5.260	The Data Store Subsubsystem shall send Static Map Data to the SmartNET GUI Subsubsystem	Data	1.2.0.670	10	Medium	Demonstrate	Con Ops §4.3	Yes

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Req No	Requirement Text	Type	Parent Req	User Needs	Criticality	Verification	Source	In Demo
1.2.5.270	The Data Store Subsubsystem shall send weather alert data to the SmartNET GUI Subsubsystem	Data	1.2.0.420	13	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.5.280	The Data Store Subsubsystem shall send incidents to the SmartNET GUI Subsubsystem	Data	1.2.0.330	12	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.5.290	The Data Store Subsubsystem shall send parking lot data to the SmartNET GUI Subsubsystem	Data	1.2.0.400	13	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.5.310	The Data Store Subsubsystem shall send link dynamic data to the SmartNET GUI Subsubsystem	Data	1.2.0.390	13	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.5.320	The Data Store Subsubsystem shall send map profile data to the SmartNET GUI Subsubsystem	Data	1.2.0.690	1	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.5.330	The Data Store Subsubsystem shall send traffic signal status data to the SmartNET GUI Subsubsystem	Data	1.2.0.680	13	Medium	Demonstrate	Con Ops §4.3	Yes
1.2.5.340	The Data Store Subsubsystem shall store VMS inventory as defined in data dictionary table 2.1.1	Functional	1.2.0.670	10	Low	Demonstrate	Con Ops §4.3	Yes

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Req No	Requirement Text	Type	Parent Req	User Needs	Criticality	Verification	Source	In Demo
1.2.5.350	The Data Store Subsubsystem shall store VMS status as defined in data dictionary table 2.1.1	Functional	1.2.0.370	13	Medium	Inspection	Con Ops §4.3	Yes
1.2.5.360	The Data Store Subsubsystem shall store CCTV inventory as defined in data dictionary table 2.1.2	Functional	1.2.0.670	10	Medium	Inspection	Con Ops §4.3	Yes
1.2.5.370	The Data Store Subsubsystem shall store CCTV status data as defined in data dictionary table 2.1.2	Functional	1.2.0.360	13	Medium	Inspection	Con Ops §4.3	Yes
1.2.5.380	The Data Store Subsubsystem shall store traffic signal inventory as defined in data dictionary table 2.1.3	Functional	1.2.0.670	10	Medium	Inspection	Con Ops §4.3	Yes
1.2.5.390	The Data Store Subsubsystem shall store traffic signal status data as defined in data dictionary table 2.1.3	Functional	1.2.0.680	13	Medium	Inspection	Con Ops §4.3	Yes
1.2.5.400	The Data Store Subsubsystem shall store the facility inventory as defined in data dictionary table 2.2.1	Functional	1.2.0.670	10	Medium	Inspection	Con Ops §4.3	Yes
1.2.5.410	The Data Store Subsubsystem shall store the roadway point data inventory as defined in data dictionary table 2.2.2	Functional	1.2.0.670	10	Medium	Inspection	Con Ops §4.3	Yes
1.2.5.420	The Data Store Subsubsystem shall store the transit facility inventory	Functional	1.2.0.670	10	Medium	Inspection	Con Ops §4.3	Yes

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Req No	Requirement Text	Type	Parent Req	User Needs	Criticality	Verification	Source	In Demo
	as defined in data dictionary table 2.3.1							
1.2.5.430	The Data Store Subsubsystem shall store the transit point data inventory as defined in data dictionary table 2.3.2	Functional	1.2.0.670	10	Medium	Inspection	Con Ops §4.3	Yes
1.2.5.440	The Data Store Subsubsystem shall store transit vehicle location as defined in data dictionary table 2.3.3	Functional	1.2.0.410	13	Medium	Inspection	Con Ops §4.3	Yes
1.2.5.450	The Data Store Subsubsystem shall store parking lot inventory as defined in data dictionary table 2.4.1	Functional	1.2.0.670	10	Medium	Inspection	Con Ops §4.3	Yes
1.2.5.460	The Data Store Subsubsystem shall store Weather alert data as defined in data dictionary table 2.4.2	Functional	1.2.0.420	13	Medium	Inspection	Con Ops §4.3	Yes
1.2.5.470	The Data Store Subsubsystem shall store Link Inventory Data as defined in data dictionary table 2.4.3	Functional	1.2.0.670	10	Medium	Inspection	Con Ops §4.3	Yes
1.2.5.480	The Data Store Subsubsystem shall store Link Dynamic Data as defined in data dictionary table 2.4.4	Functional	1.2.0.390	13	Medium	Inspection	Con Ops §4.3	Yes

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Req No	Requirement Text	Type	Parent Req	User Needs	Criticality	Verification	Source	In Demo
1.2.5.490	The Data Store Subsubsystem shall store Incidents as defined in data dictionary table 2.5.1	Functional	1.2.0.330	12	Medium	Inspection	Con Ops §4.3	Yes
1.2.5.500	The Data Store Subsubsystem shall store construction as defined in data dictionary table 2.5.2	Functional	1.2.0.340	12	Medium	Inspection	Con Ops §4.3	Yes
1.2.5.510	The Data Store Subsubsystem shall store Special Events as defined in data dictionary table 2.5.3	Functional	1.2.0.350	12	Medium	Inspection	Con Ops §4.3	Yes
1.2.5.580	The Data Store Subsubsystem shall store Alarm Notifications as defined in data dictionary table 2.6.3	Functional	1.2.0.720	1	Low	Demonstrate	Con Ops §4.3	Yes
1.2.5.590	The Data Store Subsubsystem shall store User Profiles as defined in data dictionary table 2.7.1	Functional	1.2.0.710	22	Low	Demonstrate	Con Ops §4.3	Yes
1.2.5.610	The Data Store Subsubsystem shall store Map Profile Data as defined in data dictionary table 2.7.3	Functional	1.2.0.690	1	Low	Demonstrate	Con Ops §4.3	Yes
1.2.5.640	The Data Store Subsubsystem shall store Ticker Message as defined in data dictionary table 2.7.6	Functional	1.0.0.10	1	Low	Demonstrate	Con Ops §4.3	Yes
1.2.5.650	The Data Store Subsubsystem shall store Incident Response Plans as defined in data dictionary table 2.9.1	Functional	1.2.0.530	14	Low	Demonstrate	Con Ops §4.3	Yes

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Req No	Requirement Text	Type	Parent Req	User Needs	Criticality	Verification	Source	In Demo
1.2.5.680	The Data Store Subsubsystem shall receive from the Plan Decision Dialogue Subsubsystem a request for agency status	Data	1.2.0.700	22	Low	Demonstrate	Con Ops §4.3	Yes
1.2.5.690	The Data Store Subsubsystem shall send to the Plan Decision Dialogue Subsubsystem agency status as defined in data dictionary table 2.7.1	Functional	1.2.0.700	22	Low	Demonstrate	Con Ops §4.3	Yes
1.2.5.720	The Data Store Subsubsystem shall send the SmartNET GUI Subsubsystem alarm notifications	Functional	1.2.0.720	1	Low	Demonstrate	Con Ops §4.3	Yes
1.2.5.730	The Data Store Subsubsystem shall determine for a special event the Start Time for conversion to an incident	Functional	1.2.0.450	4	Low	Demonstrate	Con Ops §4.3	Yes
1.2.5.740	The Data Store Subsubsystem shall determine for a construction event the start time for conversion to an incident	Functional	1.2.0.440	4	Low	Demonstrate	Con Ops §4.3	Yes
1.2.5.750	The Data Store Subsubsystem shall generate for a special event an activation alarm based on a configurable time interval	Functional	1.2.0.450	4	Low	Demonstrate	Con Ops §4.3	Yes
1.2.5.760	The Data Store Subsubsystem shall generate for a construction	Functional	1.2.0.440	4	Low	Demonstrate	Con Ops §4.3	Yes

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Req No	Requirement Text	Type	Parent Req	User Needs	Criticality	Verification	Source	In Demo
	an activation alarm based on a configurable time interval							
1.2.5.860	The Data Store Subsubsystem shall allow the SmartNET GUI Subsubsystem the capability to create a user profile	Functional	1.2.0.710	22	Low	Demonstrate	Con Ops §4.3	Yes
1.2.5.870	The Data Store Subsubsystem shall allow the SmartNET GUI Subsubsystem the capability to modify a user profile	Functional	1.2.0.710	22	Low	Demonstrate	Con Ops §4.3	Yes
1.2.5.880	The Data Store Subsubsystem shall allow the SmartNET GUI Subsubsystem the capability to delete a user profile	Functional	1.2.0.710	22	Low	Demonstrate	Con Ops §4.3	Yes
1.2.5.950	The Data Store Subsubsystem shall send the Plan Decision Dialogue Subsubsystem agency status	Data	1.2.0.700	22	Low	Demonstrate	Con Ops §4.3	Yes
1.2.5.1160	The Data Store Subsubsystem shall receive from the Data Fusion Subsubsystem weather alert data	Data	1.2.0.420	13	Low	Demonstrate	Con Ops §4.3	Yes
1.2.5.1180	The Data Store Subsubsystem shall send Agency Profile Data to the SmartNET GUI subsubsystem	Data	1.2.0.700	22	Medium	Inspection	Con Ops §4.3	Yes

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6.3.8 Plan Decision SubSubSystem Requirements

Req No	Requirement Text	Type	Parent Req	User Needs	Criticality	Verification	Source	In Demo
1.2.1.10	The Plan Decision Subsubsystem shall receive from the Expert Rules Subsubsystem a response plan recommendation	Data	1.1.0.210	15, 16	Medium	Demonstrate	Con Ops §5	Yes
1.2.1.20	The Plan Decision Subsubsystem shall receive from the Data Store Subsubsystem agency status	Data	1.1.0.180	15, 16	Medium	Demonstrate	Con Ops §5	Yes
1.2.1.40	The Plan Decision Subsubsystem shall send the Plan Decision Dialogue Subsubsystem a response plan recommendation.	Data	1.1.0.210	15, 16	Medium	Demonstrate	Con Ops §5	Yes
1.2.1.60	The Plan Decision Subsubsystem Shall receive from the Plan Decision Dialogue Subsubsystem response plan recommendation decision	Data	1.0.0.150, 1.0.0.160	15, 16	Low	Demonstrate	Con Ops §5	Yes
1.2.1.90	The Plan Decision Subsubsystem Shall generate for the Plan Decision Dialogue Subsubsystem the agency contact list	Functional	1.1.0.210	15, 16	Low	Demonstrate	Con Ops §5	Yes
1.2.1.120	The Plan Decision Subsubsystem Shall receive from the Plan Decision Dialogue	Data	1.1.0.210	15, 16	Medium	Demonstrate	Con Ops §5	Yes

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Req No	Requirement Text	Type	Parent Req	User Needs	Criticality	Verification	Source	In Demo
	Subsubsystem a plan decision dialogue request							
1.2.1.130	The Plan Decision Subsubsystem Shall receive from the Plan Decision Dialogue Subsubsystem a plan decision dialogue response	Data	1.1.0.210	15, 16	Medium	Demonstrate	Con Ops §5	Yes
1.2.1.140	The Plan Decision Subsubsystem Shall send to the Data Store Subsubsystem a plan decision dialogue request	Data	1.1.0.210	15, 16, 20	Medium	Demonstrate	Con Ops §5	Yes
1.2.1.150	The Plan Decision Subsubsystem Shall send to the Data Store Subsubsystem a plan decision dialogue response	Data	1.1.0.210	15, 16, 20	Medium	Demonstrate	Con Ops §5	Yes
1.2.1.190	The Plan Decision Subsubsystem Shall send to the Expert Rules Subsubsystem a plan decision result	Data	1.1.0.210	15, 16, 20	Medium	Demonstrate	Con Ops §5	Yes
1.2.1.200	The Plan Decision Subsubsystem shall receive from the Plan Decision Dialogue Subsubsystem a plan decision result	Data	1.1.0.210	15, 16, 20	Medium	Demonstrate	Con Ops §5	Yes
1.2.1.210	The Plan Decision Subsubsystem shall receive from the Plan Decision Dialogue Subsubsystem a response plan	Data	1.1.0.210	15, 16, 20	Low	Demonstrate	Con Ops §5	Yes

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Req No	Requirement Text	Type	Parent Req	User Needs	Criticality	Verification	Source	In Demo
	implementation notice							
1.2.1.220	The Plan Decision Subsubsystem shall send the Expert Rules Subsubsystem a response plan implementation notice	Data	1.1.0.210	15,16,20	Low	Demonstrate	Con Ops §5	Yes

For the SmartNET Subsystem, the following SubSubSystem Requirements were developed.

6.3.9 SmartNET GUI SubSubSystem Requirements

Req No	Requirement Text	Type	Parent Req	User Needs	Criticality	Verification	Source	In Demo
1.3.2.10	The SmartNET GUI Subsubsystem shall refresh the SmartNET Event Form based on a time interval defined in minutes	Performance	1.3.0.20	4	Medium	Demonstrate	Con Ops §4.3	Yes
1.3.2.20	The SmartNET GUI Subsubsystem shall refresh the SmartNET Map based on a time interval defined in minutes	Performance	1.3.0.10	4	Medium	Demonstrate	Con Ops §4.3	Yes
1.3.2.30	The SmartNET GUI Subsubsystem shall refresh the Alarm Form based on a configurable time interval	Performance	1.3.0.240	1	Medium	Demonstrate	Con Ops §4.3	Yes

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Req No	Requirement Text	Type	Parent Req	User Needs	Criticality	Verification	Source	In Demo
	defined in minutes							
1.3.2.40	The SmartNET GUI Subsubsystem shall provide an administrative user the capability to create an agency user profile in the Data Store	Functional	1.3.0.210	22	Medium	Demonstrate	Con Ops §4.3	Yes
1.3.2.50	The SmartNET GUI Subsubsystem shall provide an agency user the capability to modify an agency user profile in the Data Store	Functional	1.3.0.230	22	Medium	Demonstrate	Con Ops §4.3	Yes
1.3.2.60	The SmartNET GUI Subsubsystem shall provide an agency user the capability to create a construction	Functional	1.3.0.160	1	Medium	Demonstrate	Con Ops §4.3	Yes
1.3.2.70	The SmartNET GUI Subsubsystem shall provide an agency user the capability to modify a construction	Functional	1.3.0.160	1	Medium	Demonstrate	Con Ops §4.3	Yes
1.3.2.80	The SmartNET GUI Subsubsystem shall provide an agency user the capability to view information layers on a map as defined in data dictionary table 2.7.5	Functional	1.3.0.260	1	Medium	Demonstrate	Con Ops §4.3	Yes

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Req No	Requirement Text	Type	Parent Req	User Needs	Criticality	Verification	Source	In Demo
1.3.2.90	The SmartNET GUI Subsubsystem shall provide an agency user the capability to send via email the incident description as defined in data dictionary table 2.5.1	Functional	1.3.0.30	1	Medium	Demonstrate	Con Ops §4.3	Yes
1.3.2.100	The SmartNET GUI Subsubsystem shall receive VMS status data from the Data Store Subsubsystem	Functional	1.3.0.120	3	Medium	Demonstrate	Con Ops §4.3	Yes
1.3.2.110	The SmartNET GUI Subsubsystem shall provide an agency user the capability to view current status of VMS in the corridor	Interface	1.3.0.10	1,	Low	Demonstrate	Con Ops §4.3	Yes
1.3.2.120	The SmartNET GUI Subsubsystem shall receive CCTV status data from the Data Store Subsubsystem	Functional	1.3.0.110	3	Medium	Demonstrate	Con Ops §4.3	Yes
1.3.2.130	The SmartNET GUI Subsubsystem shall provide an agency user the capability to view current status of CCTV in the corridor	Functional	1.3.0.10	3	Low	Demonstrate	Con Ops §4.3	Yes
1.3.2.140	The SmartNET GUI Subsubsystem shall receive HOV status data from the Data Store Subsubsystem	Functional	1.3.0.100	3	Medium	Demonstrate	Con Ops §4.3	Yes

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Req No	Requirement Text	Type	Parent Req	User Needs	Criticality	Verification	Source	In Demo
1.3.2.150	The SmartNET GUI Subsubsystem shall provide Agency Users the capability to view current status of HOV facilities in the corridor	Functional	1.3.0.10	3	Medium	Demonstrate	Con Ops §4.3	Yes
1.3.2.160	The SmartNET GUI Subsubsystem shall receive Transit Vehicle Location from the Data Store Subsubsystem	Functional	1.3.0.190	3	Medium	Demonstrate	Con Ops §4.3	Yes
1.3.2.170	The SmartNET GUI Subsubsystem shall provide Agency Users the capability to view Transit Vehicle Location in the corridor	Functional	1.3.0.20	4	Medium	Demonstrate	Con Ops §4.3	Yes
1.3.2.210	The SmartNET GUI Subsubsystem shall provide Agency Users the capability to view link based weather link data in the corridor	Functional	1.3.0.20	4	Medium	Demonstrate	Con Ops §4.3	Yes
1.3.2.220	The SmartNET GUI Subsubsystem shall receive from the Data Store Subsubsystem incidents	Functional	1.3.0.40	1	Low	Test	Con Ops §4.3	Yes
1.3.2.230	The SmartNET GUI Subsubsystem shall provide an agency user the capability to view incidents in the corridor	Functional	1.3.0.20	4	Medium	Demonstrate	Con Ops §4.3	Yes
1.3.2.240	The SmartNET GUI Subsubsystem shall receive from the Data Store Subsubsystem parking lot data	Functional	1.3.0.70	1	Medium	Demonstrate	Con Ops §4.3	Yes

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Req No	Requirement Text	Type	Parent Req	User Needs	Criticality	Verification	Source	In Demo
1.3.2.250	The SmartNET GUI Subsubsystem shall provide Agency Users the capability to view parking lot data in the corridor	Functional	1.3.0.20	4	Medium	Demonstrate	Con Ops §4.3	Yes
1.3.2.260	The SmartNET GUI Subsubsystem shall receive from the Data Store Subsubsystem Link dynamic data	Functional	1.3.0.90	1	Medium	Demonstrate	Con Ops §4.3	Yes
1.3.2.270	The SmartNET GUI Subsubsystem shall provide Agency Users the capability to view link dynamic data on a map in the corridor	Functional	1.3.0.20	4	Medium	Demonstrate	Con Ops §4.3	Yes
1.3.2.300	The SmartNET GUI Subsubsystem shall provide an administrative user the capability to make inactive a agency user profile in the Data Store Subsubsystem	Functional	1.3.0.230	22	Medium	Demonstrate	Con Ops §4.3	Yes
1.3.2.310	The SmartNET GUI Subsubsystem shall provide Agency Users the capability to view Freeway Travel Time link dynamic data on a map in the corridor	Functional	1.3.0.20	4	Medium	Demonstrate	Con Ops §4.3	Yes
1.3.2.330	The SmartNET GUI Subsubsystem shall provide Agency Users the capability to view Arterial Travel Time link dynamic data on a map in the corridor	Functional	1.3.0.20	4	Medium	Demonstrate	Con Ops §4.3	Yes

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Req No	Requirement Text	Type	Parent Req	User Needs	Criticality	Verification	Source	In Demo
1.3.2.340	The SmartNET GUI Subsubsystem shall receive from the Data Store Subsubsystem construction	Functional	1.3.0.50	1	Low	Test	Con Ops §4.3	Yes
1.3.2.350	The SmartNET GUI Subsubsystem shall receive from the Data Store Subsubsystem special events	Functional	1.3.0.60	1	Low	Test	Con Ops §4.3	Yes
1.3.2.360	The SmartNET GUI Subsubsystem shall provide an agency user the capability to create an incident	Functional	1.3.0.150	1	Low	Test	Con Ops §4.3	Yes
1.3.2.370	The SmartNET GUI Subsubsystem shall provide an agency user the capability to create a special event	Functional	1.3.0.170	1	Low	Test	Con Ops §4.3	Yes
1.3.2.380	The SmartNET GUI Subsubsystem shall provide an agency user the capability to modify an incident	Functional	1.3.0.150	1	Low	Test	Con Ops §4.3	Yes
1.3.2.390	The SmartNET GUI Subsubsystem shall provide an agency user the capability to modify a special event	Functional	1.3.0.170	1	Low	Test	Con Ops §4.3	Yes
1.3.2.400	The SmartNET GUI Subsubsystem shall provide an agency user the capability to close an incident	Functional	1.3.0.150	1	Low	Test	Con Ops §4.3	Yes

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Req No	Requirement Text	Type	Parent Req	User Needs	Criticality	Verification	Source	In Demo
1.3.2.410	The SmartNET GUI Subsubsystem shall provide an agency user the capability to close a construction	Functional	1.3.0.160	1	Low	Test	Con Ops §4.3	Yes
1.3.2.420	The SmartNET GUI Subsubsystem shall provide an agency user the capability to close a special event	Functional	1.3.0.170	1	Low	Test	Con Ops §4.3	Yes
1.3.2.460	The SmartNET GUI Subsubsystem shall provide an agency user the capability to create a link	Functional	1.3.0.330	10	Medium	Demonstrate	Con Ops §4.3	Yes
1.3.2.470	The SmartNET GUI Subsubsystem shall provide an agency user the capability to modify a link	Functional	1.3.0.330	10	Medium	Demonstrate	Con Ops §4.3	Yes
1.3.2.480	The SmartNET GUI Subsubsystem shall provide an agency user the capability to delete a link	Functional	1.3.0.330	10	Medium	Demonstrate	Con Ops §4.3	Yes
1.3.2.500	The SmartNET GUI Subsubsystem shall provide an agency user the capability to create a map profile	Functional	1.3.0.270	1	Medium	Demonstrate	Con Ops §4.3	Yes
1.3.2.510	The SmartNET GUI Subsubsystem shall provide an agency user the capability to update a map profile	Functional	1.3.0.270	1	Medium	Demonstrate	Con Ops §4.3	Yes

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Req No	Requirement Text	Type	Parent Req	User Needs	Criticality	Verification	Source	In Demo
1.3.2.520	The SmartNET GUI Subsubsystem shall provide an agency user the capability to delete a map profile	Functional	1.3.0.270	1	Medium	Demonstrate	Con Ops §4.3	Yes
1.3.2.530	The SmartNET GUI Subsubsystem shall provide an agency user the capability to select layers on a map by toggling on and off	Functional	1.3.0.20	4	Medium	Demonstrate	Con Ops §4.3	Yes
1.3.2.540	The SmartNET GUI Subsubsystem shall provide an agency user the capability to create a facility point	Functional	1.3.0.330	10	Medium	Demonstrate	Con Ops §4.3	Yes
1.3.2.550	The SmartNET GUI Subsubsystem shall provide an agency user the capability to update a facility point	Functional	1.3.0.330	10	Medium	Demonstrate	Con Ops §4.3	Yes
1.3.2.560	The SmartNET GUI Subsubsystem shall provide an agency user the capability to delete a facility point	Functional	1.3.0.330	10	Medium	Demonstrate	Con Ops §4.3	Yes
1.3.2.570	The SmartNET GUI Subsubsystem shall provide an agency user the capability to create a VMS object	Functional	1.3.0.330	10	Medium	Demonstrate	Con Ops §4.3	Yes
1.3.2.580	The SmartNET GUI Subsubsystem shall provide an agency user the capability to update a VMS	Functional	1.3.0.330	10	Medium	Demonstrate	Con Ops §4.3	Yes

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Req No	Requirement Text	Type	Parent Req	User Needs	Criticality	Verification	Source	In Demo
	object							
1.3.2.590	The SmartNET GUI Subsubsystem shall provide an agency user the capability to delete a VMS object	Functional	1.3.0.330	10	Medium	Demonstrate	Con Ops §4.3	Yes
1.3.2.600	The SmartNET GUI Subsubsystem shall provide an agency user the capability to create a CCTV object	Functional	1.3.0.330	10	Medium	Demonstrate	Con Ops §4.3	Yes
1.3.2.610	The SmartNET GUI Subsubsystem shall provide an agency user the capability to update a CCTV object	Functional	1.3.0.330	10	Medium	Demonstrate	Con Ops §4.3	Yes
1.3.2.620	The SmartNET GUI Subsubsystem shall provide an agency user the capability to delete a CCTV object	Functional	1.3.0.330	10	Medium	Demonstrate	Con Ops §4.3	Yes
1.3.2.630	The SmartNET GUI Subsubsystem shall provide an agency user the capability to create a traffic signal object	Functional	1.3.0.330	10	Medium	Demonstrate	Con Ops §4.3	Yes
1.3.2.640	The SmartNET GUI Subsubsystem shall provide an agency user the capability to update a traffic signal object	Functional	1.3.0.330	10	Medium	Demonstrate	Con Ops §4.3	Yes

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Req No	Requirement Text	Type	Parent Req	User Needs	Criticality	Verification	Source	In Demo
1.3.2.650	The SmartNET GUI Subsubsystem shall provide an agency user the capability to delete a traffic signal object	Functional	1.3.0.330	10	Medium	Demonstrate	Con Ops §4.3	Yes
1.3.2.660	The SmartNET GUI Subsubsystem shall provide an agency user the capability to send via email the construction description as defined in the data dictionary table 2.5.2	Functional	1.3.0.30	1	Medium	Demonstrate	Con Ops §4.3	Yes
1.3.2.670	The SmartNET GUI Subsubsystem shall provide an agency user the capability to send via email the special event description as defined in the data dictionary table 2.5.3	Interface	1.3.0.30	1	Medium	Demonstrate	Con Ops §4.3	Yes
1.3.2.680	The SmartNET GUI Subsubsystem shall provide an agency user the capability to create reports	Functional	1.3.0.20,	4	Medium	Demonstrate	Con Ops §4.3	Yes
1.3.2.690	The SmartNET GUI Subsubsystem shall provide an agency user the capability to view construction in the corridor	Functional	1.3.0.20	4	Medium	Demonstrate	Con Ops §4.3	Yes
1.3.2.700	The SmartNET GUI Subsubsystem shall provide an agency user the capability to view special events in the corridor	Functional	1.3.0.20	4	Medium	Demonstrate	Con Ops §4.3	Yes

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Req No	Requirement Text	Type	Parent Req	User Needs	Criticality	Verification	Source	In Demo
1.3.2.710	The SmartNET GUI Subsubsystem shall provide an agency user the capability to view incidents on a map in the corridor	Functional	1.3.0.20.	4	Medium	Demonstrate	Con Ops §4.3	Yes
1.3.2.720	The SmartNET GUI Subsubsystem shall provide an agency user the capability to view construction on a map in the corridor	Functional	1.3.0.20	4	Medium	Demonstrate	Con Ops §4.3	Yes
1.3.2.730	The SmartNET GUI Subsubsystem shall provide an agency user the capability to view special events on a map in the corridor	Functional	1.3.0.20	4	Medium	Demonstrate	Con Ops §4.3	Yes
1.3.2.740	The SmartNET GUI Subsubsystem shall provide an agency user the capability to edit current status of VMS in the corridor	Interface	1.3.0.330,	10	Low	Demonstrate	Con Ops §4.3	Yes
1.3.2.750	The SmartNET GUI Subsubsystem shall provide an agency user the capability to view Traffic signal device status information on a map in the corridor	Functional	1.3.0.10,	3	Medium	Demonstrate	Con Ops §4.3	Yes
1.3.2.770	The SmartNET GUI Subsubsystem shall provide an agency user the capability to view link speed information on a map in the	Functional	1.3.0.20	4	Medium	Demonstrate	Con Ops §4.3	Yes

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Req No	Requirement Text	Type	Parent Req	User Needs	Criticality	Verification	Source	In Demo
	corridor							
1.3.2.780	The SmartNET GUI Subsubsystem shall provide an agency user the capability to view link weather information on a map in the corridor	Functional	1.3.0.20	4	Medium	Demonstrate	Con Ops §4.3	Yes
1.3.2.790	The SmartNET GUI Subsubsystem shall provide an agency user the capability to view an alarm	Functional	1.3.0.20	4	Medium	Demonstrate	Con Ops §4.3	Yes
1.3.2.800	The SmartNET GUI Subsubsystem shall provide an agency user the capability to confirm an alarm	Functional	1.3.0.20	4	Medium	Demonstrate	Con Ops §4.3	Yes
1.3.2.810	The SmartNET GUI Subsubsystem shall provide an agency user the capability to ignore an alarm	Functional	1.3.0.20	4	Medium	Demonstrate	Con Ops §4.3	Yes
1.3.2.820	The SmartNET GUI Subsubsystem shall provide an agency user the capability to acknowledge an alarm	Functional	1.3.0.20	4	Medium	Demonstrate	Con Ops §4.3	Yes
1.3.2.830	The SmartNET GUI Subsubsystem shall provide an agency user the capability to login to the SmartNET GUI	Functional	1.3.0.20	4	Medium	Demonstrate	Con Ops §4.3	Yes

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Req No	Requirement Text	Type	Parent Req	User Needs	Criticality	Verification	Source	In Demo
1.3.2.840	The SmartNET GUI Subsubsystem shall validate an agency user login	Functional	1.3.0.20	4	Medium	Demonstrate	Con Ops §4.3	Yes
1.3.2.850	The SmartNET GUI Subsubsystem shall authorize an agency user based on user profile	Functional	1.3.0.20	4	Low	Test	Con Ops §4.3	Yes
1.3.2.860	The SmartNET GUI Subsubsystem shall send to the Data Collection Subsubsystem incidents	Functional	1.3.0.150	1	Low	Test	Con Ops §4.3	Yes
1.3.2.870	The SmartNET GUI Subsubsystem shall send to the Data Collection Subsubsystem construction	Functional	1.3.0.160	1	Low	Test	Con Ops §4.3	Yes
1.3.2.880	The SmartNET GUI Subsubsystem shall send to the Data Collection Subsubsystem special events	Functional	1.3.0.170	1	Low	Test	Con Ops §4.3	Yes
1.3.2.900	The SmartNET GUI Subsubsystem shall send to the Data Collection Subsubsystem VMS inventory	Functional	1.3.0.330	10	Low	Test	Con Ops §4.3	Yes
1.3.2.910	The SmartNET GUI Subsubsystem shall send to the Data Collection Subsubsystem VMS status data	Functional	1.3.0.330	10	Low	Test	Con Ops §4.3	Yes
1.3.2.920	The SmartNET GUI Subsubsystem shall send to the Data Collection Subsubsystem CCTV	Functional	1.3.0.330	10	Low	Test	Con Ops §4.3	Yes

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Req No	Requirement Text	Type	Parent Req	User Needs	Criticality	Verification	Source	In Demo
	inventory							
1.3.2.930	The SmartNET GUI Subsubsystem shall send to the Data Collection Subsubsystem Traffic Signal inventory	Functional	1.3.0.330	10	Low	Test	Con Ops §4.3	Yes
1.3.2.940	The SmartNET GUI Subsubsystem shall send to the Data Collection Subsubsystem Traffic Signal status data	Functional	1.3.0.330	10	Low	Test	Con Ops §4.3	Yes
1.3.2.950	The SmartNET GUI Subsubsystem shall send to internet email an incident description	Functional	1.3.0.30	1	Low	Test	Con Ops §4.3	Yes
1.3.2.960	The SmartNET GUI Subsubsystem shall send to internet email a construction description	Functional	1.3.0.380	1	Low	Test	Con Ops §4.3	Yes
1.3.2.970	The SmartNET GUI Subsubsystem shall send to internet email a special event description	Functional	1.3.0.30	1	Low	Test	Con Ops §4.3	Yes
1.3.2.980	The SmartNET GUI Subsubsystem shall send to the Data Store Subsubsystem an updated user profile	Functional	1.3.0.220	22	Low	Test	Con Ops §4.3	Yes

6.3.10 Plan Decision Dialogue GUI SubSubSystem Requirements

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Req No	Requirement Text	Type	Parent Req	User Needs	Criticality	Verification	Source	In Demo
1.3.1.10	The Plan Decision Dialogue Subsubsystem shall receive from the Plan Decision Subsubsystem a response plan recommendation	Data	1.1.0.210	15,16,20	Low	Demonstrate	Con Ops §5	Yes
1.3.1.20	The Plan Decision Dialogue Subsubsystem shall receive from the Decision Support Subsystem a response plan recommendation	Data	1.1.0.210	15,16,20	Low	Demonstrate	Con Ops §5	Yes
1.3.1.40	The Plan Decision Dialogue Subsubsystem Shall display to the ICM Coordinator a response plan recommendation	Functional	1.1.0.210	15,16,20	Low	Demonstrate	Con Ops §5	Yes
1.3.1.50	The Plan Decision Dialogue Subsubsystem shall provide the ICM Coordinator the capability to accept or reject a response plan recommendation	Functional	1.1.0.210	15,16,20	Low	Demonstrate	Con Ops §5	Yes
1.3.1.60	The Plan Decision Dialogue Subsubsystem Shall receive from the ICM Coordinator a decision on whether to use a response plan recommendation	Data	1.1.0.210	15,16,20	Low	Demonstrate	Con Ops §5	Yes
1.3.1.70	The Plan Decision Dialogue Subsubsystem shall display to an agency user a response plan recommendation	Functional	1.1.0.210	15,16,20	Low	Demonstrate	Con Ops §5	Yes

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Req No	Requirement Text	Type	Parent Req	User Needs	Criticality	Verification	Source	In Demo
1.3.1.80	The Plan Decision Dialogue Subsubsystem Shall provide to an agency user the capability to accept or reject a response plan recommendation	Functional	1.1.0.210	15,16,20	Low	Demonstrate	Con Ops §5	Yes
1.3.1.90	The Plan Decision Dialogue Subsubsystem shall receive agency accept or reject responses to response plan recommendation	Data	1.1.0.210	15,16,20	Low	Demonstrate	Con Ops §5	Yes
1.3.1.100	The Plan Decision Dialogue Subsubsystem shall display to ICM Coordinator agency accept or reject responses to response plan recommendation	Data	1.1.0.210	15,16,20	Low	Demonstrate	Con Ops §5	Yes
1.3.1.110	The Plan Decision Dialogue Subsubsystem shall provide the ICM Coordinator the capability to implement a response plan recommendation	Functional	1.1.0.210	15,16,20	Low	Demonstrate	Con Ops §5	Yes
1.3.1.120	The Plan Decision Dialogue Subsubsystem shall display to the agency users a response plan implementation notice	Functional	1.1.0.210	15,16,20	Low	Demonstrate	Con Ops §5	Yes
1.3.1.130	The Plan Decision Dialogue Subsubsystem shall send the Plan Decision Subsubsystem a response plan implementation notice	Functional	1.1.0.210	15,16,20	Low	Demonstrate	Con Ops §5	Yes

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Chapter 7.0 Glossary

This section defines the terms and definitions used in the requirements document.

Real-time – receipt or calculation of conditions within 2 minutes of occurrence

Near real-time - receipt or calculation of conditions more than 2 minutes of occurrence, but within 30 minutes of occurrence

Status – condition of infrastructure

Active - not marked as out-of-order or in-maintenance

Link - the portion of a model connecting two nodes. The link is defined within the model as:

- facility type
- number of lanes
- capacity per lane
- speed limit
- average jam density

Node – point of branching of physical connections, or terminating a physical connection within a simulation model

Average Jam Density - the maximum number of vehicles per unit length of the highway link

Intermodal network conditions – current status and state of modes of travel within the network

Consistency – the system's estimation error will fall within a pre-determined range

Real-world conditions – model capabilities to match conditions of actual network

- The system's estimation error of the traffic speed, density and volume on every highway link in the network should not exceed 15% (plus or minus).
- The system's estimation error of the location of every transit vehicle in the network should not exceed 10% (plus or minus).
- The system's estimation error of the occupancy of every park-and-ride facility in the network should not exceed 20% (plus or minus).

Corridor management strategy – management plan for an event or incident within the corridor. These strategies include:

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- pre-trip and en-route traveler information provision

- congestion pricing

- signal timing modification

- transit service modification

- transit signal priority

- parking management and pricing

- combinations of the above

Traffic Management Scheme – A traffic management scheme consists of the different actions that will be implemented by all agencies to manage the corridor. These actions are:

- List of Dynamic Message Signs (DMS) to be activated along with their messages

- Transit vehicle service pattern including any route and headway modifications

- Timing plan of all signalized intersections

Environment-oriented – factor relating to the environment of the system

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APPENDIX A – Action Verbs

This section defines the action verb terms and definitions used in the requirements document.

VERB	DEFINITION
Accept	to receive (e.g. data feed from another system)
Activate	to make active; cause to function or act (e.g. to make a planned event an active incident)
Add	to add (e.g. add a timestamp to a record)
Aggregate	to bring together; collect into one
Allow	to give permission to or for
Authorize	to give authority or official power to (associated with security authentication requirement)
Collect	to get from source; assemble
Compare	to examine (two or more objects, ideas, people, etc.) in order to note similarities and differences
Compute	to determine or ascertain by mathematical or logical means
Confirm	to make valid or binding by some formal or legal act; sanction; ratify
Determine	to settle or decide (a dispute, question, etc.) by an authoritative or conclusive decision
Display	to output (data) on a monitor or other screen
Evaluate	to judge or determine the significance, worth, or quality of; assess
Execute	to run (a program or routine) or to carry out (an instruction in a program)
Filter	to remove by the action of a filter
Generate	to bring into existence; cause to be; produce (eg. generate a log file)
Import	to bring (documents, data, etc.) into one software program from another, implies translate
Manage	to handle, direct, govern, or control in action or use (eg. manage the add, change, delete of an object)
Merge	to combine or blend
Monitor	to watch closely for purposes of control, surveillance, etc.; keep track of; check continually
Notify	to inform (someone) or give notice to
Parse	to analyze (a string of characters) in order to associate groups of characters with the syntactic units of the underlying grammar
Predict	to declare or tell in advance; prophesy; foretell
Provide	to make available (eg. provide a function to a user)
Publish	to make generally known (eg. publish to C2C)
Receive	to get or be informed of
Recommend	to advise, as an alternative; suggest (a choice, course of action, etc.)
Refresh	to read and write (the contents of dynamic storage) at intervals in order to avoid

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VERB	DEFINITION
	loss of data
Remove	to get rid of; do away with (eg. remove from User Interface display)
Reside	- Hardware constraint - eg. reside in a controller cabinet
Restore	to bring back to a former, original, or normal condition
Restrict	to confine or keep within limits, as of space, action, choice, intensity, or quantity
Retrieve	to locate and read (data) from storage, as for display on a monitor
Save	to copy (a file) from RAM onto a disk or other storage medium
Search	to examine (one or more files, as databases or texts) electronically, to locate specified items
Select	to make a choice; pick
Send	to cause to be transmitted to a destination
Simulate	to create a simulation, likeness, or model of (a situation, system, or the like)
Sort	to arrange according to sort, kind, or class; separate into sorts; classify
Start	to set in operation
Store	to put or retain (data) in a memory unit
Translate	to convert (a program, data, code, etc.) from one form to another
Update	to incorporate new or more accurate information in (a database, program, procedure, etc.)
Use	- Constraint Only - to utilize a specific technology
Validate	to substantiate

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APPENDIX B – Data Dictionary

APPENDIX C – Data Flow Diagrams

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APPENDIX D – Interface Control Documents

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