



Systems Engineering Management Plan

Version 1.0

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Prepared for the **Sacramento Area Council of Governments**
and transportation operating agencies in the Sacramento region

by Siemens ITS



SIEMENS

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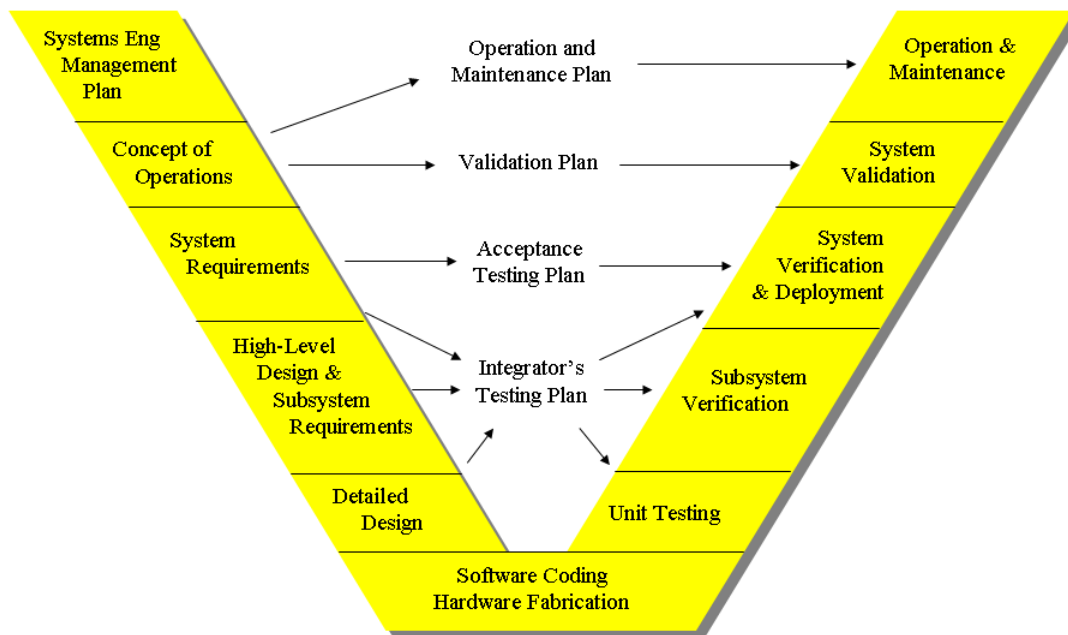
1 Introduction

The Sacramento Transportation Area Network, or STARNET, is an information exchange network that will be used by the operators of transportation facilities and emergency responders in the Sacramento region of California. It will enable the real-time sharing of data and live video pertaining to the operation of roadways and public transit, thereby assisting operations personnel in the coordination of their activities and in providing the public with comprehensive information about current travel conditions and options.

This Systems Engineering Management Plan is essentially a project management plan for STARNET, where in this case the “project” is the implementation, operation, and maintenance of STARNET. Within this scope, there are several smaller “projects”, one of which is the initial building or implementation of STARNET. It is important to look ahead now to its operation and maintenance too, as that may have a big influence on its design, and can ensure the system is used, robust, and sustainable.

The Systems Engineering Management Plan identifies needed systems engineering activities. The term “systems engineering” here refers both to the engineering of the system, and to the best-practices process for systems life-cycle management known as Systems Engineering. The scope and key elements of the generic Systems Engineering process are illustrated in the following “vee” diagram.

Figure 1 - Overview of the Systems Engineering Process



Among other things, this document describes how this generic process has been tailored to the unique circumstances of STARNET.

This Systems Engineering Management Plan is divided into the following sections

- Work breakdown structure.
- A description of all work items or tasks.
- Time schedule and indication of task interdependencies.
- Control gates – points at which high level approval is needed before proceeding, who will provide that approval, and requirements for approval.
- Resources needed for each task, including lead and supporting organizations and personnel, level of effort and funding needed, source of funding, and any specialty tools, equipment or services needed.
- Identification of risks and counter measures.
- Identification and description of needed specific plans (also called technical plans).
- Reference documents used in the preparation of this plan.

As with nearly all documents used in the management of STARNET, this document will be used throughout the life of the system and will be updated as needed.

2 Acronyms

CFR – Code of Federal Regulations

FHWA – Federal Highway Administration

ITS – Intelligent Transportation Systems

O&M – Operations and Maintenance

PM – Project Manager

RFP – Request for Proposals

SACOG – Sacramento Area Council of Governments

SEMP – Systems Engineering Management Plan

STARNET – Sacramento Transportation Area Network

WBS – Work Breakdown Structure

3 Work Breakdown Structure

The major activities needed to plan, implement, operate, and maintain STARNET have been identified and structured hierarchically as follows.

- 1 Define STARNET
 - 1.1 Contract with a Firm for Technical Assistance
 - 1.2 Oversee the Technical Assistance Contract
 - 1.3 Prepare and Maintain the Systems Engineering Management Plan

- 1.4 Develop the Concept of Operations
 - 1.4.1 Hold Stakeholder Interviews and a Workshop
 - 1.4.2 Identify User Needs
- 1.5 Identify System Requirements
- 1.6 Develop the Verification Plan
- 1.7 Develop Other Specific Plans
- 2 Design the Initial STARNET System
 - 2.1 Develop a High Level Design
 - 2.2 Contract with a System Integrator
 - 2.2.1 Write the System Integrator Request For Proposals
 - 2.2.2 Select the System Integrator
 - 2.2.3 Negotiate a Contract with the System Integrator
 - 2.3 Oversee the System Integrator Contract
 - 2.4 Identify Detailed Requirements
 - 2.5 Prepare the Detailed Design
- 3 Deploy the Initial STARNET System
 - 3.1 Build the Initial System
 - 3.2 Verify (Test) the Initial System
 - 3.3 Train Agency Personnel
 - 3.4 Add STARNET Use to Each Agency's Operations Procedures
 - 3.5 Document Compliance with Federal Rule 23 CFR 940
 - 3.6 Validate the Initial System
- 4 Use and Maintain STARNET
 - 4.1 Secure Operation and Maintenance Funding as Needed
 - 4.2 Use STARNET
 - 4.3 Reconfigure the System for Changes
 - 4.4 Update System Configuration Documentation
 - 4.5 Maintain Leased or Contract Services
 - 4.6 Provide System Maintenance
 - 4.7 Plan System Expansions and Upgrades
 - 4.8 Implement System Expansions and Upgrades
 - 4.9 Plan System Retirement

4 Work Descriptions

In order to have a clearer understanding of the different activities in the Work Breakdown Structure, each work item has been further defined in the following paragraphs.

WBS 1: Define STARNET – This high level task covers activities from contracting for technical assistance through documentation of system requirements and a verification plan.

WBS 1.1: Contract with a Firm for Technical Assistance – SACOG and the Sacramento Region ITS Partnership prepared a Request for Proposals, which included a description of the required scope of work, for a System Engineering Technical Assistance contract. Siemens ITS was selected and a contract negotiated. Work by the contractor commenced January 2, 2006.

WBS 1.2: Oversee the Technical Assistance Contract – SACOG is providing contract management for the System Engineering Technical Assistance contract. Stakeholders assist by reviewing the contractor's deliverables.

WBS 1.3: Prepare/Maintain Systems Engineering Management Plan – The Technical Assistance contractor is tasked with writing and providing initial maintenance of a Systems Engineering Management Plan – this document. The SEMP will be a living document updated throughout the STARNET project. The stakeholders will review the Systems Engineering Management Plan.

WBS 1.4: Develop the Concept of Operations – The Technical Assistance contractor is tasked with obtaining input from the stakeholders and writing a Concept of Operations plan.

WBS 1.4.1: Hold Stakeholder Interviews and a Workshop – The Technical Assistance contractor will conduct one-on-one meetings with SACOG and the key stakeholders and conduct a workshop to ensure the Concept of Operations Plan captures all goals and needs of the stakeholders. A Strawman Concept of Operations Plan will be used to jumpstart the stakeholders' input during the one-day workshop.

WBS 1.4.2: Identify User Needs – After documenting goals and operation scenarios, the Technical Assistance contractor will assist the stakeholders in extracting a list of User Needs from those scenarios. Needs will address both the functionality of STARNET and the support measures needed from the stakeholders and contractors. User Needs will be documented in the Concept of Operations document. The stakeholders will review the whole Concept of Operations document.

WBS 1.5: Identify System Requirements – The Technical Assistance contractor will decompose the User Needs into testable system requirements. The system requirements will identify the required system features and performance metrics. The system requirements will be grouped based on priority and implementation stage and documented in the System Requirements document. The stakeholders will review the system requirements.

WBS 1.6: Develop the Verification Plan - The Technical Assistance contractor will prepare the Verification Plan, which identifies acceptable procedures for verification (acceptance testing) of each system requirement, such as inspection, demonstration, analysis, or test. Test cases will be identified based on the concept of operations. The stakeholders will review the Verification Plan. Based on the Verification Plan, the System Integrator will later develop a detailed acceptance test plan.

WBS 1.7: Develop Other Specific Plans – Where appropriate, the Technical Assistance contractor will prepare separate documents, called “specific plans” or “technical plans” to provide additional detail about the procedures, tools, and resources that will be used throughout the life cycle of STARNET. These documents will also detail the responsibilities of the involved agencies. Some specific plans include Stakeholders Cooperation Plan, Procurement Plan, Documentation Plan, Configuration Management Plan, Operations and Maintenance Plan, Data Management Plan, and Interface Control Plan. Throughout the project, additional plans may be identified and developed as necessary and documents will be updated as appropriate. The Stakeholders will review the specific plans.

WBS 2: Design the Initial STARNET System – This high level task involves designing the initial implementation of STARNET based on the requirements developed during the definition phase.

WBS 2.1: Develop High Level Design – Based on the users needs, system requirements and input from specific plans, the Technical Assistance contractor will develop a high level design of the STARNET system. This design will include a logical architecture drawing and specifications that illustrate the required data flows between all existing and future end systems. The design will also include candidate high level physical architectures and standards that address the system requirements. The stakeholders will review the High Level Design.

WBS 2.2: Contract with a System Integrator – In order to implement STARNET in accordance with the system requirements, a System Integrator will be hired.

WBS 2.2.1: Write the System Integrator Request For Proposals – The Technical Assistance contractor will prepare a Request for Proposals (RFP) for procurement of System Integration services, in accordance with the STARNET Procurement Plan. The RFP will incorporate or reference the Concept of Operations, System Requirements, Verification Plan, and High Level Design. The RFP will include details of each node system to be connected, the quantities of field devices or incidents managed by each node system, details of pan/tilt/zoom cameras and analog video switches that may need direct control via the network, existing digital video standards in use, details of agency-owned or leased communications links available for use by STARNET, information technology policies (including those related to security) and other policies that may impact the project. The stakeholders will review the RFP.

WBS 2.2.2: Select the System Integrator – The Technical Assistance contractor will assist in responding to questions from proposers, review submitted proposals and provide comments, help address specific issues raised by a proposal, help prepare requests for clarification from proposers if appropriate, help prepare questions during interviews, participate in interviews if appropriate, and help evaluate further information provided during interviews. Based on the proposals and interviews, the stakeholders will select a System Integrator to implement the STARNET system.

WBS 2.2.3: Negotiate a Contract with the System Integrator – Based on contract terms in the request for proposals, and the successful proposal, SACOG will negotiate a contract with the selected System Integrator.

WBS 2.3: Oversee the System Integrator Contract – SACOG will provide contract management and oversight of the System Integrator contract. Stakeholders will assist by reviewing the contractor’s deliverables. The Technical Assistance contractor will also assist particularly with technical oversight including review of submittals; monitoring the STARNET detailed design, field installation, and acceptance testing; helping prepare responses to questions from the contractor; providing updates to specific management plans and documents as the implementation progresses; and helping with risk management.

WBS 2.4: Identify Detailed Requirements – Based on the Concept of Operations, and System Requirements the System Integrator will develop detailed requirements for the STARNET system. These will be reviewed by the stakeholders and the Technical Assistance contractor.

WBS 2.5: Prepare the Detailed Design – Based on the detailed requirements and the High Level Design, the System Integrator will prepare the detailed design. This will be reviewed by the stakeholders and the Technical Assistance contractor.

WBS 3: Deploy the Initial STARNET System – This high level task involves building, testing, documenting, and validating the initial system, and providing training for agency personnel. The Technical Assistance contractor and stakeholders will monitor the system implementation and verification (testing) by the System Integrator.

WBS 3.1: Build the Initial System – Based on the detailed design, the System Integrator will build the initial STARNET system including procurement and installation of hardware and software, and systems integration. The stakeholders and the Technical Assistance contractor will monitor this work, including review of prototypes.

WBS 3.2: Verify (Test) the Initial System – Tests will include functional tests of each component/subsystem, acceptance tests of each subsystem, and system end-to-end acceptance tests of the entire STARNET system. The tests will be conducted by the System Integrator with oversight by the stakeholders and the Technical Assistance contractor.

WBS 3.3: Train Agency Personnel – The System Integrator will provide formal training for agency personnel. The training will include operation, administration, and maintenance of the new system. The training will be broken into multiple

sessions to ensure each group of students receives the proper type and level of training that corresponds with their role. Stakeholders will also receive informal training by virtue of their involvement with the System Integrator and the partially built system during system integration.

WBS 3.4: Add STARNET Use to Each Agency's Operations Procedures – During STARNET implementation, each agency's standard operating procedures will be updated with information pertaining to the operations, maintenance and interoperability of the STARNET system with the agency's existing transportation management systems.

WBS 3.5: Document Compliance with Federal Rule 23 CFR 940 – In order to comply with FHWA's Federal Rule 23 CFR 940, documentation will be developed to illustrate that STARNET as implemented is consistent with the regional ITS architecture and that a systems engineering analysis was used in its definition and design.

WBS 3.6: Validate the Initial System – After STARNET has been operational for some time, its performance will be evaluated and the results assessed to see how closely it meets the stakeholders' vision and objectives. This process is referred to as system validation, and will result in a validation report.

WBS 4: Use and Maintain STARNET – This high level task commences once the STARNET system has been deployed and is operational. The involved agencies will then have the responsibility of on-going operation and maintenance.

WBS 4.1: Secure Operation and Maintenance Funding as Needed – The involved agencies will secure the funding needed for that part of operations and maintenance for which each agency is responsible.

WBS 4.2: Use STARNET – The involved agencies will make use of STARNET in their day-to-day transportation management activities. The Operations and Maintenance Plan will provide guidance.

WBS 4.3: Reconfigure the System for Changes – The involved agencies will perform system administration which involves making changes to its configuration to add or delete; users, node systems, communications links, etc. The system administration manuals provided by the System Integrator will provide guidance.

WBS 4.4: Update System Configuration Documentation – The involved agencies will update the system configuration documentation as each configuration change is made. The Configuration Management Plan will provide guidance.

WBS 4.5: Maintain Leased or Contract Services – The involved agencies will arrange and maintain any leased or contract services needed, such as for leased communications links or supplemental maintenance services.

WBS 4.6: Provide System Maintenance – The involved agencies will conduct preventive and reactive maintenance for the system components for which they are responsible. The Operations and Maintenance Plan and maintenance manuals provided by the System Integrator will provide guidance.

WBS 4.7: Plan System Expansions and Upgrades – The stakeholders will plan system expansion and upgrades when needed to accommodate new node systems, new agencies, or new functionality, or to replace obsolete components. Planning will include obtaining the required funding.

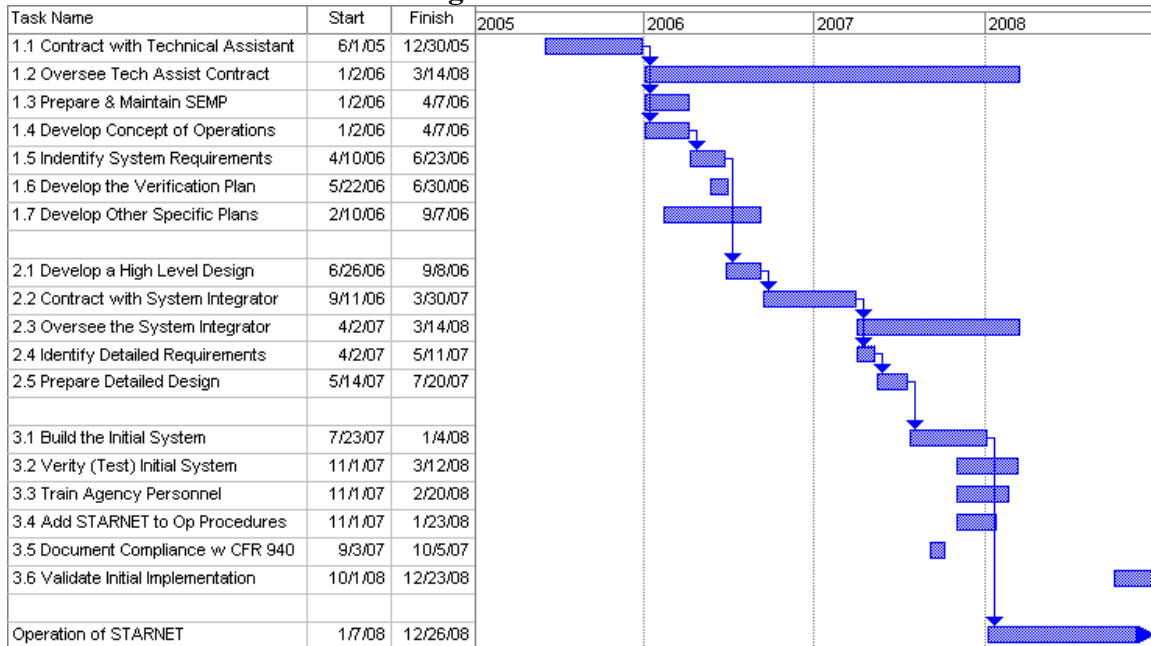
WBS 4.8: Implement System Expansions and Upgrades – The stakeholders will implement planned system expansions and upgrades. Depending on the scope and scale of the system change, some or all of this Systems Engineering Management Plan will be applicable for managing such changes. The process will also need to address continued operation of the existing system during implementation of the changes.

WBS 4.9: Plan System Retirement – Eventually, the stakeholders may need to retire the STARNET system if other systems or procedures take over its role. The agencies will plan the decommissioning of the system, transition to alternative systems and procedures, and disposal of any shared resources.

5 Time Schedule

The following schedule is provided as a high level project schedule that includes all phases of the STARNET program leading to initial system operation, including tasks performed by the stakeholders, the Technical Assistance contractor, and the System Integrator. As the STARNET program progresses, the schedule will be updated to reflect actual or more accurate start and finish dates, and to add system upgrade projects when identified.

Figure 2 - Gantt Chart



6 Control Gates

Control gates are points or milestones at which formal approval is required before proceeding with an action or activity. The following table identifies the major control gates for STARNET implementation, the person who will authorize “opening the gate”, and prerequisites for doing so.

Table 1 Control Gates

Control Gate	Source of Authorization	Prerequisites
Commence Technical Assistance contract.	SACOG Executive Director	Funding in place, contractor selection process completed, agreement negotiated, agreement signed by contractor
Commence identification of system requirements	SACOG project manager for Technical Assistance contract	Concept of Operations completed, including review by stakeholders
Commence development of high level design	SACOG project manager for Technical Assistance contract	System Requirements identified and reviewed by stakeholders
Issue Request for Proposals for System Integrator	SACOG Board of Directors	Funding in place, RFP completed including review by stakeholders
Commence System Integration contract	SACOG Executive Director	Funding in place, contractor selection process completed, agreement negotiated, agreement signed by contractor
Commence preparation of detailed design	SACOG project manager for System Integrator contract	Detailed requirements identified and reviewed by Technical Assistant and stakeholders
Commence system development	SACOG project manager for System Integrator contract	Detailed design completed and reviewed by Technical Assistant and stakeholders
System acceptance	SACOG project manager for System Integrator contract	System successfully passes acceptance criteria

7 Resources

This section summarizes the resources required for major activities involved in the implementation and operation of STARNET. For each activity, it identifies the organizations needed to conduct the activity, the lead agency or contractor, the estimated level of effort needed, funding sources, and any specialty skills, tools, equipment, or services needed.

Contract with a Firm for STARNET Technical Assistance

- Organizations Needed – Public agencies involved in transportation operations in the Sacramento region, and the Sacramento office of the Federal Highway Administration.
- Lead Agency or Contractor – Sacramento Area Council of Governments (SACOG).
- Level of Effort – 200 hours of SACOG staff time, 40 hours of FHWA staff time, 50 hours of other agencies staff time (total for all agencies).
- Funding Sources – Agency operations – no special funding.
- Specialty Skills, Tools, Equipment or Services – Knowledge of systems engineering.

STARNET Technical Assistance

- Organizations Needed – Specialty contractor.
- Lead Agency or Contractor – STARNET System Engineering Technical Assistance contractor (Siemens ITS).
- Level of Effort – 3,000 person hours for Stage 1. 3,000 person hours for Stage 2 (preliminary estimate).
- Funding Sources – Federal earmark and local.
- Specialty Skills, Tools, Equipment or Services – Experience in integration of multiple intelligent transportation systems, experience in real-time transportation operations, experience in systems engineering, project management.

Contract with a Firm for STARNET System Integration

- Organizations Needed – Public agencies involved in transportation operations in the Sacramento region, the Sacramento office of the Federal Highway Administration, and the Technical Assistance contractor.
- Lead Agency or Contractor – Sacramento Area Council of Governments (SACOG).
- Level of Effort – 200 person hours of Technical Assistance contractor, 50 hours of SACOG staff time, 20 hours of FHWA staff time, 50 hours of other agencies staff time (total for all agencies).
- Funding Sources – Agency operations – no special funding.
- Specialty Skills, Tools, Equipment or Services – Knowledge of systems engineering.

STARNET System Integration

- Organizations Needed – Specialty contractor.
- Lead Agency or Contractor – STARNET System Integration contractor (to be determined).

- Level of Effort – 4,000 person hours (preliminary estimate).
- Funding Sources – To be determined.
- Specialty Skills, Tools, Equipment or Services – Experience in integration of multiple intelligent transportation systems for regional transportation operations, experience in software development and integration, experience in systems engineering, project management.

Stakeholder Participation in STARNET Implementation

- Organizations Needed – Public agencies involved in transportation operations in the Sacramento region, and the Sacramento office of the Federal Highway Administration.
- Lead Agency or Contractor – Sacramento Area Council of Governments (SACOG).
- Level of Effort – 600 hours of staff time (total for all agencies).
- Funding Sources – Agency operations – no special funding.
- Specialty Skills, Tools, Equipment or Services – Knowledge of local transportation management systems, procedures, and policies.

Manage the Technical Assistance and System Integrator Contracts

- Organizations Needed – Sacramento Area Council of Governments (SACOG).
- Lead Agency or Contractor – Sacramento Area Council of Governments (SACOG).
- Level of Effort – 200 hours of SACOG staff time.
- Funding Sources – Agency operations – no special funding.
- Specialty Skills, Tools, Equipment or Services – Experience in contract management, knowledge of systems engineering.

Operate and Maintain STARNET

- Organizations Needed – Public agencies involved in transportation operations in the Sacramento region.
- Lead Agency or Contractor – Sacramento Area Council of Governments (SACOG).
- Level of Effort – 3,000 hours of staff time (total for all agencies) per year.
- Funding Sources – Agency operations and maintenance budgets.
- Specialty Skills, Tools, Equipment or Services – Knowledge of local transportation management systems, procedures, and policies. Experience in telecommunications and computer network maintenance. Equipment used in testing and troubleshooting telecommunications and computer networks. Operation and maintenance personnel available outside of normal work hours.

8 Risk Management

Risk management is the systematic process of planning for, identifying, analyzing, proactively addressing, and monitoring project risks. A project risk is an uncertain event or condition that, if it occurs, can have a significantly negative or positive effect on a project objective.

Most risks are associated with negative outcomes, and can be called threats. The challenge is to prevent the threatening condition from occurring, and mitigating its impact if it does happen.

Risks can also include uncertain events that result in a positive outcome. These can be thought of as opportunities rather than threats. An example is an unexpected funding windfall, or an unexpected low price for one or more major system components. In this case, the challenge is to facilitate occurrence of the opportunistic condition and to be in a position to take full advantage of it if it does occur.

The following table identifies major risks for STARNET and planned proactive measures. The column labeled “Exposure” reflects the frequency with which the risk occurred in other similar projects. Experience on other projects is assumed to be indicative of the probability of it occurring in this project, in the absence of proactive measures (proactions) to prevent a negative risk or to encourage a positive risk.

Table 2 - Risks and Proactive Measures

Risk	Causes	Exposure	Impact	Proactions
Failure to complete any implementation	System integration contractor fails to deliver.	Low	High Negative	Evaluate system integrator proposals for stability and delivery track record.
Failure to provide some components or required functionality	Insurmountable problems during system integration, a node system not functional, node system unexpectedly changed, communications infrastructure not available as anticipated.	Medium	Medium Negative	Evaluate system integrator proposals for ability to address unforeseen problems, coordinate with agencies on plans for node systems, plan backup communication links.
At least some agencies do not operate or maintain system effectively	Staff shortage, staff turnover, lack of training, lack of funding, perceived need does not eventuate.	Medium	Medium Negative	Arrange staffing and their training well in advance, produce thorough documentation, ensure concept of operations is realistic.

Risk	Causes	Exposure	Impact	Proactions
Late completion of system	Implementation time underestimated, unexpected problems during system integration.	High	Low Negative	Allow time for dealing with the unexpected, have a process ready for dealing with the unexpected.
System provides useful capabilities or coverage beyond requirements	Funding windfall, lower than expected price, off-the-shelf product exceeds requirements.	Low	Low Positive	Plan a staged implementation, seek additional funds, during system integrator selection consider cost and benefits of off-the-shelf solutions, have optional components ready to add in at short notice.
Early completion of system	Implementation time over estimated, implementation proves easier than expected.	Low	Low Positive	Monitor progress and accelerate agency staff training and other support measures as needed.

9 Specific Plans

Where appropriate, separate documents, called “specific plans” or “technical plans” have been, or will be, produced to provide additional detail about the procedures, tools, and resources that will be used throughout the life cycle of STARNET. An outline of the content of each plan is provided in the following table. Most of these plans will be continually refined over time.

Table 3 - Specific Plans

Specific Plan	Purpose and Content
STARNET Stakeholders Cooperation Plan	Identify the procedures and documents that will be used to coordinate the activities of stakeholders in the implementation, operation, and maintenance of STARNET. It will guide development of any memoranda of understanding or interagency agreements, and answer questions such as: How will stakeholders provide input to the needs and requirements for STARNET? Will decision making be subject to voting or consensus? Will a Memorandum of Understanding or formal cooperative agreement be necessary for system implementation and/or on-going operation and maintenance? How will the group handle expansion to additional members, or withdrawal by a member? What costs will be incurred and who will pay for what? What level of signature authority is needed on which documents? Who are the contacts and contact information for each purpose at each agency or organization involved? What web site or other means will be used for sharing project documentation between stakeholders?

Specific Plan	Purpose and Content
STARNET Procurement Plan	Identify the planned strategy for procuring STARNET. It will guide the development of a request for proposals for STARNET procurement and will answer questions such as: What form of contract(s) will be used for STARNET procurement? What form of solicitation (e.g., RFP) and selection process will be used? What criteria will be used for proposal evaluation? Who will participate in the proposal selection? What will be the roles and relationships between SACOG project manager, Technical Assistance contractor, System Integrator, and ITS Partnership during STARNET procurement? What high risk items need special attention in the procurement process? How will risk be managed? What procedures will be used for review of progress and deliverables? Etc.
STARNET Verification Plan	Identify requirements for system testing. It will guide development of Acceptance Test Procedures for different system components and the overall network.
STARNET Documentation Plan	Identify and briefly describe the content of all documents pertaining to STARNET. It is used initially as a checklist of which documents will be needed (including configuration and interface control documents), and evolves into a master index of all documents that exist for the system. It indicates the state of each document (e.g., planned, in progress, draft, final, obsolete, withdrawn) and records the current version number and date of each document. It also records the form, availability and publication format of each document (e.g., electronic file format, media on which it is available, etc.).
STARNET Configuration Management Plan	Identify the procedures to be used for managing changes to STARNET and for keeping accurate and up-to-date records of its current configuration. It will identify the configuration manager, establish a change control board, describe procedures for reviewing and approving change requests, procedures for making approved changes including coordination with and notification of affected parties, and procedures for updating configuration documentation.
STARNET Operations and Maintenance Plan	Identify day-to-day procedures to be followed by users and maintainers of STARNET, primarily at the policy level. Technical level procedures will be primarily covered by user and maintenance manuals provided by the System Integrator. It will document acceptable and unacceptable uses of the network, requirements for notifying other users of activities or occurrences that may affect them, procedures for notifying maintenance personnel of suspected operational problems, courtesy protocols to be followed by users and maintainers, and examples of best practices in using the network.
STARNET Data Management Plan	Identify how STARNET will be used to collect transportation data needed for regional travel modeling and other planning needs. The information will primarily be extracted or referenced from the Concept of Operations (including user needs) and System Requirements documents. This document will explain how data will be continuously archived and analyzed to populate the appropriate portions of the SACOG Geographical Information System and provide a historical data store.
STARNET Interface Control Plan	Identify the nature of center-to-center interfaces used by STARNET, how those interfaces will be specified, and how those specifications will be maintained over time.

Additional plans may be identified and developed as necessary during the project. The following are examples of additional specific plans that may be needed:

- Technical Review Plan
- System Integration Plan
- Risk Management Plan

10 References

1. Systems Engineering Guidebook for ITS, version 1.1, February 2005, Caltrans and FHWA.
2. Agreement Between SACOG and Siemens ITS for STARNET System Engineering Assistance, January 2006.
3. Project Risk Management Handbook – First Edition, Revision 0, Caltrans – Office of Project Management Process Improvement, June 26, 2003.

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