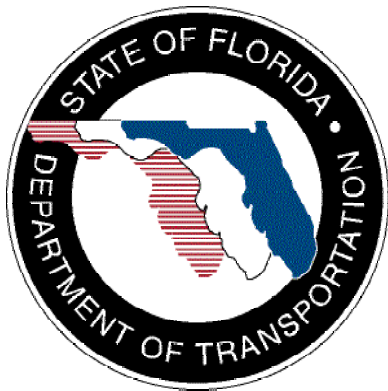# Statewide Transportation Management Center Software Library System:

Risk Management Plan

STMCSLS-RMP-1.0.0

Prepared for:

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List of Acronyms

DOT ....Department of Transportation
DPM...........................Deputy Project Manager
FDOT ....Florida Department of Transportation
ITS.............................Intelligent Transportation Systems
ITN............................Invitation to Negotiate
PM.............................Project Manager
SPM...........................Software Project Manager
STMCSLS.................Statewide Transportation Management Center Software Library System
SwRI ....Southwest Research Institute

REVISION HISTORY

Revision	Date	Changes
1.0.0-Draft	October 29, 2003	Initial Release
1.0.0	November 25, 2003	Updated the document based on FDOT comments, major updates included: • Clarification of "generic" versus "specific" risks • Added a cost risk table • Added additional risks identified at the project kickoff meeting

1. Scope

1.1 Document Identification

This document serves as the Risk Management Plan for the Statewide Transportation Management Center Software Library System (STMCSLS).

1.2 Project Overview

The Florida Department of Transportation (FDOT) is conducting a program that is developing an STMCSLS. The STMCSLS is a set of Intelligent Transportation System (ITS) software that allows the control of roadway devices as well as information exchange across a variety of transportation agencies. The goal of the STMCSLS is to have a common software base that can be deployed throughout the state of Florida. The STMCSLS development effort is based on ITS software available from both the states of Texas and Maryland; significant customization of the software is being performed as well as the development of new software modules. The following figure provides a graphical view of the software to be developed:
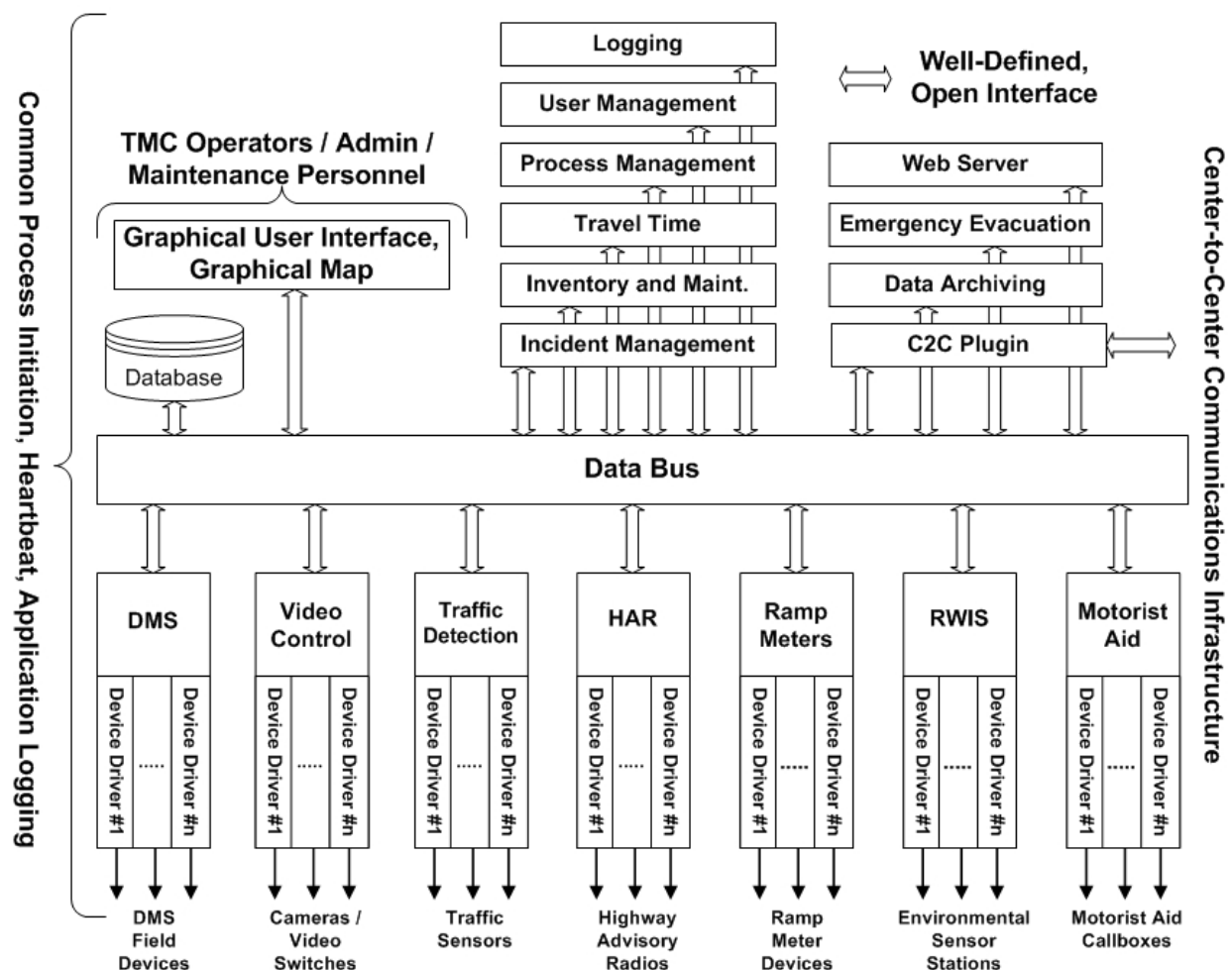

Figure 1.1 – High-Level Architectural Concept

The STMCSLS development effort spans approximately two years. After the development, the software will be deployed to a number of Districts and Expressway Authorities throughout Florida and support activities will be performed.

1.3 Related Documents

The following documents were used to develop this document:

- Southwest Research Institute® (SwRI®) Qualification Response: *Response to the Invitation to Negotiate (ITN): Statewide Transportation Management Center Software Library System, Negotiation Number: ITN-DOT-02/03-9025-RR,* SwRI Proposal No. 10-35924, dated: November 18, 2002.

- SwRI Technical Proposal: *Technical Proposal for Invitation to Negotiate (ITN): Statewide Transportation Management Center Software Library System, Negotiation Number: ITN-DOT-02/03-9025-RR,* SwRI Proposal No. 10-35924, dated: January 31, 2003.

- SwRI Cost Proposal: *Cost Proposal for Invitation to Negotiate (ITN): Statewide Transportation Management Center Software Library System, Negotiation Number: ITN-DOT-02/03-9025-RR, ,* SwRI Proposal No. 10-35924, dated: January 31, 2003.

- SwRI BAFO letter: *Southwest Research Institute Proposal No. 10-35924, "Invitation to Negotiate (ITN): Statewide Transportation Management Center Software Library System", Reference: Negotiation Number: ITN-DOT-02/03-9025-RR*, dated: May 5, 2003.

- FDOT procurement document: *Invitation To Negotiate (ITN), Negotiation Number: ITN-DOT-02/03-9025-RR, Statewide Transportation Management Center Software Library System*, dated: October 21, 2002.

- FDOT Scope of Services: *Statewide Transportation Management Center Software Library System: Scope of Services,* September 22, 2003.

- FDOT Requirements Document: *Statewide Transportation Management Center Software Library System: Requirements Specification,* June 3, 2003.

- STMCSLS Project web site (contains schedule and various planning documents): http://stmcsls.datasys.swri.edu

1.4 Contacts

The following are contact persons for the STMCSLS project:

- Chester Chandler, ITS Central Office, chester.chandler@dot.state.fl.us, 850-410-5600
- Liang Hsia, FDOT Project Manager, liang.hsia@dot.state.fl.us, 850-410-5615
- John Bonds, Senior ITS Specialist, jbonds@pbsj.com, 408-873-2514
- David Chang, ITS Specialist, David.Chang@dot.state.fl.us, 850-410-5622
- Steve Dellenback, SwRI Project Manager, sdellenback@swri.org, 210-522-3914
- Robert Heller, SwRI Software Project Manager, rheller@swri.org, 210-522-3824
- Charlie Wallace, PBF Deputy Project Manager, WallaceC@pbworld.com, 352-374-6635
- John Schumitz, PBF Software Project Manager, schumitz@pbworld.com, 301-816-1852

The following are contacts that will be used by the STMCSLS project team to assure consistency with other FDOT projects and FDOT procedures:

- Dan Baxter, PB Farradyne, FDOT C2C Project, baxter@pbworld.com, 407-587-7809
- David Lambert, University of North Florida, RWIS, jlambert@unf.edu, 904-620-3881
- Bob Colins, PBS&J, Emergency Evacuation, bobcolins@pbsj.com, 850-575-1800
- John Fain, FDOT, Comptroller, john.fain@dot.state.fl.us, 850-921-7332
- Jerry Bloodgood, McCain, Ramp Metering
- Leslie Jacobson, PB Farradyne, Ramp Metering, jacobsonl@pbworld.com, 206-382-5290
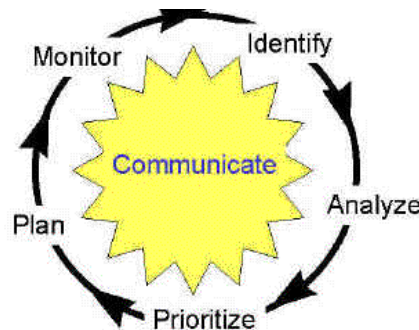
2. Risk Management Plan

As part of SwRI's software process activities, projects identify possible risk areas that the project team should monitor and evaluate over the duration of the project. These risk areas may appear to be generic in nature but they are listed in this Risk Management Plan because development experience suggests that they should be included based on the type of development project being performed. When specific risks are identified (they will usually fit into one of the general risk areas that have been defined) the specific details will be captured and tracked as a project risk. If the newly identified risk indicates that a new risk area should be added, the Risk Manager will also add the new risk area. SwRI believes that the key to successful Risk Management is to be aware of possible risk areas and when specific risks are identified, develop mitigation techniques and communicate about the risk until it has been fully mitigated.

2.1 Introduction

This Risk Management document describes the process of assessing, planning, and monitoring risks throughout the STMCSLS project life cycle. Throughout the project life cycle, the STMCSLS team will conduct periodic checkpoint assessments, which will help re-focus both our risk and project management systems.

The purpose of this Risk Management plan is to document issues involving any risks relating to the STMCSLS. This plan will be updated periodically throughout the life-cycle of the STMCSLS project. It is important that risks are identified, considered, and planned for, and that procedures are in place to mitigate risk where necessary in order to have a successful development project.

2.2 Risk Management Cycle

The Risk Management Cycle depicted above runs continuously throughout the life of any project. A successful risk plan consists of the following components:

- Risk Identification
- Risk Analysis
- Risk Prioritization
- Risk Planning
- Risk Monitoring

2.3 Risk Management and Assessment

This is the process where the Risk Management Cycle is put into action. Risks are identified, analyzed, and prioritized. A Risk Manager is assigned; the role of the STMCSLS Risk Manager is the responsibility of the SwRI STMCSLS Project Manager.

The Risk Manager will be responsible for maintaining the Risk Plan during the life cycle of the project. This will include updating risks and insuring that each risk is assigned a responsible "Risk Owner". The possible risk owners include (see the Staffing Plan on the project web site at http://stmcsls.datasys.swri.edu for detailed personnel information):

- SwRI – PM: Southwest Research Institute Project Manager (PM)
- SwRI – SPM: Southwest Research Institute Software Project Manager (SPM)
- PBF – DPM: PB Farradyne Deputy Project Manager (DPM)
- PBF – SPM: PB Farradyne Software Project Manager (SPM)
- FDOT – Florida Department of Transportation ITS Office
- FDOT-DIST – District Traffic Operations
- MDX – Miami Dade Expressway Authority

The Risk Manager is responsible for the continuous planning and monitoring process throughout the project's life cycle.

2.3.1 Risk Identification

This phase of the risk management cycle consists of the identification of possible risks which can influence the project's success by the project team. The FDOT Scope of Services identified three classifications of risk: cost risk, schedule risk, and/or technical risk. The SwRI Risk Management process adds three additional categories of risk, the following is a list of possible risk categories that will be used on this project:

- Technical Risks: risks that could possibly impact a successful (technical) implementation of the project.
- Operational Risks: risks that could occur as a result of deploying and using the system under development.
- Schedule Risks: risks that could affect the schedule performance of the project.
- Cost Risks: risks that could affect the fiscal performance of the project.
- Legal and Contractual Risks: risks (such as software license issues) that could impact the performance of the project.
- Organizational Risks: risks that could occur because of differences of philosophy within an organization or between organizations.

There is no ranking or prioritization at this point.

2.3.2 Risk Analysis

After identifying a broad range of possible risks, the analysis phase is where risks are quantified and prioritized. At a minimum level, they must be evaluated for their potential impact that a particular risk would have on the project and the likelihood of the risk occurring. This project will rank risks as "High (3)", "Medium (2)", and "Low (1)" to represent the likelihood of their occurrence.

2.3.3 Risk Prioritization

All risks will be added to the risk assessment tables to determine potential impact of risks and develop priorities. The Risk Manager ranks each risk according to likelihood of occurrence, and potential impact on the project. A ranking of "High (3)", "Medium (2)", or "Low (1)" is then assigned to both the likelihood and impact of the risks. An overall risk ranking is then calculated by multiplying the likelihood by the impact.

For each risk identified, the following will be developed and recorded:

- Description of Risk
- Likelihood of Identified Risk
- Impact of Identified Risk
- Risk Control
- Internal Mitigation Resources
- Current Status

2.3.4 Risk Planning

The Risk Manager determines the category for each risk. All risks will be monitored and updated by the Risk Manager. Each risk is placed in one of the following categories:

- Technical Risks
- Operational Risks
- Schedule Risks
- Cost Risk
- Legal and Contractual Risks
- Organizational Risks

2.3.5 Risk Monitoring

In this phase existing risks are monitored and reported on by the Risk Owner to the Risk Manager. Once there is no chance of the risk's occurrence or if the risk has passed, the Risk Manager will update the risk to "closed".

Typically, most risk identification, analysis and planning takes place during the early stages of a project. However, risk monitoring is a continual process. As new risks are generated and as additional information is learned, technical approaches are modified, personnel turnovers take place, etc., risks are identified and/or information updated. During each project status meeting, all open risk items will be discussed.

2.4 Risk Tables

The following tables identify risks for each of the following areas:

- Table 2.1: Technical Risks
- Table 2.2: Operational Risks
- Table 2.3: Schedule Risks
- Table 2.4: Costs Risks
- Table 2.5: Legal and Contractual Risks
- Table 2.6: Organizational Risks

Each table contains the following columns:

- Risk Owner: Who is responsible to monitor the risk.
- Num: A unique number attached to each risk. The first one or two letters of the risk number associate the risk to one of the risk categories.
- Risks and Text of Identified Risks: Description of the risk.
- Likelihood of Identified Risk: The perceived likelihood that the identified risk will occur.
- Impact of Identified Risk: The perceived impact of the risk if it does occur.
- Risk Ranking: this column is computed by multiplying the likelihood of the identified risk against the impact of the identified risk. This value will range in value from one (1) to nine (9). The risk manager needs to pay particular attention to risks with a higher ranking; these high ranking risks should be routinely discussed with the client.
- Risk Controls: What can be done to control or contain the risk
- Mitigation Strategy: What can be done to mitigate the risk so that the project will not be impacted.
- Status: Indicates if the risk is open (no entry) or closed.

These tables will be maintained throughout the life-cycle of the STMCSLS project.

Table 2.1 – Technical Risks

Risk Owner	Num	Risks and Text of Identified Risks	Likelihood of Identified Risk		Impact of Identified Risk		Risk Ranking	Risk Controls	Mitigation Strategy	Status
SwRI – PM	T1	Scope creep	High	3	High	3	9	Project scope is baselined in the Scope of Services and will be refined in the Software Requirements Specification. Utilize change management functions to capture change requests. SwRI will provided cost and schedule impact to FDOT when change is identified. Manage District expectations via communications in status meetings and project documentation.	Change management procedures contained in the Configuration Management Plan. Liaison with SwRI Project Manager (PM) and FDOT PM to arbitrate scope creep issues as they arise.	
FDOT/ SwRI - PM	T2	Fractured management by the various parties (SwRI, FDOT & PBS&J) may lead to a lack of consensus on process and/or product expectations.	Medium	2	Medium	2	4	Each party must maintain span of control as appropriate to their role on the project. Effective coordination between the responsible parties is needed to reach consensus concerning what is best for program success.	Mutual respect and effective communication between the parties. Planned periodic teleconferences and face-to-face meetings.	
SwRI – SPM	T3	Browser technology may not perform adequately to satisfy user interface performance and functionality requirements.	Low	1	Medium	2	2	SwRI has developed prototypes to demonstrate functionality and performance. Software architecture has been demonstrated as feasible.	SwRI internal research activities have allowed for performance and functional benchmarking.	Closed 11/24/03

Risk Owner	Num	Risks and Text of Identified Risks	Likelihood of Identified Risk		Impact of Identified Risk		Risk Ranking	Risk Controls	Mitigation Strategy	Status
SwRI – PM/ SwRI – SPM/ PBF – DPM/ PBF – SPM	T4	Two companies performing development on a single product.	Low	1	Medium	2	2	SwRI and PBF are both high maturity software organizations. Frequent communications facilitates information flow. Previous working experience minimizes the unknowns. Well defined interfaces between software modules being developed minimizes integration risks.	Team members and project leadership have had similar experience in other development projects. Common vision of what is to be developed. Multi-times a week communication.	
SwRI – PM/ FDOT	T5	Inadequate or Incompatible field hardware/software.	Low	1	Low	1	1	SwRI has established a test lab to allow protocols currently in the scope of work to be tested in the development laboratory. Protocols of devices currently in the scope of work are well known and documented.	Extensive diagnostic hardware available at development laboratories to identify any protocol anomalies.	
SwRI – PM	T6	Project Size - large number of technical resources involved and numerous influences on scope of project.	Low	1	Medium	2	2	The scope is clearly and concisely defined in contractual documents. At Project startup, define a strict Change Control Mechanism. All Districts should be made aware of the cost of each change. Anticipate that requirements and technology will change over the lifetime of the project. Ensure that proposed technical solutions are open and adaptable.	Members of the development team have experience of similar development projects so techniques to address the risk are well known. Frequent internal team meetings are held to address issues, project scope and requirements.	

Risk Owner	Num	Risks and Text of Identified Risks	Likelihood of Identified Risk		Impact of Identified Risk		Risk Ranking	Risk Controls	Mitigation Strategy	Status
FDOT	T7	ITS devices deployed for which no device driver exists in the STMCSLS code base.	High	3	Low	1	3	Device drivers under development are clearly identified in the cost proposal provided by SwRI. Development costs for other drivers have been identified. Hardware devices that can be used to convert from supported protocols to "new protocols" can be commercially procured.	Plan to deploy with currently funded drivers.	
SwRI – PM	T8	Consensus on the Concept of Operations and Software Requirements will not be reached.	Low	1	Medium	2	2	Assure that all stakeholders understand the statewide perspective. Develop software that is "configurable" to meet different District's needs.	SwRI to hold "small group" meetings with the Districts to discuss operational concepts and project requirements.	

Table 2.2 – Operational Risks

Risk Owner	Num	Risks and Text of Identified Risks	Likelihood of Identified Risk		Impact of Identified Risk		Risk Ranking	Risk Controls	Mitigation Strategy	Status
SwRI – PM/ FDOT	OP1	FDOT Districts are autonomous in their approach to operational activities.	Medium	2	Low	1	2	Full District representation at critical project junctures. Web site availability for project status. Extensive demonstrations and discussion at status meetings to assure all stakeholders are well informed.	FDOT ITS Central office will provide project documentation and information to Districts in a timely manner. Development team will have public web site available for information dissemination.	
FDOT	OP2	C2C communications protocol recommended by C2C project team may not be identical to the protocol recommended by STMCSLS team.	Low	1	High	3	3	SwRI will provide FDOT details of the TxDOT C2C implementation. The TxDOT C2C was included in the SwRI offer to FDOT so all STMCSLS software is based on this solution.	FDOT should evaluate the TxDOT C2C solution to verify that it meets their operational requirements.	
FDOT/ SwRI PM	OP3	Communication between the FDOT C2C project team and the STCMSLS project team fails to produce a common ICD.	Low	1	High	3	3	FDOT needs to establish a common C2C software protocol to assure that a lack of communication does not harm the STMCSLS efforts (the STMCSLS project team has already proposed the TxDOT based C2C protocol).	Initiate regular discussions between the two project teams.	
FDOT/ MDX	OP4	MDX's hardware, software, communication network, and institutional setup may be incompatible with the STMCSLS.	Low	1	Low	1	1	MDX should evaluate planned STMCSLS device drivers for compatibility.	FDOT and MDX need to discuss what devices are to be supported by the STMCSLS.	

Table 2.3 – Schedule Risks

Risk Owner	Num	Risks and Text of Identified Risks	Likelihood of Identified Risk		Impact of Identified Risk		Risk Ranking	Risk Controls	Mitigation Strategy	Status
SwRI – PM	S1	Lack of resources to complete critical portions of the project.	Low	1	High	3	3	Develop schedule and carefully monitor task completion. Assign enough resources to insure timely execution.	SwRI / PBF project management team to closely monitor task completion. Significant staff changes will be discussed at staff meetings.	
SwRI – PM / PBF – DPM	S2	Lack of communication within the development team (SwRI and PBF).	Low	1	High	3	3	Establish weekly status meetings to review tasks and schedule. Both organizations are at a high level of software development maturity.	Conference calls and frequent email communication. Both organizations will participate in the monthly status meetings with FDOT.	
SwRI / FDOT	S3	Lack of communication between SwRI and FDOT.	Low	1	High	3	3	Establish monthly status meetings to review tasks and schedule.	Conference calls and frequent email communication. Monthly status meetings with FDOT will be held.	
FDOT	S4	Lack of timely FDOT decisions may be serious risk to the schedule.	Low	1	High	3	3	Continue to work with the Districts to perform timely reviews.	Continue to make all project participants aware of issues with potential impact to the schedule.	
FDOT	S5	Yearly funding cycle (funding rollover) may cause project delays (at FDOT Fiscal year boundaries).	Low	1	High	3	3	Development and deployment plan were developed during the ITN negotiation. Provides a roadmap for expected costs over fiscal years.	FDOT has funds identified in cost feasible plan. Appropriate contractor notification needs to be prepared at fiscal year boundaries.	

Table 2.4 – Cost Risks

Risk Owner	Num	Risks and Text of Identified Risks	Likelihood of Identified Risk		Impact of Identified Risk		Risk Ranking	Risk Controls	Mitigation Strategy	Status
SwRI – PM	C1	Scope creep	High	3	High	3	9	Project scope is baselined in the Scope of Services and will be refined in the Software Requirements Specification. Utilize change management functions to capture change requests. SwRI will provided cost and schedule impact to FDOT when change is identified. Manage District expectations via communications in status meetings and project documentation.	Change management procedures contained in the Configuration Management Plan. Liaison with SwRI Project Manager (PM) and FDOT PM to arbitrate scope creep issues as they arise.	

Table 2.5 – Legal and Contractual Risks

Risk Owner	Num	Risks and Text of Identified Risks	Likelihood of Identified Risk		Impact of Identified Risk		Risk Ranking	Risk Controls	Mitigation Strategy	Status
SwRI – PM / PBF – DPM	L1	Software license to reuse the Ramp Metering software from University of Washington may not meet FDOT legal requirements.	Low	1	High	3	3	Insure that the terms offered by University of Washington are acceptable to FDOT.	PBF will provide terms and conditions for review by FDOT.	
FDOT	L2	Memo of Understanding between FDOT and TxDOT may not reach consensus.	Low	1	Low	1	1	FDOT has an existing sublicense with SwRI that provides them access to all necessary TxDOT source code.	FDOT and TxDOT need to extensively discuss license terms.	

Table 2.6 – Organizational Risks

Risk Owner	Num	Risks and Text of Identified Risks	Likelihood of Identified Risk		Impact of Identified Risk		Risk Ranking	Risk Controls	Mitigation Strategy	Status
FDOT	OR1	Change in FDOT Organization Structure could effect project direction/ acceptance.	Low	1	Low	1	1	Continuous communications at all levels within FDOT.	FDOT will engage District management and operational personnel at meetings and reviews.	
SwRI/FDOT	OR2	End product of STMCSLS will not be accepted by users.	Low	1	High	3	3	Frequent user interaction throughout development.	Aggressive training and information dissemination. Involve the users in small group requirements meetings to achieve "buy-in" early in the program.	

3. Notes

A Microsoft Excel spreadsheet will be used to track the risks for this project. A current copy of this spreadsheet will be maintained on the project web site at:

http://stmcsls.datasys.swri.edu