Case Study

IR-SIP Risk Management Plan Outline

Baselined:
Last Modified:
Owner:
Purpose:

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Case Study

IR-SIP Risk Management Plan

Baselined: 11/15/95

Last Modified: N/A

Owner: J. Johnstone/IR-SIP Project Manager

Purpose: This plan documents the practice of risk management as tailored to the IR-SIP Project. This plan will be updated on 2/25/96 and 4/25/96 to reflect changes and improvements to the risk management practice based on the evaluation results.

Section 1. Introduction

This plan will direct the processes, methods, and tools used to manage risks in the IR-SIP Project. All project personnel are responsible for following this plan. This plan is part of the IR-SIP Project Management Plan suite of documents.

1.1 Purpose and Scope

This plan will define the practice of risk management as it should be performed once it reaches maturity within the IR-SIP Project. This document does not address risk management within the AA Program.

1.2 Assumptions, Constraints, and Policies

This plan does not address the process of putting a new risk management practice in place (in other words, the actual transition process - that is documented in the Implementation Plan). This plan defines the risk management practice for the IR-SIP Project. It is recognized that this plan addresses a new practice being put into place on a project that is already in progress and that this plan is the first of its kind for IR-SIP. It is expected that significant changes and improvements will be necessary over the course of time as risk management is adopted by IR-SIP. Therefore, any corrections should be forwarded to the plan owner. Change recommendations should be submitted on the Change Documentation Request Form 1246.

1.3 Related Documents and Standards

IR-SIP Risk Management Implementation Plan will guide the technology transition process. It directs the flow of activities associated with getting the risk management practice defined in *this* plan established and ongoing.

IR-SIP Project Management Plan directs the activities of the overall project. The Risk Management Plan is subordinate to project management plan.

Section 2. Overview of Risk Management Practice

2.1 Overview

This section provides an overview of the risk management practice and its relation to IR-SIP's project management. Details are to be found in the following sections. The overview of the process will be defined by a process/data flow diagram.

There are four primary activities performed in the risk management practice:

- identification of risks: a continuous effort to identify and document risks as they are found

- analysis of risks: an estimation of the probability, impact, and timeframe of the risks, classification into sets of related risks, and prioritization of risks relative to each other

- planning risks: decision about what to do with the risks, which, for important risks, will include mitigation plans

- tracking and controlling risks: collection and reporting status information about risks and their mitigation plans (where appropriate) and taking corrective action as needed.

The risk management activities will be carried out during day-to-day activities of project personnel as well as during key project meetings.

Only Top 20% risks shall have any resources expended for mitigation. All non-Top N risks shall be watched or accepted.

2.2 Process and Data Flows

The following diagram depicts the overall process of managing risks on the IR-SIP Project.
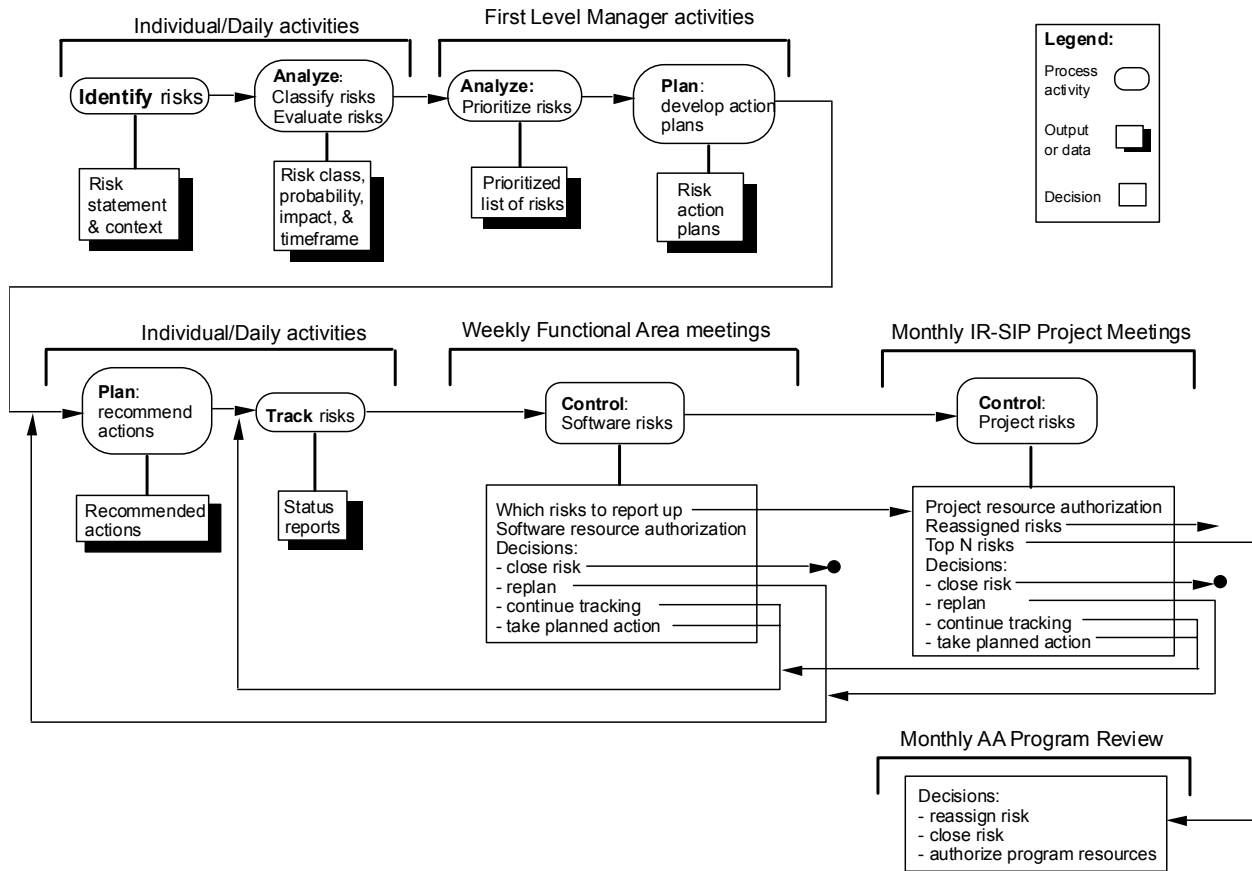

2.3 Project Management Integration (optional)

The IR-SIP Project Management Plan calls for the identification, processing, and documentation of changes and problems to the system. Risks will, in general, be considered an equivalent item to problems and changes in terms of tracking and significance during project meetings. Top 20% risks will be handled similar to critical issues, as documented in the Project Management Plan. Any risk which is also a safety risk will be handled similar to a safety-related problem - referral to the project's safety plan or to the Safety Guidebook *NASA-GB-1740.13-96*.
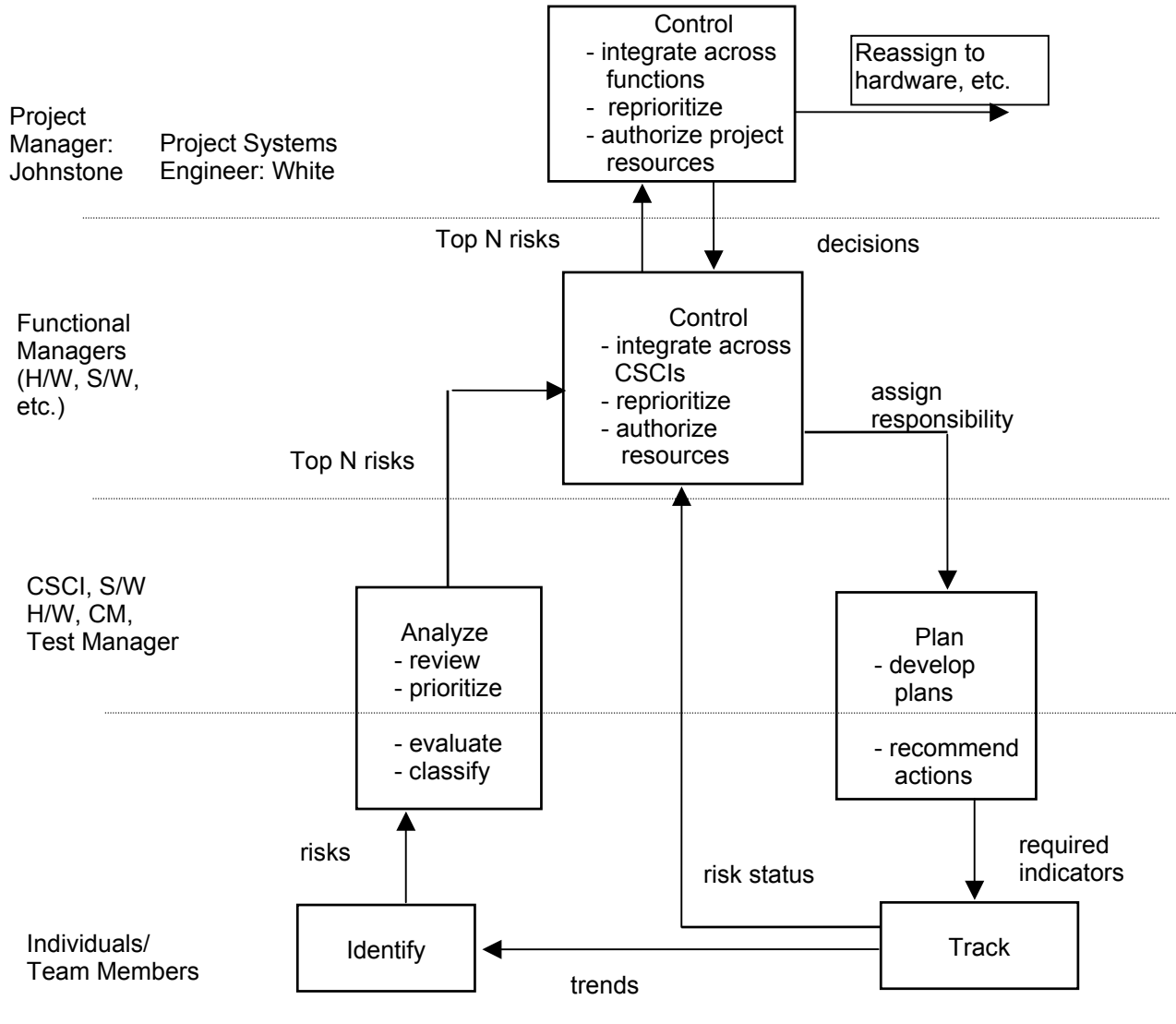
Section 3. Organization

3.1 Project Organization

The IR-SIP project organization is defined in the Project Management Plan and repeated here for convenience.
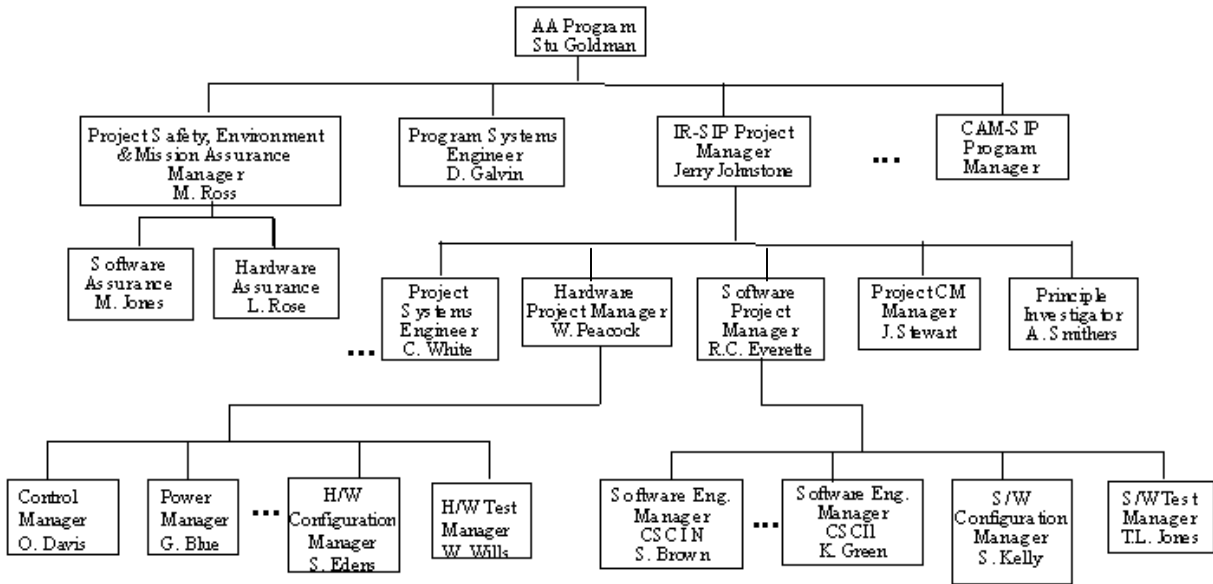
3.2 Project Communication and Responsibilities

The following diagram introduces the structure of risk communication and responsibility within the IR-SIP organization for conducting risk management activities.

Project
Manager: Project Systems
Johnstone   Engineer: White

Control
- integrate across functions
- reprioritize
- authorize project resources

Reassign to hardware, etc.

Top N risks   decisions

Functional
Managers
(H/W, S/W,
etc.)

Control
- integrate across CSCIs
- reprioritize
- authorize resources

assign responsibility

Top N risks

CSCI, S/W
H/W, CM,
Test Manager

Analyze
- review
- prioritize

- evaluate
- classify

Plan
- develop plans

- recommend actions

risks   risk status   required indicators

Individuals/
Team Members

Identify   Track

trends

The responsibilities of all project personnel as individuals, the team or technical leads, the function leads, and the project manager are specified in the following table. This table illustrates the type of responsibilities that need to be identified and allocated to the project personnel for the management of risks.

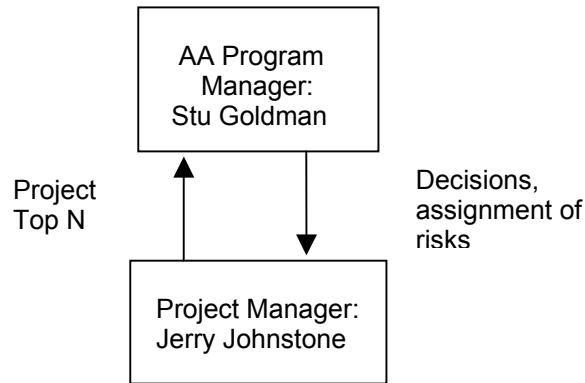| Who	Responsibilities
Individuals	Software/Hardware engineers, testers, leads, and project manager • identify new risks • estimate probability, impact, and timeframe • classify risks • recommend approach and actions • track risks and mitigation plans (acquire, compile, and report)
S/W, H/W, CSCI, CM, and Test Managers	Leads for each CSCI • ensure accuracy of probability/impact/timeframe estimates and the classification • review recommendations on approach and actions • build action plans (determine approach, define scope & actions) • report their Top N risks and issues to the project manager • collect and report general risk management measures/metrics
Software Project Manager, Hardware Project Manager, etc.	• integrates risk information from all technical leads • reprioritizes all risks to determine Top 20% risks in each area (software, hardware, etc.) • makes control decisions (analyze, decide, execute) for risks (e.g., Software Project Manager controls software risks) • authorizes expenditure of resources for mitigation • assigns or changes responsibility for risks and mitigation plans within the CSCI, CM, and test areas • handles communication IR-SIP project manager
IR-SIP Project Manager, IR-SIP Project Systems Engineer	• integrates risk information from all software, hardware, and CM leads • reprioritizes all risks to determine Top 20% project risks • makes control decisions (analyze, decide, execute) for Top 20% project risks • authorizes expenditure of project resources for mitigation • assigns or changes responsibility for risks and mitigation plans within the project (e.g., moving responsibility for a risk from software to hardware) • handles communication with AA program manager • reviews general risk management measures/metrics with Quality Assurance during each quarter to evaluate effectiveness of risk management

The criteria for communicating risk information is documented in the following table.

Communication Path	Criteria for Selecting Risks and Status Information
Technical leads to Jerry Johnstone	• Top 20% risks for each team • Any risk that impacts launch readiness • Any risk with an impact >10% of budget • Any risk that needs to be transferred to another team
Jerry Johnstone to AA Program Manager (Goldman)	• Top 20% risks in the project • Any risk that impacts the satellite's operation • Any risk with major impact on IR-SIP operations • Any risk that impacts the launch schedule • Any risk that exceeds 25% of the project budget • Any risk that negatively impacts NASA's reputation
Everette to contractor program manager	• Any risk that impacts the contractor's ability to succeed • Any risk that impacts the overall project schedule • Any risk that needs to be transferred or jointly managed by the contractor
Jerry Johnstone to Program System Engineer	• Any risk that impacts the satellite's operation • Any risk that impacts the launch schedule • Any risk that exceeds 25% of the project budget • Information on technical problems that affect the spacecraft or other instruments

3.3 AA Program Responsibilities

If IR-SIP project personnel identify risks that affect the AA Program, it is the responsibility of the IR-SIP Project Manager to notify the AA Program Manager. The AA Program Manager, with the assistance of the change agent P. Stone and the IR-SIP Project Manager, to manage risks transferred to the SE Program level.

The IR-SIP Program manager shall report progress summaries on Top N IR-SIP risks to the AA Program Manager on a monthly basis. The AA Program Manager is responsible for authorizing additional expenditures if requested by the IR-SIP Project Manager and transferring assignments of risks to the IR-SIP Project.

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        ┌─────────────────┐
        │   AA Program    │
        │    Manager:     │
        │   Stu Goldman   │
        └─────────────────┘
Project      ↑      ↓      Decisions,
Top N                      assignment of
                           risks
        ┌─────────────────┐
        │ Project Manager:│
        │  Jerry Johnstone│
        └─────────────────┘
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Meeting	Purpose	Method or Tool
Monthly and major milestone AA Program Manager reviews	IR-SIP, CAM-SIP, SPEC-SIP, AA Spacecraft Project Managers, their Systems Engineers, AA Program Systems Engineer, and Safety & Environment Mission Assurance Manager meet with AA Program Manager to review program status and issues. Risk-specific information from each project • new Top 20% risks, any risks that impact the program • status of safety risks • status of all Top 20% risks Status for program risks are reported by the program manager. Decisions and actions include • decisions/resolutions for risks that are not being successfully managed • approval for mitigation plans and resources that exceed normal project limits	Stoplight Charts Risk Information Sheets Cost-Benefit Analysis Safety risk/hazard information

3.4 Contractor Responsibilities

Software Contractor reports to the Software Project Manager. Since the original contract did not call for risk management, risk management performed by the contractor and reported to the Software Project Manager is voluntary. Contractual modifications to install risk management as a part of the contract would result in an update to this part of the Risk Management Plan.

Section 4. Practice Details

This section provides the details about the practice needed to enable project personnel to carry out the risk management activities.

4.1 Establishing Baselines and Reestablishing Baselines

A baseline set of risks was established before this plan was written. That baseline shall be updated or re-established periodically at major project milestones. Risk baseline re-establishment is conducted using the following process.

Step	Action
1	IR-SIP project manager identifies a cross section of project personnel. All levels and disciplines should be represented in this group.
2	Group uses the TBQ Interview method to generate risks in a two-hour session.
3	Group evaluates risks using the Tri-Level Attribute Evaluation method.
4	Group classifies according to source in the Risk Taxonomy.
5	Project Managers and Functional Area Managers prioritize to identify the Top N risks or sets of risks.
6	Project Managers and Functional Area Managers compare Top N risks from this effort to existing Top N risks. Expand project Top 20% risks list to include the rebaselining Top N.
7	Project Managers and Functional Area Managers reprioritize new Top N.
8	Assign new Top N risks to personnel to begin building action plans.
9	Add all other rebaseline risks to the database and determine which ones will need to be transferred, delegated, watched, accepted, or researched.
10	PM distributes rebaseline set of risks listing to the project and asks for additional information from anyone in the project who might know more than what is documented.

4.2 Identifying Risks

All personnel are responsible for identifying new risks. The database can be accessed by anyone at any time to identify new risks. The Short TBQ and project data shall be reviewed twice per month by all project personnel to help identify new risks. Project metrics (as defined by the Goal/Question/Metric method) will be reviewed whenever any predefined thresholds or triggers are reached that would indicate a potential problem (i.e., a risk). Risk statements shall be written according to the format, "condition; consequence." All relevant information shall be captured as context. The risk database shall automatically assign a risk identifier and tag the identifier's name onto the report. The Risk Information Sheet shall be used as the input form for risk information.

Any new risks identified during any project-related meeting shall be added to the database within two working days of the meeting. It is the responsibility of the meeting leader to make sure that this is accomplished.

[Note to students: The actual procedure steps for accomplishing this task would go here - equivalent to the procedure steps listed for re-establishing a baseline.]

4.3 Analyzing Risks

Risk attributes of probability, impact, and timeframe shall be estimated by the identifier of the risk and entered at the same time the risk is identified. If the identifier does not know the value of the estimates, it can be skipped during database entry. The team mangers shall be responsible for reviewing and correcting attribute values for new risks on a weekly basis.

The Tri-Level Attribute Evaluation method shall be used for evaluating attributes. Classification shall be done using risk source according to the Risk Taxonomy. Prioritization shall be accomplished noting that only the Top N risks shall receive mitigation resources. Determination of the number of Top 20% risks to maintain shall be made by the PM and FAMs for the project and the functional area.

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[Note to students: The actual procedure steps for accomplishing this task would go here - equivalent to the procedure steps listed for re-establishing a baseline.]

4.3.1 Criteria for Assigning Attribute Values

The criteria for assigning attribute values are documented in the following table.

Attribute	Value	Description
Probability	Very Likely (H)	High chance of this risk occurring, thus becoming a problem >70%
	Probable (M)	Risk like this may turn into a problem once in a while 30% < x < 70%
	Improbable (L)	Not much chance this will become a problem 0% < x < 30%
Impact	Catastrophic (H)	Loss of IR-SIP; unrecoverable failure of IR-SIP operations; major system damage to IR-SIP; schedule slip that causes vehicle launch date to be missed; cost overrun exceeding 50% of planned costs.
	Critical (M)	Minor system damage to IR-SIP with recoverable operational capacity; cost overrun exceeding 10% (but less than 50%) of planned costs.
	Marginal(L)	Minor system damage to IR-SIP; recoverable loss of IR-SIP operational capacity; internal schedule slip that does not impact vehicle launch date; cost overrun of less than 10% of planned costs.
Timeframe	Near-term (N)	Note: Refers to *when* action must be taken on the risk. In the next month
	Mid-term (M)	1-2 months from now
	Far-term (F)	3 or more months from now

4.4 Planning Risks

All Top 20% risks shall be assigned to someone within the project for responsibility. Accomplishment of actions contributing to the mitigation of the risk may be assigned. Responsibility for a risk means that the responsible person must answer for the status and mitigation of the risk.

Assign responsibility: As newly identified risks are brought to a manager's immediate attention through weekly database reports, the manager shall determine whether or not to keep the risk, delegate responsibility, or transfer responsibility up the project organization. If transferred, the transferee must make a similar decision. The project manager, if necessary, can transfer a risk to the AA Program Manager.

When you are assigned or keep responsibility for a risk: Decide if the risk requires further research (then create a research plan); accept the risk (document acceptance rationale in the database and close the risk), watch (define tracking requirements, document in the database, and assign watch action), or mitigate (create a mitigation plan, assign actions, and monitor the plan and the risk). See Appendix A for standard plan templates. Note that only Top N risks shall be mitigated.

Mitigation plans shall be either an action item list or follow the standard template for IR-SIP task plans. Task plans shall be written for any mitigation effort that requires reallocation of project resources. The project manager shall determine when to use a task plan format.

[Note to students: The actual procedure steps for accomplishing this task would go here - equivalent to the procedure steps listed for re-establishing a baseline.]

4.5 Tracking and Control of Risks

The person responsible for a risk shall provide routine status reports to the Functional Area Managers and PM during weekly Functional Area meetings and the weekly and monthly project meetings. The status for each Top 20% risk shall be reported each week in their respective meetings. Status on all watch lists shall also be reported during the monthly meetings. The Risk Spreadsheet shall be used to report summary status information for risks. The Stoplight Status Report shall be used by the PM to report progress to the AA Program Manager at the program monthly reviews.

[Note to students: The actual procedure steps for accomplishing this task would go here - equivalent to the procedure steps listed for re-establishing a baseline]

4.6 Summary of Methods and Tools

Method or Tool	Use:
Risk Information Sheet	Used by everyone to document new risks and to add information as risks are managed.
Problem-Solving Planning	Used for developing mitigation plans for complex risks.
Periodic review of project data and the Short TBQ	Used for routine or frequent identification of risks. The short TBQ provides a memory jogger for possible sources of risks and the project data is reviewed with that list in mind.
Goal/Question/Metric for project metrics	Use project metrics to help identify and track risks.
Action Item Lists	Used for developing a list of relatively simple mitigation actions.
Spreadsheet Risk Tracking	Used technical leads to succinctly report current status

	information about their teams' risks.
Taxonomy Classification	Used when risks are identified as a structure for grouping related risks. Technical leads use this to help eliminate duplicate risks and combine related mitigation plans.
Tri-Level Attribute Evaluation	Used when risks are identified to evaluate probability, impact, and timeframe. Also helps level the risks into those that might be important enough to be considered Top 20% risks (filters out the less important risks). Safety risks are evaluated according to the Safety Handbook.
Multivoting	Used by technical leads and project manager to isolate the Top 20% risks, which will get mitigation resources.

Section 5. Resources and Schedule of Risk Management Milestones

Resources for the management of risks are broken into two categories:

- overhead costs associated with the risk management process: 00.05% of the project budget

- mitigation plan costs: resources associated with mitigation plans, specifically those with task plans

Budget allocation for mitigation plan development and execution is initially set at 1% of the project budget, with equal portions of that distributed to each functional area. Each Functional Area Manager is responsible for managing their mitigation budget. Any requirements for additional mitigation resources must be made to the Project Manager.

Milestones

- Weekly project and functional area meetings shall include statusing of risks.

- Monthly project meetings shall include statusing of risks.

- Top 20% risk status shall be summarized and reported to the AA Program Manager on a monthly basis.

- The baseline set of risks shall be re-established on a project milestone basis.

Section 6. Documentation of Risk Information

All risk information shall be documented in the risk database. The risk database is accessible by all project personnel for the purpose of identifying new risks. Once a risk has been assigned to someone, then only that person shall have the authority to update the risk information. The Risk Information Sheet for any risk can be printed by whomever is assigned to the risk. Spreadsheets and Stoplight Status Reports can only be printed by the Program Manager, Functional Area Managers or their designated assistants.

The responsible person must document lessons learned before closing the risk. Those lessons learned must be reviewed and approved by whoever is assigned closing authority for the risk before the risk can be officially closed within the database.

The IR-SIP database is being provided at no cost by the SR & QA office. Assistance in maintaining and modifying the database is also being provided at no cost, provided it does not exceed two hours per week. Any additional needs must be negotiated between the IR-SIP PM and the SR & QA director.