



# Ames Procedural Requirements

**APR 8000.4**

Effective Date: March 13, 2018  
Expiration Date: March 13, 2023

**COMPLIANCE IS MANDATORY**

**Subject: Risk Management Process Requirements**

**Responsible Office: Q/Office of Safety and Mission Success**

## Change Log

Status [Baseline /Revision /Cancelled]	Document Revision	Date of Change	Description
Baseline	0	May 8, 2007	Initial
Revision	1	January 27, 2011	Document updated to omit Ames Technical Authority Advisory and System Management Office. Added SS&MA as a risk reviewer.
Revision	2	March 13, 2018	Added appointed Center Risk Officer and management of institutional risks.

## TABLE OF CONTENTS

### **PREFACE**

- P.1 Purpose
- P.2 Applicability
- P.3 Authority
- P.4 Applicable Documents and Forms
- P.5 Measurement/Verification
- P.6 Cancellation

### **CHAPTER 1. Responsibilities**

- 1.1 Center Director
- 1.2 Directorates
- 1.3 Activity Managers (AM)
- 1.4 Activity Risk Executive
- 1.5 RMB
- 1.6 Risk Owners
- 1.7 Activity Personnel
- 1.8 External Boards, Committees and Organizations
- 1.9 The Center Risk Management Executive

### **CHAPTER 2. General Procedure**

- 2.1 Risk Identification
- 2.2 Risk Analysis
- 2.3 Plan, Track and Control
- 2.4 Communicate

### **APPENDIX A. Acronyms**

### **APPENDIX B. Activity Specific RM Requirements and APR Mapping**

### **APPENDIX C. Development of the Agency 5x5 Risk Matrix**

## **PREFACE**

### **P.1 PURPOSE**

This APR defines the Ames Research Center's Risk Management (RM) process which is made up of two sub-processes; continuous risk management (CRM), and risk-informed decision making (RIDM), respectively. Its implementation ensures that the Center's programs, Activities, and institutional or mission support office activities (herein referred to as Activities) remain compliant with NPR 8000.4. It is a continuously applied process that is aimed at ensuring all risks (safety, technical, cost, and schedule) are mitigated to a rating of "LOW" or an equivalent value where they are judged to be an insignificant threat to the Activity's minimum success/exit requirements. However, it incorporates provisions that allow Activities to address those risks which cannot be mitigated to the LOW rating. It is intended to be the general Risk Management Plan (RMP) for all Activities. Therefore, an Activity's RMP can consist of this APR with the Activity's own specific RM nomenclature, organization, tools, and process details documented in the template provide in Appendix A.

### **P.2 APPLICABILITY**

a. In this directive, all mandatory actions (i.e., requirements) are denoted by statements containing the term "shall." The terms: "may" or "can" denote discretionary privilege or permission, "should" denotes a good practice and is recommended, but not required, "will" denotes expected outcome, and "are/is" denotes descriptive material. In this directive, all document citations are assumed to be the latest version unless otherwise noted.

This APR applies to all activities which are being led by Ames Research Center. For this APR, the definition of an activity includes all acts wherein Center/NASA resources are used towards the fulfillment of requirements or are impacted by the pursuit of such requirements.

For existing activities, the requirements of this document are applicable to the activity's extant phase as of the effective date of the APR and to phases yet to be completed.

For those activities, wherein Ames is responsible for a task within an Activity led by an organization outside of Ames, the applicable procedural requirements are jointly negotiated by the cognizant authorities and delineated in the statement of work or customer agreement for the task. This agreement will establish the hierarchy and reconciliation of the procedural requirements to be followed.

This APR applies to all ARC employees and contractors (to the extent specified in their contract with NASA) who support the above described activities as a member of a technical team or in any other capacity.

This APR may be applied to other ARC activities at the discretion of the cognizant manager.

### **P.3 AUTHORITY**

NPD 1000.0, NASA Governance and Strategic Management Handbook

NPR 8000.4, Risk Management Processes and Requirements

#### **P.4 APPLICABLE DOCUMENTS AND FORMS**

- a. NPR 7120.5, NASA Space Flight Program and Activity Management Requirements
- b. NPD 7120.6, NASA Knowledge Management
- c. NPR 7123.1, Systems Engineering Processes and Requirements
- d. NPR 8621.1, NASA Procedural Requirements for Mishap and Close Call Reporting, Investigating, and Recordkeeping
- e. NPR 8700.1, Policy for Safety and Mission Success
- f. NPR 8705.5, Probabilistic Risk Assessment Procedures for NASA Programs and Projects
- g. NASA Reference Publication 1358
- h. APR 1220.1, NASA Ames Center Management Objectives
- i. SP-2011-3422, NASA Risk Management Handbook

#### **P.5 MEASUREMENT/VERIFICATION**

Verification of compliance is measured through the internal audit process and management review and those results. Measuring effectiveness will at a minimum use customer satisfaction data. Verification of this APR/D is accomplished via the Center's internal and external auditing process using Center Level Management Objective (CLeMO) performance goal five (ref. APR 1220.1).

Measurement of this APR is accomplished by the Responsible Office via the Center's Management Objectives Program using CLeMO performance goals one and four (ref. APR 1220.1).

#### **P.6 CANCELLATION**

APR 8000.4, Risk Management dated January 7, 2011

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/s/

Eugene Tu  
Director

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#### **DISTRIBUTION STATEMENT: CDMS**

## **CHAPTER 1. RESPONSIBILITIES**

### **1.1. The Center Director Shall:**

- a. The Office of the Director shall ensure the Center is in compliance with this APR and provide executive oversight of the Center's RM planning and implementation activities via its Ames Executive Management Councils; including those for safety, and, management systems.
- b. Appoint the Center Risk Management Executive

### **1.2 Directorates Shall:**

- a. Ensure all activities under their purview designated as NPR 7120.X or 8820.2 develop and implement a risk management plan (RMP)
- b. Specify which activities within their purview, in addition to all those designated as NPR 7120.X or 8820.2, require a risk management plan (RMP)
- c. Provide oversight of the RM process through their participation in the EMCs and day-to-day business interactions with the Activities they support
- d. Support the Center's Risk Management Executive by reviewing, contributing too, and approving the Center's quarterly risk management reports
- e. Ensure the Center's quarterly risk management reports accurately reflect the enterprise (i.e. Centerwide) risks for both the institutional/mission support and programmatic process areas

#### **1.2.1 Systems Safety and Mission Assurance Division Shall:**

Comply with all responsibilities levied on it via NPR 8000.4, and provide (via its Chief Safety Officers and Mission Assurance Managers) an independent review of the Activity RMP, risk list, and Risk Management Data Base (RMDB) to verify that SS&MA risks are adequately addressed and appropriately mitigated.

### **1.3 Activity Managers (AM) Shall:**

- a. Develop, document, and maintain the Activity's RMP by using Appendix A to describe Activity specific RM philosophies, practices, methodologies, tools, and activities.
- b. Chair the Activity Risk Management Board (RMB).
- c. Present to the EC those primary risks the Activity wants to waive.
- d. Appoint the Activity Risk Executive (REx).
- e. Appoint RMB members such that it has adequate representation from across the Activity, including (when part of the OBS) the Activity systems engineer, REx, scientist, resources manager, and SS&MA manager.
- f. Ensure the RMP is implemented throughout the Activity life cycle.

#### 1.4 Activity Risk Executive Shall:

- a. Make recommendations to the AM concerning the Activity's general philosophy and approach for risk identification, analysis, assessment, mitigation, and communication.
- b. Ensure the RMP is implemented.
- c. Serve as an RMB member and its Executive Secretary.
- d. Serve as the primary interface between the Activity personnel and the RMB.
- e. Coordinate all RM training, and tool distribution, access, and implementation processes.
- f. Ensure that all risks statements are written in the *condition; consequence* format and provide sufficient *context/scenarios* to facilitate risk assessment and mitigation.
- g. Assign each risk a Risk Owner (RO).
- h. Review all RM process actions and provide RO oversight to ensure risks are managed according to the Activity's processes and other higher level requirements (such as NPR's 8700.1, 8000.4, 8705.2, and 8705.5 corresponding to the Policy for Safety and Mission Success, Risk Management Procedural Requirements, Probabilistic Risk Assessment Procedures for NASA Programs and Projects, respectively).
- i. Schedule RMB meetings as required to deposition risks and manage the RM process.
- j. Inform the RMB of RM activities.
- k. Inform the RMB of risks needing immediate attention or risks that have manifested into problems.
- l. Accept ownership and "Watch" responsibilities for all risks categorized as "Acceptable" and "Waived."
- m. Prepare, document, and coordinate all RM activities as required by Activity, Center, and Agency management/review bodies.
- n. Ensure all risk related information originating from sources external to the Activity (External Boards, Committees, and Organizations) is appropriately addressed and added to the RMDB if necessary.
- o. Coordinate the transfer of the RM related lessons learned to the Center's LLC.
- p. Upon Activity termination, prepare and deliver a RM closeout document that summarizes the RM process, its results, and appropriate LL to the AM.
- q. Serve as the primary spokesperson for Activity RM process.

#### 1.5 The RMB Shall

- a. Meet according to the schedule documented in Appendix A (Activity specific RM processes and procedures) or at the discretion of the RMB Chair to deposition candidate risks and oversee the RM process.
- b. Document and archive the RMB's RM process actions.
- c. Promote the use of RM throughout the Activity life cycle.
- d. Propagate risks from one WBS element to others that may be impacted to ensure all risk assessments take into account a risk's threat to both direct and collateral WBS elements.
- e. Ensure the RM activities of the Activity are integrated throughout all appropriate elements of the WBS.

## 1.6 The Risk Owners Shall

Manage their risks using specific methodologies and tools that they deem most appropriate for the risk but that fall within the general philosophies, practices, methodologies, and tools documented in Appendix A as well as those required by higher level documents.

- a. Analyze their risk for:
    - (1) triggering mechanisms
    - (2) failure modes and scenarios
    - (3) worst and most likely consequences
    - (4) prevention, detection, and control methods
  - (5) Assess their risk's attributes (see Table 1)
  - (6) Likelihood
  - (7) Consequence
  - (8) Urgency
  - (9) Rating
- b. Plan and implement risk mitigation actions for those risks categorized as "Unacceptable."
  - c. Inform the REx of risks needing immediate attention or risks that have manifested into problems.
  - d. Document all Risk information in the Activity RMDB.

## 1.7 Activity Personnel Shall:

- a. Identify candidate risks, enter them into the RMDB, and forward them to the REx and their Process Area Lead (PAL).
- b. Consult the RMDB, LL data bases, their PAL, and other information sources (SME's, review team members, and peers) to help identify and mitigate risks.
- c. Notify the REx when significant risk identification opportunities occur (i.e., reviews, system integration, tests, operations).
- d. Serve as a RO at the REx's request.

## 1.8 External Boards, Committees, and Organizations

The various external boards, committees, and organizations include those for health and safety described in APR 8715.1, those for engineering oversight described in APR 7120.12, the Ames Technical Authorities (ATA) for safety and mission assurance, and engineering, and LLC. These groups each play a specific role with regard to RM in terms of the types of risks they review or the mechanisms used to disseminate risk information. Their specific responsibilities can be found in either their own APR or Charter via the AMS. However, any new risks or risk information originating from a person external to the Activity must be conveyed to the REx as only Activity personnel may enter information into the Activity's RMDB.

## **1.9 The Center Risk Management Executive Shall:**

- a. Be the Center's representative to the Agency Risk Management Working Group (ARMWG).
- b. Coordinate the Center's quarterly risk management report to the ARMWG with all Directorates for review, contributions, and approval.
- c. Submit the Center's quarterly risk management report to the ARMWG in accordance with ARMWG guidelines.

## **CHAPTER 2. General Procedure**

- a. The RM process flow is illustrated in Figure 1 and described in the following sections. This process in addition to any Activity specific details (listed in Appendix A) shall be continually implemented such that risks are mitigated below a rating which could cause the Activity to miss its minimum mission success requirements.
- b. All exceptions (i.e., unavoidable/residual risks over the "LOW" rating) to this philosophy shall be formally documented in an RMB issued waiver.
- c. A preliminary version of the Activity specific RM details shall be developed prior to the Mission Definition Review (MDR), and a final (baseline) RMP developed prior to the Preliminary Design Review (PDR).



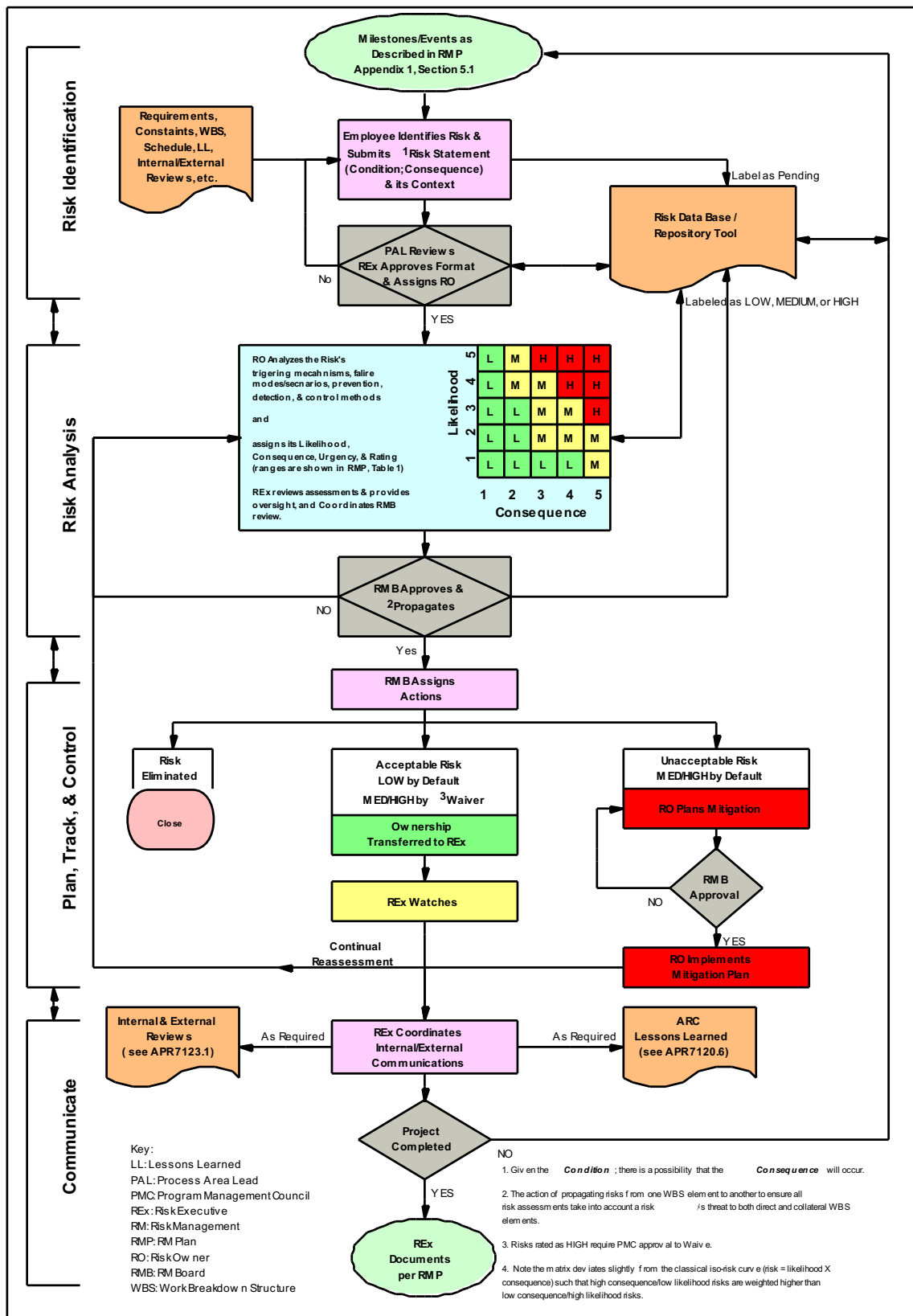


Figure 1. ARC Risk Management Process

## 2.1 Risk Identification

2.1.1 Risks shall be identified and submitted to the identifier's PAL and the REx via the RMDB throughout the Activity life-cycle using mechanisms and tools such as:

- a. Phase A and B trade studies,
- b. Risk and hazard analyses (i.e., Preliminary Hazard Analysis (PHA), Operational Hazards Analysis (OHA), Fault Trees Analysis (FTA), Failure Modes and Effects Analysis (FEMA), etc.)
- c. Activity OBS and WBS,
- d. Activity peer and milestone reviews,
- e. Activity schedules,
- f. Interface control documents,
- g. LL from similar activities as documented in the Center and Agency LL data bases,
- h. Various reviews, assessments, and audits of similar Government, Academic, and Industry activities,
- i. Appropriate SMEs.

2.1.2 Upon the reception of an identified risk, the REx, in consultation with the identifier and identifier's PAL, shall accept it as written or have the identifier rewrite it so it is in the proper "*condition; consequence*" format (Given the *Condition*; there is a possibility that the *Consequence* will occur) and has an adequate context statement (pertinent information not captured in the brief risk statement such as scenarios of occurrence, contributing factors, circumstances, sources, and interrelationships with other risks).

2.1.3 Once accepted, the REx shall assign the risk a unique identification/tracking number and a RO.

2.1.4 The RO shall enter all their risk's additional information into the RMDB and update it as each process step is started and completed. At a minimum the risk information at this stage shall include:

Risk Information	Responsibility
Risk Statement and context	Risk Identifier
Identifiers contact information	Risk Identifier
Date of submission	Risk Identifier
How the risk was identified	Risk Identifier
What part of the WBS is predominantly threatened	Risk Identifier
Risk identification/tracking number	REx
Assigned RO's contact information	RO

## 2.2 Risk Analysis

- a. The risk analysis shall be performed by the RO with REx oversight and RMB approval and is aimed at ensuring the risk's attributes are commensurate with its significance such that adequate actions can be taken to mitigate it.
- b. The RO has the discretion to use any tools and techniques deemed appropriate to analyze their risk for:
  - (1) triggering mechanisms
  - (2) failure modes and scenarios
  - (3) worst and most likely consequences
  - (4) prevention, detection, and control methods
  - (5) and to assign it its attributes which are given below:

- (6) Likelihood: 1 (Very Low), 2 (Low), 3 (Moderate), 4 (High), 5 (Very High)
- (7) Consequence: 1 (Very Low), 2 (Low), 3 (Moderate), 4 (High), 5 (Very High)
- (8) Urgency: Low, Medium, High
- (9) Rating: HIGH, MEDIUM, LOW

c. In assigning these attributes to each risk the Activity shall use the numerical values and ranges shown in Table 1, where it is shown that the likelihood and consequence ranges for human safety risks differ from all others.

d. The Activity may tailor the values, not associated with human safety risks, in Table 1 to reflect their situation, but shall document them and their mapping onto the 5X5 matrix (Figure 2).

**Table 1 Relationship between risk levels and their corresponding attribute ranges**

Attribute		Level				
		1 (Very Low)	2 (Low)	3 (Moderate)	4 (High)	5 (Very High)
<b>Likelihood (L) Non-Human Safety Risks</b>		≤ 0.01	0.01 < ≤ 0.10	0.10 < ≤ 0.33	0.33 < ≤ 0.50	> 0.50
<b>Consequence (C) Non-Human Safety Risks</b>	<b>Cost</b>	Overrun of ≤ 2%	Overrun of 2% < ≤ 5%	Overrun of 5% < ≤ 10%	Overrun of 10% < ≤ 15%	Overrun of > 15%
	<b>Schedule</b>	Overrun of ≤ 2% or No impact to critical path	Overrun of 2% < ≤ 5% or No impact to critical path	Overrun of 5% < ≤ 10% or ≤ 1 Month impact to critical path/milestones	Overrun of 10% < ≤ 15% or >1 to ≤ 6 Month impact to critical path/milestones	Overrun of > 15% or > 6 Month impact to critical path/milestones
	<b>Mission Success (Technical Performance)</b>	Loss of ≤ 2% success/exit criteria	Loss of 2% < ≤ 5% success/exit criteria	Loss of 5% < ≤ 10% success/exit criteria	Loss of 10% < ≤ 15% success/exit criteria	Loss of > 15% success/exit criteria
	<b>Facilities, Equipment or other Assets</b>	More than normal wear and tear > \$20K	Property damage \$20K < ≤ \$50K	Property damage \$50K < ≤ \$500K	Destruction of non-critical assets or damage \$500K < ≤ \$2M	Destruction of critical assets or damage > \$2M
	<b>Environmental</b>	Non reportable OSHA/EPA violation	Reportable OSHA/EPA violation that does not require immediate remediation	Reportable OSHA/EPA violation which requires immediate remediation	Reportable OSHA/EPA violation causing temporary stoppage	OSHA/EPA violations resulting in termination of Activity
<b>Likelihood (L) Human Safety Risks</b>		≤ 10 <sup>-6</sup>	10 <sup>-6</sup> < ≤ 10 <sup>-3</sup>	10 <sup>-3</sup> < ≤ 10 <sup>-2</sup>	10 <sup>-2</sup> < ≤ 10 <sup>-1</sup>	> 10 <sup>-1</sup>

<b>Consequence (C)</b> <b>Human Safety Risks</b>	<b>Human Safety</b>	Injury or illness with no adverse or long-term health effects or lost time	Injury or illness with no adverse or long-term health effects but resulting in lost time	Injury or illness resulting in adverse or long-term health effects	Injury or illness resulting in permanent or disabling health effects	Injury or illness resulting in death
		<b>Low</b>	<b>Medium</b>	<b>High</b>		
<b>Urgency</b>	Mitigation can start at earliest convenience	Mitigation should start before next relevant milestone	Mitigation should start as soon as possible			
<b>Notes:</b> 1. Facilities, Equipment, or other Assets monetary consequences are based on Mishap Classification Levels of NPR 8621.1.						

In order to efficiently and effectively represent the likelihood, consequence, and corresponding rating values shown in Table 1 for all risks, and therefore, facilitate the risk management process, the Activity shall use the risk matrix shown in Figure 2. The demarcations between the risk rating levels (LOW, MEDIUM, and HIGH) are arrived at through weighting the risk equation in favor of high consequence/low likelihood risks. This process is shown in Appendix C.

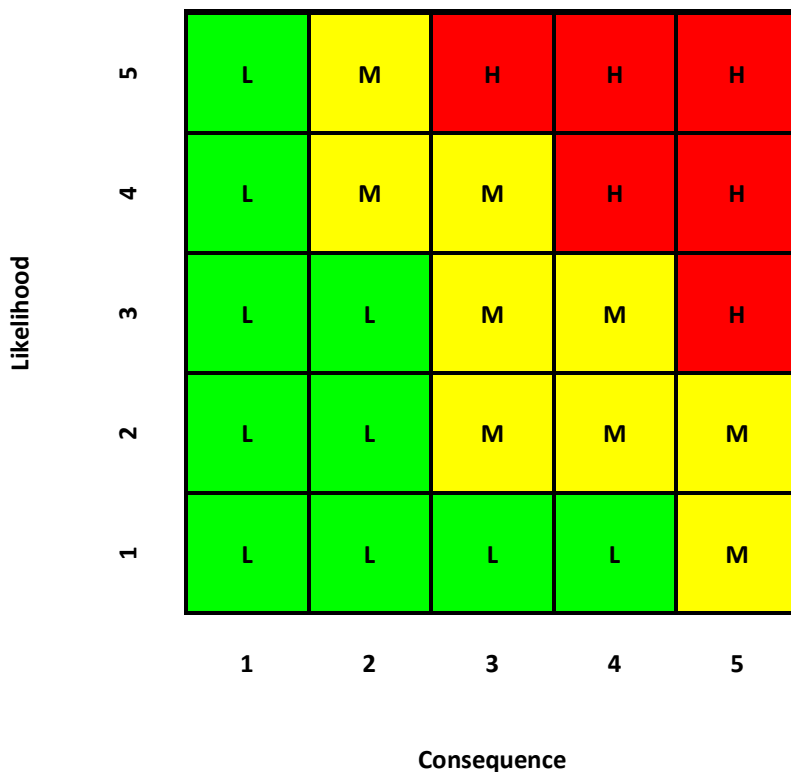


Figure 2. Risk Matrix

- a. The RO documents these activities in the RMDB and informs the REx upon completion.
- b. The REx ensures all attributes have been assessed and includes the risk on the agenda for the next RMB meeting.
- c. The REx shall immediately notify the RMB for risks that are deemed to require attention before the next scheduled RMB meeting.

### 2.3 Plan, Track, and Control

The RMB shall meet according to the schedule documented in Appendix A, or as called for by the Chair, to review and approve all RMP activities and results. The outcome of these meetings will be approved risk attributes, ratings, control actions, top risk and primary risk lists. The control actions, as determined by RMB, are shown in Table 2.

Table 2: RMB Risk Control Actions

Risk Ratings	Default Action	Action by RMB Discretion
LOW	Risk is "Accepted," ownership and Watch responsibilities transferred to REx	Risk is "Unacceptable," RO develops and implements a mitigation plan
MED/HIGH	Risk is "Unacceptable," RO develops and implements a mitigation plan	Risk is "Accepted" by waiver. The RMB waives the default action (mitigation) and transfers ownership and Watch responsibilities to REx
<p>Instructions:</p> <ol style="list-style-type: none"> <li>1. Risks which are eliminated shall be labeled "Closed."</li> <li>2. Risks that are assessed as HIGH shall be added to the primary risk list and be added into the Activity plan.</li> <li>3. The Waiving of risks rated as HIGH shall be approved by the Activity's AMC.</li> <li>4. Risks that exceed Activity established attribute thresholds (documented in Appendix C) shall be added to the Activity top risk list.</li> </ol>		

Mitigation actions or plans shall be developed and implemented by the RO for all risks rated as Medium or High, unless they have been accepted by an RMB issued waiver. The RMB has the discretion to determine the detail and formality of the action or plan which can range from a relatively simple task list to an involved multiple page document with detailed schedules and resource estimates. However, each action or plan shall include an estimate of the overall resources (cost, schedule, and personnel), an estimate of the risk's final (mitigated) attributes, and any appropriate metrics that will be used to trigger specific actions. In addition, each action or plan shall describe the methodologies that will be used to verify each mitigation action is accomplished and to validate their effectiveness.

The RMB shall propagate risks from one WBS element to others that may be impacted to ensure all risk assessments take into account a risk's threat to both direct and collateral WBS elements.

The RMB shall document the rationale used in each case a risk is accepted by waiver and the REx shall develop contingency and/or descope options with specific metrics to watch such that waived risks can be addressed in the event they begin to develop into problems. However, the waiving of risks rated as HIGH shall be approved by the Activity's AMC.

All RMB actions will be documented by the RMB Executive Secretary.

## 2.4 Communicate

- a. All RM activities and results shall be communicated using the tools and formats established by the Activity for internal communications and those required by their stakeholders for external communications (communications up the Activity hierarchy).
- b. At a minimum, all ROs shall notify the REx via email when updates to the RMDB (the primary tool to document and archive RM related information) have been made.
- c. The REx shall communicate updates to the RMDB to other individuals that may benefit.
- d. The REx coordinates all RMB meetings and prepares any RM related information the Activity is required to communicate to its stakeholders.
- e. Whenever there is a difference in terminology or formatting, the RM shall include a key that maps the Activity specific information to that being communicated to external bodies.
- f. In addition the REx shall ensure that any LL related information is submitted to the Center LLC.

## APPENDIX A. ACRONYMS

Acceptable Risks	Risks which have been assessed at a Rating of “LOW”; and other risks which have been accepted by waiver. These risks do not require mitigation
AMS	Ames Management System
APR	Ames Procedural Requirements
ARMWG	Agency Risk Management Working Group
ATA	Ames Technical Authority
EMC	Executive Management Council
LL	Lessons Learned
LLC	Lessons Learned Committee
LLIS	Lessons Learned Information System
MDR	Mission Definition Review
Moderate Risk	Same as Medium Risk
OBS	Organizational Breakdown Structure
PAL	Process Area Lead: a) Internal to the Activity - an individual responsible for a discrete element or task of the Activity WBS; b) External to the Activity – an individual leading a technical or administrative process area, group, or team.
PDR	Preliminary Design Review
AM	Activity Manager
AMC	Program Management Council
AMP	Activity Management Plan
Primary Risk	Risks that have been rated as HIGH
Risk Attributes	The measures of Likelihood, Consequence, Urgency, and Rating
Risk Rating	The single attribute that represents both the risk’s likelihood and consequence attributes
Risk Statement	Given the <i>Condition</i> ; there is a possibility that the <i>Consequence</i> will occur
Rex	Risk Executive
RM	Risk Management
RMB	Risk Management Board
RMDB	Risk Management Data Base
RMP	Risk Management Plan
RO	Risk Owner
SME	Subject Matter Expert



SS&MA	System Safety and Mission Assurance
Top Risk List	Risks exceeding specific attribute thresholds established by the Activity
Unacceptable Risks	By default, all risks which have been assessed at a Rating of “MEDIUM” or “HIGH”; and other risks by RMB exception. These risks require mitigation
Waived Risks	“MEDIUM” or “HIGH” risks which the Activity formally accepts and chooses not to mitigate
WBS	Work Breakdown Structure

**APPENDIX B. ACTIVITY SPECIFIC RM REQUIREMENTS AND APR MAPPING TEMPLATE**

Activity Specific RM Requirements and APR Mapping Template				
<p><i>Note: This template shall be used by the Activity to document its specific RM practices. Therefore, an Activity's RMP shall consist of this APR and this template filled out with the Activity's unique RM nomenclature, organization, tools, and process details.</i></p>				
APR 8000.4 Section	Title	Activity Specific Documentation Requirements		
1.0	General Procedure	<i>What level of risk will require mitigation or a waiver to accept</i>		
3.0	Definitions and Acronyms	<i>Activity terms and acronyms</i>		
		Example:		
		<table border="1"> <thead> <tr> <th>APR</th> <th>Activity</th> </tr> </thead> <tbody> <tr> <td>Risk Executive Urgency Likelihood Consequence</td> <td>Risk Officer Timeframe Probability Impact</td> </tr> </tbody> </table>	APR	Activity
APR	Activity			
Risk Executive Urgency Likelihood Consequence	Risk Officer Timeframe Probability Impact			
4.0	Responsibilities	<p><i>Organization chart showing how the various Activity entities relate to the RM process and additional responsibilities</i></p> <p>Example: In addition to the RMB Chair, the Activity Risk Officer also has the authority to convene the RMB</p>		
5.0	General Procedure	<p><i>The risks which the Activity will mitigate by default</i></p> <p>Example: Only risks rated as HIGH will be mitigated by default. Therefore, the default action for MEDIUM risks is to accept by waiver</p>		
5.1	Risk Identification	<p><i>Specific milestones and activities/events which will be scrubbed for risks and the Activity<sup>1</sup> tools, forms, and risk information entries which will be used</i></p> <p>Example: The Activity will use checklists, brainstorming, and the ARC LLDB as the primary risk identification tools. Concentrated risk identification efforts will be conducted prior and during all level 1 milestones, and WBS changes/reviews. The Activity's RMDB will be an Excel spreadsheet controlled by the Risk Officer. Communications will be implemented via email.</p>		
5.2	Risk Analysis	<p><i>Tools to be used to quantify risk attributes and any additional details added to the required risk categories and likelihood/consequence values specified in Table 1.</i></p> <p>Example: The Activity only uses two levels to distinguish a risk's Urgency. They are; Near Term and Long Term, corresponding to before the next relevant milestone, and at the earliest convenience, respectfully.</p>		

<sup>1</sup> Some Agency organizations have their own requirements for tools (i.e., ESMD requires its Programs/Activities to use the Active Risk Manger tool)

## Activity Specific RM Requirements and APR Mapping Template

*Note: This template shall be used by the Activity to document its specific RM practices. Therefore, an Activity's RMP shall consist of this APR and this template filled out with the Activity's unique RM nomenclature, organization, tools, and process details.*

<b>APR 8000.4 Section</b>	<b>Title</b>	<b>Activity Specific Documentation Requirements</b>
5.3	Plan, Control & Track	<p><i>Planning alternatives for each Risk rating, propagation strategies, decision protocols, tracking metrics, waiving protocols, and associated tools</i></p> <p>Example: The Activity will use MS Excel for risk tracking.</p>
5.4	Communicate	<p><i>Communication content, formats, protocols, and tools</i></p> <p>Example: The Activity will use MS Excel and email to communicate risk information.</p>
6.0	Records	<i>Records</i>

## Appendix C. Development of the Agency 5x5 Risk Matrix

As discussed in section 5.2, the likelihood, consequence, and corresponding rating values shown in Table 1 for all risks are conveniently represented by a single risk matrix (Figure 2). This figure was arrived at by using the values of Table 1 (taken from NPRs 8000.4 and 8621.1) with the risk equation (Risk = Consequence X Likelihood, see NASA Reference Publication 1358) to develop a baseline matrix. In example, Figure B1 shows the baseline matrix for human safety risks where the thresholds of 1,000 and 25,000 (corresponding to Mishap Classification Levels of NPR 8621.1) have been used for the levels of risk under which would be acceptable (LOW) and over which would be unacceptable (HIGH), respectively. The initial demarcation between the LOW, MEDIUM, and HIGH risk squares have been made by assigning each square along the demarcation line the rating corresponding to the risk curve that intersects it. In this way, a transfer from a continuous format, the risk curve, to a digitized format, the risk square, is made. This figure is then adjusted to reflect the Agency's practice of weighting high consequence/low likelihood risks over those that are low consequence/high likelihood. Thus, applying this adjustment to the crosshatched squares, the LOW risk squares corresponding to a Likelihood 2 / Consequence 3 and 4 and the bottom most right square (Likelihood 1 / Consequence 5) of Figure B1 are designated as MEDIUM and redrawn with all other squares in Figure 2.

A similar process for non-human safety risks wherein thresholds of 0.01 and 0.05 (corresponding to NPR 8000.4 likelihood and consequence levels) can be used for the levels of risk under which would be acceptable (LOW) and over which would be unacceptable (HIGH), respectively, to arrive at Figure 2. Thus, as stated previously, Figure 2 (the risk matrix) is a valid representation for all Activity risks.

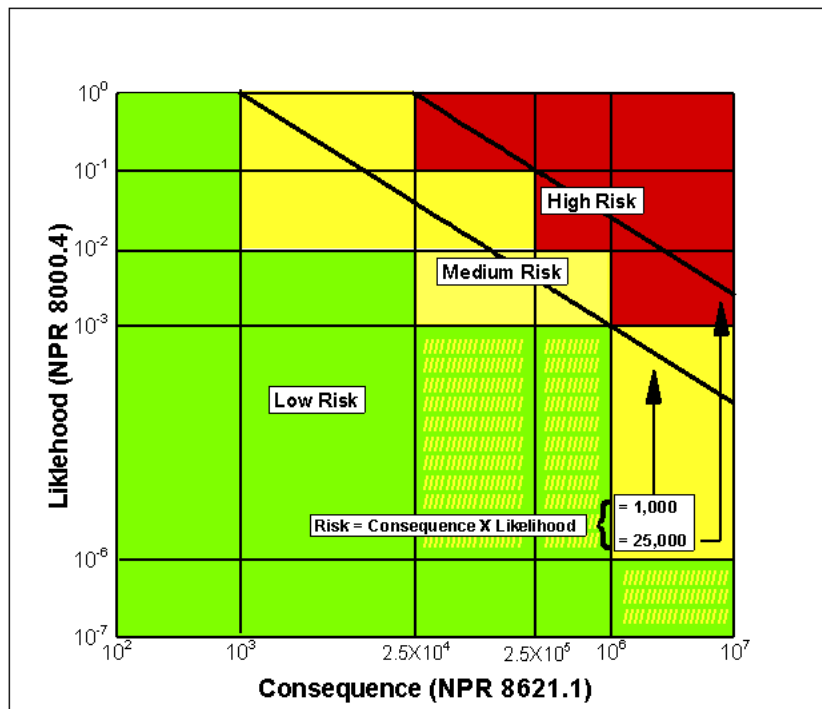


Figure B1. Iso-Risk Curves and Corresponding Risk Rating Levels (Human Safety Risks)