

SPG 7120.1
July 2001

JOHN C. STENNIS SPACE CENTER (SSC)

RISK MANAGEMENT



National Aeronautics and
Space Administration

John C. Stennis Space Center
Stennis Space Center, MS 39529-6000

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PREFACE

P1. PURPOSE

1.1 This SPG establishes the process for the implementation of an effective risk management program at Stennis Space Center (SSC). The risk management program at SSC is based on the Process Based Mission Assurance (PBMA) model. It utilizes a continuous risk management approach to provide discipline as to how risks are identified, tracked and mitigated throughout the life of a program/project. Risk Management (RM) is an organized, systemic decision-making process that efficiently identifies, analyzes, plans, tracks, controls, communicates, and documents risk to increase the likelihood of achieving program/project goals. This SPG provides guidelines for applying RM to programs and projects as required by NPG 7120.5, *NASA Program and Project Management Processes and Requirements* and SPD 7120.1, *Program/Project Management*.

1.2 The RM requirements of NPG 7120.5, *NASA Program and Project Management Processes and Requirements*, as further detailed in this document, are the minimum requirements essential to good program/project management, are vital to safety and mission success, and are, therefore, not tailorable. Although, the basic requirements from NPG 7120.5 are not tailorable, the requirement for a RM plan and its implementation is considered risk-based and SSC organizations can tailor their respective RM plans to fit the nature of their programs/projects.

P2. APPLICABILITY

This SPG governs all major lines of business under the management responsibility of SSC.

P3. AUTHORITY

Assumed to be the latest version unless otherwise specified.

- a. 42 U.S.C. 2473 (c)(1), Section 203(c)(1) of *the National Aeronautics and Space Act of 1958, as amended*.
- b. NPD 7120.4, *Program/Project Management*.
- c. NPD 8700.1, *NASA Policy for Safety and Mission Success*.
- d. NPG 7120.5, *NASA Program and Project Management Processes and Requirements*.
- e. SPD 7120.1, *Program/Project Management*.

P4. REFERENCES

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- a. NPG 8705.xx, *Risk Management Procedures and Guidelines*.
- b. NPG 8715.3, *NASA Safety Manual*.
- c. NPG 1441.1, *NASA Records Retention Schedules*.
- d. SPG 8715.3, *Safety and Health Procedures and Guidelines*.
- e. SPG 8715.1, *Operational Readiness Program Procedures and Guidelines*.
- f. SCWI-8700-0001, *Hazard Analysis Preparation*.
- g. ANSI/ASQC Q9001-1994, *American National Standard Quality Systems, Model for Quality Assurance in Design, Development, Production, Installation and Servicing*.
- h. Dorofee, Audrey J., et al., *Continuous Risk Management Guidebook, Carnegie Mellon University, 1996*.

P5. CANCELLATION

None.

Original Signed By

Mark Craig
Acting Director

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CHAPTER 1. REQUIREMENTS

1.1 Each program/project at SSC will follow a continuous risk management process as outlined in the SSC Risk Management Plan (RMP). This process will be iterated throughout the program/project life cycle. The Propulsion Test Directorate and the Geospace Applications Development Directorate (GADD) shall each develop RMPs in accordance with the direction contained herein. This process begins with risk identification and an assessment of program/project constraints. Risk areas include but are not limited to cost, schedule, technical/performance, safety, environmental, etc. Risk areas will be analyzed to determine whether immediate mitigation planning is required. All identified risks will be managed to assure mission success. The governing Program Management Council (PMC) will concur with the scope of analysis that is specified in the plan. The RMPs will be updated to reflect significant organizational or program/project changes that impact established policies and procedures. Risk Management records will be maintained throughout the life cycle of each program/project.

1.2 The Program/Project Managers (PMs) shall serve as the primary implementors of the RM process for each organization and are responsible for verifying, collecting, and prioritizing risks; implementing risk mitigation plans; and reporting the status of RM to higher level management.

1.3 The governing PMC is the designated approval authority and must concur in the formal acceptance of primary risks (those undesirable events having both high probability and high impact/severity).

1.4 Safety and Mission Assurance (S&MA) organizations will review and concur on program documentation, provide ongoing RM consultation, facilitation, and training to program/project organizations.

1.5 Detailed responsibilities shall be further defined in the RMPs developed by each SSC organization.

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CHAPTER 2. DOCUMENTATION

2.1 The RM documentation process ensures that RM policies are established, understood, implemented, and maintained, and that an audit trail is developed to establish the origin of, and rationale for, key risk-related decisions made during the program/project life cycle.

2.2 RM documentation is controlled and maintained so that, within each step of the RM process, key RM results and decisions are auditable/verifiable. All RM documentation and records are maintained per the requirements of NPG 1441.1, *NASA Records Retention Schedules*. Risk data shall be formally documented on a Risk Information Sheet (SSC Form 743) or a Risk Information Spread Sheet (SSC Form 743A). [**Note:** Both forms are located on the Stennis Electronic Forms Page.]

2.3 The RM process draws on existing project documentation to the maximum extent possible. Documentation established specifically for RM includes the following:

- a. Risk Management Plan. Updated when significant organizational changes occur, or when nontrivial changes in program/project scope, budget, or schedule occur that impact established policies/procedures.
- b. Risk list (continuous, initial plan plus updates with all supporting risk information). A list of risks identified by the program/project and associated mitigation of those risks.
- c. Risk indicators (triggers). Placing indicators (triggers) within a project's risk management system to notify the project when a potential risk tolerance has been exceeded or not met. This will facilitate the real-time decision-making process for mitigation of risks that exceed acceptable tolerance levels.
- d. Risk acceptance records (as required). Documentation kept to provide objective evidence that RM is being performed on a particular program/project. Documentation includes risk lists, risk mitigation plans, risk acceptance rationale, risk tracking requirements, and any other documentation deemed necessary.
- e. Project Office estimates of cost risk should be updated when a change in program phase occurs or when non-trivial changes in program scope, budget or schedule occur.
- f. Risk Mitigation Plan . This plan describes actions to take to mitigate identified risks as required. The plan may include schedule milestones and other relevant information.

2.4 The outline for development of RMPs is included in this document as Appendix B. The following sections of the RMP may be modified/tailored to fit the specific requirements of each program/project:

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- a. Organization – identifies organizational structure, and roles and responsibilities of program/project personnel.
- b. Resources and Schedule - identifies funding policies/practices for allocation of resources to RM-related activities, establishes general guidelines for RM status reporting.
- c. Specific Risk Identification – outlines approaches to be used to identify risks. This includes a list of risks specific to a given program/project with an estimate of the two elements of risk for each risk identified: (1) The probability that the risk will become a problem; (2) the effect the problem would have on the program/project if the problem materializes.
- d. Risk Mitigation – defines approaches used to mitigate identified risks.
- e. De-scope Methodology – discussion of tailorable de-scope opportunities (e.g. workarounds, changes in project content, schedule, etc.) in cases where risk identification, planning, tracking, and mitigation cannot be formally accomplished due to limited cost or schedule. Safety shall in no way be compromised through the use of any project de-scope activities.

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CHAPTER 3. METRICS

Each organization shall develop metrics for risk management. The monitoring and reporting of these metrics will be incorporated into the RM review process. The SSC Risk Assessment Code (RAC) should be used to help prioritize risk. This method combines qualitative and semi-quantitative measures of risk likelihood with similar measures of risk consequences to yield a RAC that can be the basis for initial prioritization of risks. The RAC is shown in Appendix B.

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Appendix A - Definitions

Risk: Risk represents the possibility or likelihood of being exposed to loss, hazard, danger, injury, or failure to meet a set of agreed upon objectives. Risk is the combination of the probability (qualitative or quantitative) that a program or project will experience an undesired consequence such as a cost overrun, schedule slippage, safety mishap, or failure to achieve a needed technological breakthrough, and the consequences, impact, or severity of the undesired event, were it to occur.

Risk Management: Risk Management (RM) is a continuous and iterative process whereby the program/project management team is therefore, responsible for the early identification, analysis, planning, tracking, controlling, and communicating effectively to the team and management, the risk items and the steps being taken to mitigate them. It is an integral part of normal program/project activity and a key element embedded within existing management and engineering processes.

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Appendix B - Stennis Space Center Risk Management Plan

Baselined: 08/04/00

Last modified: N/A

Owners: "Project Manager's Name"

Section 1. Introduction

1.1 Purpose and Scope

1.2 Related Documents and Standards

Section 2. Overview of Risk Management Practice

2.1 Overview

2.2 Project Management Integration

Section 3. Organization

3.1 Project Organization

3.2 Project Communication and Responsibilities

Section 4. Practice Details

4.1 Establishing Baselines and Reestablishing Baselines

4.2 Identifying Risks

4.3 Analyzing Risks

4.4 Planning Risks

4.5 Tracking and Control of Risks

4.6 Summary of Methods and Tools

Section 5. Resources and Schedule of Risk Management Milestones

Section 6. Documentation and Risk Information

Section 7. Methodology Associated with Project De-scope

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Appendix C - Summary Hazard Risk Index

Category	Descriptive Work	Probability				
		A	B	C	D	E
		Frequent	Reasonably Probable	Occasional	Remote	Improbable
I	Catastrophic	1	2	4	8	12
II	Critical	3	5	6	10	15
III	Marginal	7	9	11	14	17
IV	Negligible	13	16	18	19	20

* See Table below for Hazard Risk Index Actions

Hazard Risk Index Actions

Index	Criteria
1 - 5	Unacceptable - operation is not permitted.
6 - 9	Undesirable - Senior Management decision/Waiver required (ORAB)
10 - 17	Acceptable with SRT review and disposition
18 - 20	Acceptable without review