MWI 7120.6
REVISION D
EFFECTIVE DATE: August 4, 2005
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MARSHALL WORK INSTRUCTION

QD01

PROGRAM/PROJECT CONTINUOUS RISK MANAGEMENT

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DOCUMENT HISTORY LOG

Status (Baseline/ Revision/ Canceled)	Document Revision	Effective Date	Description
Baseline		7/10/00	
Revision	A	5/15/01	Added reference 4.9. Added definitions 5.1, 5.4 a 5.5 and 5.7. Added planning responsibilities clarification into 6.1. Added responsibilities for PMC and the Procurement Office into section 6.2 and reordered section to more logically follow process flow. Updated risk management tools application into section 6.3. Added procurement responsibilities into flow diagram.
Revision	B	12/16/2003	Removed reference from paragraph 6.3, Type III. Defined the PMC in section 5.12. Made appropriate changes to bring in accordance with NPG 8000.4 throughout the document. Added the word "Continuous" in front of Risk Management throughout the document. Added NPG 8000.4 to the Applicable Documents section. Corrected the number references for S&MA OI's in the reference section. Corrected the title to MPD 1150.1 in the reference section. Added the word "may" prior to the word cause and removed "or prior" to the word loss in section 5.6. Added the words "The PHA" prior to the word provides in section 5.7. Added the words "an undesired" prior to the word consequence in section 5.8. Removed the last two sentences in section 6.1 and added section 6.1.1 which discusses MPG 2810.1. Added the words "a CRM" prior to the word plan. Also, changed the word "Presents" to Present in section 6.2.3. Added the words, "Organizations supporting programs/projects will also support the respective team" in section 6.2.6. Eliminated section 6.2.8 and added to the end of section 6.2.6 the words, "Periodically assess the risk management process to ensure risks continue to be managed throughout the project life cycle." In section 6.3 identified the Table as Table 6.3. Added a new line item (4.1.1) to the reference section and it was, "Schedule Risk Assessment Guide" – MSFC Project Analysis Office (RS40). Added to section 5 a new line item (5.1.1) which was a definition of Schedule Risk Assessment (SRA). Added a new line item for section 6.2 (6.2.9) which says, "The Actionees are Project or Program Manager and Project Analysis Office". Added to section 6.3 SRA to all three Program/Project Types. Added to section 6.3 SRA to the list risk management tools. Corrected section 6.2.8 to say, "S&MA evaluates implementation of risk management requirements in MSFC Programs and Projects. Added cost numbers to section 6.3 with regards to Type I, II and III. In the reference section deleted the 40 after QS for 4.2, 4.3 and 4.4.
Revision	C	10/15/2004	Changed document Revision number "B" to "C". Changed document effective and expiration date to September 1, 2004 and September 1, 2009 respectively. Replaced all references to QS01 with QD01 throughout the document. Changed title of document from Program/Project Risk Management to Program/Project Continuous Risk Management. Changed NPG 7120.5 to NPR 7120.5 and NPG 8000.4 to NPR 8000.4 throughout the document as applicable. Added NPR 9501.5 and NPD 9501.3 to the References. Added Development Model Analysis (DMA) and description under the 5. Definitions and renumbered applicable paragraphs. Changed will be required to shall in section 6.1 as appropriate. Added the word "all" to section 6.2.2 and added the words "the program or project manager shall aggressively implement the risk management plan.", "the selected risk handling tool (risk management database or risk management spreadsheet", "and documented in the risk

			management database or spreadsheet" and changed worksheet to spreadsheet in section 6.2.3. Added the word "shall" and "all risk management" to section 6.2.6. Deleted Systems Management Office section and renumbered Project or Program Manager and Project Analysis Office to 6.2.8. Added S&MA Continuous Risk Management Office 6.2.9 "Evaluates implementation of Continuous Risk Management requirements in MSFC programs and projects. Changed Table 6.3 Type II to include: FMEA, FTA, HA and SRA and Type III to Include: HA and SRA. Changed RM to CRM. Changed will to "shall" in sections 9.1 and 9.2. Changed Flow Diagram section 11 "arranges" to read "schedules" and inserted "the entire", "identifies the risk and" and "S&MA will facilitate this" Added 3.4 NPD 8700.1B, "NASA Policy for Safety & Mission Success" to the Applicable Document section. Changed S&MA Office to S&MA Directorate. Changed all references of Project/Program to Program/Project throughout document. Changed section 6 Instructions to CRM Process Requirements, Roles, Responsibilities and Tools. Deleted FMEA from Table 6.3, Type III. In the References section, paragraphs 4.2, 4.3 and 4.4, changed QS to QD. In section 5, put the definitions in alphabetical order. In paragraph 6.1, changed all the will's to shall. In section 6.2, took out the word "will" throughout the section and replaced it with "shall". In the second sentence of section 6.2.6, I added an "s" to the word "activity". In the sixth sentence of the same section, added the word "risk" after the word "continuous". In section 6.3 in Table 6.3, I added the words "FMEA or FTA" under the heading "Type 111". In section 6.3, changed "will" to "shall". In paragraph 9.1, added the word "shall" before the word "maintain". Added "& Team" to section heads 6.2.1, 6.2.3 and 6.2.7. In paragraph 3.5, changed the title of NPR 8000.4 to Risk Management Procedural Requirements. In paragraph 6.1 the third sentence in the note changed shall to may. In paragraph 5.1 changed the definition of Acceptable Risk. Appendix Z is added to include a risk identification worksheet to aid program/project personnel in identifying risks.
Revision	D	8/4/2005	Changed document Revision number "C" to "D". Added – Section 1 Work Instruction. Added 4.16 NPR 8705.5, "Probabilistic Risk Assessment (PRA) Procedures for NASA Programs and Projects", MPR 3410.1, "Training". ".Added – 5.1 Referenced definitions and improved Definitions 5.1 Acceptable Risks and 5.2 Continuous Risk Management (CRM). Added – 5.10 Independent Assessment (IA). Added – 5.11 Metric. Added – 5.13 Probabilistic Risk Assessment (PRA), Added – 5.14 Program (or Project) Management Council (PMC). Added – 5.15 Risk. Added – 5.16 Risk Assessment. Added – 5.17 Risk Management, Added Risk Mitigation. Added - 5.18 Risk Mitigation: This may be accomplished through engineering changes to design, processes, or procedures; schedule realignment; budget adjustments; or alternate paths and approaches. Added – 5.20 Technical Warrant Holder (TWH). Revised Section 6.1 through 6.4. Added 6-1 through 6.6.4 and Figure 1-1, CRM paradigm and Figure 1-2, CRM Process Overview. Revised – 7. Notes. Revised 8. Safety Precautions and Warning Notes. Added – 9. Records. Changed Training Organization to reflect new organizational title: Learning & Organization Development Office. Also, added to section 9.1 Program/Project Office. Added to section 9.2 by the Program/Project Office. Added – 10. Personnel Training and Certification. Added – 11. Cancellation. Revised and updated – Table 1-1, CRM Roles & Responsibilities for Programs/Projects. Deleted – Responsibility Flow Table. Revised – Appendix Z - Continuous Risk Management Worksheet for Concern/Risk Identification

1. PURPOSE

This Marshall Work Instruction (MWI) establishes the processes and responsibilities for the implementation of an effective Continuous Risk Management (CRM) process at Marshall Space Flight Center (MSFC). Continuous Risk Management is an essential process for managing MSFC's assets and programs, as established by NASA Procedural Requirements (NPR) 7120.5, Program and Project Management Processes and Requirements and NPR 8000.4, Risk Management Procedural Requirements.

2. APPLICABILITY

This MWI applies to all MSFC-managed programs and projects and MSFC's facilities.

3. APPLICABLE DOCUMENTS

3.1 NPD 8700.1, "NASA Policy for Safety & Mission Success"

3.2 NPR 1441.1, "NASA Records Retention Schedules" (NRRS)

3.3 NPR 7120.5, "NASA Program and Project Management Processes and Requirements"

3.4 NPR 8000.4, "Risk Management Procedural Requirements"

3.5 MPR 1410.2, "Marshall Management Directives System"

3.6 MPR 3410.1, **"**Training**"**

3.7 MPR 7120.1, "Program/Project Planning"

4. REFERENCES

4.1 NPD 9501.3, "Earned Value Performance Management"

4.2 NPR 1441.1, "NASA Records Retention Schedules"

4.3 NPR 8705.5, "Probabilistic Risk Assessment (PRA) Procedures for NASA Programs and Projects"

4.4 NPR 8715.3, "NASA Safety Manual"

4.5 NPR 9501.3, "Earned Value Management Implementation on NASA Contracts"

4.6 MPD 1150.1, Charter MC–08, "MSFC Program Management Committee"

4.7 MPR 2810.1, “Security of Information Technology”

4.8 QD–R–001, “Failure Mode and Effects Analysis and Critical Items List”

4.9 QD–R–009, “Reliability Prediction”

4.10 QD–SS–011, “Procedures for Performing Hazard Analysis”

4.11 W.E Veseley, et al., NUREG 0492, Fault Tree Handbook, Government Printing Office, 1981.

4.12 SSP 50431, “Space Station Requirements for Payloads”

4.13 MSFC, Project Analysis Office (RS40) “Schedule Risk Assessment Guide”

4.14 NASA Procurement Notice 97–58, “Risk-Based Acquisition Management”

4.15 Dorofee, Audrey J., et al., Continuous Risk Management Guidebook. Carnegie Mellon University, 1996.

4.16 ISO 17666, “Space Systems – Risk Management”

5. DEFINITIONS

5.1 Acceptable Risk. The risk that is understood and agreed to by the program/project, PMC, Mission Directorate (or Mission Support Office), the Technical Warrant Holders (TWH) (for safe and reliable operations), and other customer(s) sufficient to achieve the defined success criteria within the approved level of resources.

5.2 Continuous Risk Management (CRM). The process that identifies risks; analyzes their impact and prioritizes them; develops and carries out plans for risk mitigation or acceptance; tracks risks and the implementation of plans; supports informed, timely, and effective decisions to control risks and mitigation plans; and ensures that risk information is communicated and documented.

5.3 Developmental Model Analysis (DMA). A conceptual statistical graphic model of the program or project linked to the analytical data (i.e., reliability, cost, and schedule data) to be used as a baseline for the Probabilistic Risk Assessment (PRA) process.

5.4 Failure Mode and Effects Analysis (FMEA). An analysis that examines the conditions that can result in failures of components and the effects of the faults to the system in which they are contained.

5.5 Fault Tree Analysis (FTA). A fault tree analysis is a graphical model of the various parallel and sequential combinations of faults that will result in the occurrence of a predefined undesired top-level event in a system.

5.6 Functional FMEA Approach. The functional FMEA approach is used when hardware items cannot be uniquely identified or when system complexity requires analysis from the initial indenture.

5.7 Hardware FMEA Approach. The hardware FMEA approach is used when hardware items can be uniquely identified from schematics, drawings, and other engineering and design data.

5.8 Hazard Analysis (HA). The determination of potential sources of danger and recommended resolutions for those conditions found in the hardware/software systems, the person/machine relationship, or both, which may cause loss of personnel capability, loss of system, or loss of life or injury.

5.9 Independent Assessment (IA). The general term referring to an evaluation of a program or program/project conducted by experts outside the advocacy chain. The evaluation results in an assessment of the program's or project's readiness (i.e., technical, schedule, cost, and risk) to proceed to the next phase in the lifecycle that is reported to a PMC.

5.10 Metric**.** A measurement taken over a period of time that communicates vital information about a process or activity. A metric should drive the appropriate risk mitigation action.

5.11 Preliminary Hazard Analysis (PHA). The PHA is the foundation on which the rest of the safety analyses and the system safety tasks are built. It documents which generic hazards are associated with the design and operational concept. The PHA provides the initial framework for a master listing of hazards and associated risks that require tracking and resolution during the course of the program design and development.

5.12 Probabilistic Risk Assessment (PRA). A comprehensive, structured, and logical analysis method aimed at identifying and assessing risks in complex technological systems for the purpose of cost-effectively improving their safety and performance in the face of uncertainties. PRA assesses risk metrics and associated uncertainties relating to the likelihood and severity of events adverse to safety or the mission.

5.13 Program (or Project) Management Committee (PMC). One of the hierarchy of forums composed of senior management that assesses program or project planning and implementation and provides oversight and direction as appropriate. These forums are established at the Agency, Mission Directorate, Center, and lower levels.

5.14 Risk. The combination of the probability that a program or project may experience an undesired event and the consequences, impact, or severity of the undesired event, were it to occur. Both the probability and consequences may have associated uncertainties. Some examples

of undesired events include a cost overrun, schedule slippage, safety mishap, health problem, malicious activities, environmental impact, failure to achieve a needed scientific or technological breakthrough, or mission success criteria.

5.15 Risk Assessment. An evaluation of a risk item that determines: (1) what can go wrong, (2) how likely is it to occur, and (3) what the consequences are.

5.16 Risk Management. An organized, systematic decision making process that efficiently identifies, analyzes, plans, tracks, controls, communicates, and documents risk to increase the likelihood of achieving program/project goals.

5.17 Risk Mitigation. The process of applying methods, tools, and resources aimed at eliminating the risk or reducing the likelihood and/or consequence of a risk. This may be accomplished through engineering changes to design, processes, or procedures; schedule realignment; budget adjustments; or alternate paths and approaches.

5.18 Schedule Risk Assessment (SRA). A quantitative analysis of a project's scheduled task durations that provides a range of probable completion dates with the associated probabilities for each. If the schedule is resource loaded, a quantitative cost analysis may also be performed using the schedule data. This cost analysis would provide a range of probable project costs with probabilities for each cost. The SRA could provide the basis for project schedule margin and recommended budgetary reserves.

5.19 Technical Warrant Holder. The person authorized to exercise delegated Technical Authority from the NASA Chief Engineer.

6. INSTRUCTIONS

6.1 The Program/Project Manager shall develop and implement a CRM process that includes integrated risk management planning for all risks associated with program/project safety, cost, schedule, and technical performance and document it in a program/project Risk Management Plan as specified in NPR 7120.5 and NPR 8000.4.

6.2 The NASA CRM process, stated below, is outlined in Figures 1 and 2.

Figure 1. The NASA Continuous Risk Management Process.

6.3 CRM process overview

The following process will be iterated throughout the program/project life cycle.

6.3.1 **Identify**. Develop the risk statements in terms of condition and consequence(s); capture the context of the risk scenario (e.g., what, when, where, how, and why). Tools such as FMEA, PRA, and FTA can be used to identify risks. During engineering product development, risk shall be identified and addressed in the final product as part of a risk management plan, in accordance with systems safety engineering practices.

6.3.2 **Analyze**. Evaluate risk probability, impact/severity, and timeframe (when action needs to be taken); classify/group with similar/related risks; and prioritize. Tools such as PRA can be used to analyze technical risks. The SRA tool can be utilized to assess schedule and cost risks.

6.3.3 **Plan**. Assign responsibility and determine approach (i.e., accept, mitigate, or watch). If risk shall be mitigated, define mitigation level (e.g., action item list or more detailed task plan) and goal and include resource estimates.

6.3.4 **Track**. Acquire/update, compile, analyze, and organize risk data; report results; and verify and validate mitigation actions.

6.3.5 **Control**. Analyze results, decide how to proceed (e.g., accept, mitigate to an acceptable level, replan, close the risk, invoke contingency plans, and/or continue tracking), and execute the control decisions.

6.3.6 **Communicate and Document**. Essential risk status is to be communicated on a regular basis to the entire program/project team and as to the PMC. A system for documentation and tracking of risk decisions shall be implemented.

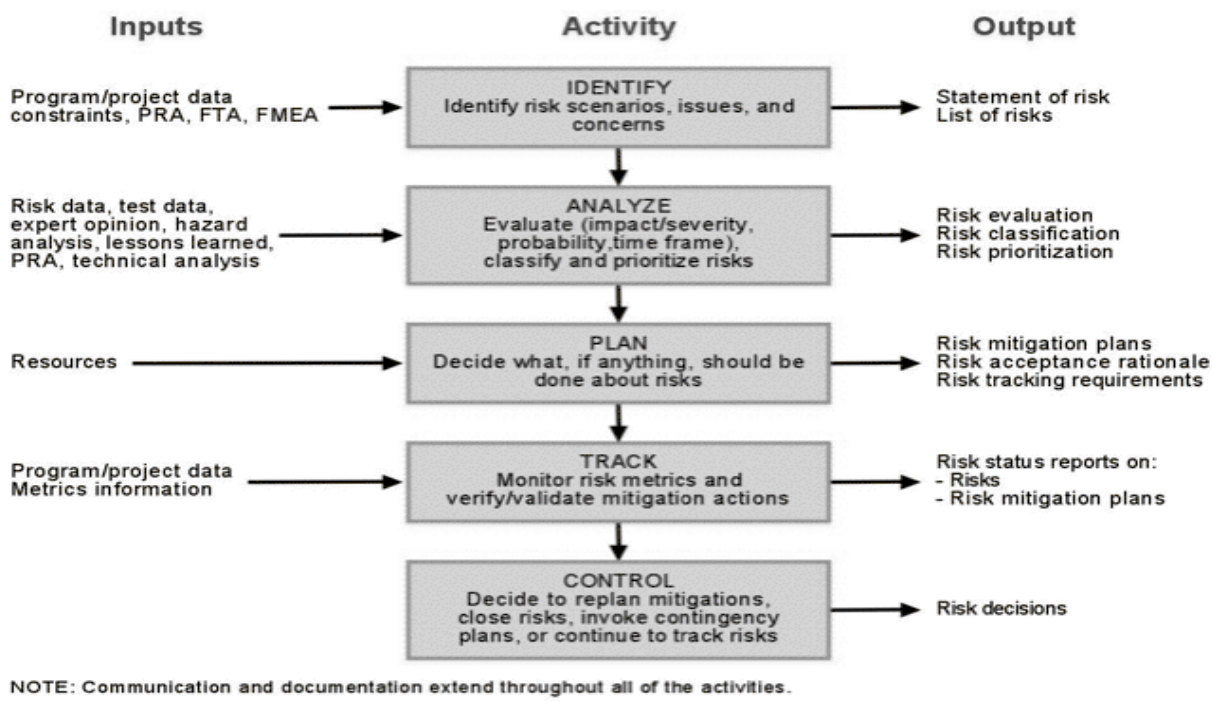

Figure 2. The CRM Process Steps.

6.3.7 Program/Project Managers shall establish safety and mission success activities as a part of the CRM process early in the program/project formulation process.

6.3.8 All programs/projects shall prepare a CRM plan during the program formulation phase. The risk management methods, tools, and level of effort dedicated to CRM may be tailored for each program/project. The project's risk management plan may be a supplement to the program plan.

6.3.9 The Program/Project Risk Management Plan shall include:

6.3.9.1 Risk list generation. This list identifies the risks that impact your program/project.

6.3.9.2 Periodic risk reviews. This review is conducted on a periodic basis to review all risks, risk mitigation, and discuss new risks.

6.3.9.3 Risk Management Review Boards. A major review conducted by the program/project manager to discuss primary risks, risk mitigation, risk roll up, and residual risk issues.

6.3.9.4 Quantitative/qualitative risk assessments. Risk assessment processes (i.e., PRA, FTA, FMEA/CIL, and Hazard Analysis) used to identify program/project risks.

6.3.9.5 Operations risk management. Used to address operational and interface risks.

6.3.9.6 Risk-Based Acquisition Management (RBAM) process. Established NASA requirement for contractors to perform risk management. This is documented in the NASA Federal Acquisition Regulation (FAR) Supplement.

6.3.9.7 Information management systems for problem reporting. This is accomplished through the NASA Problem Reporting and Corrective Action (PRACA) system process or by the program/project corrective action systems.

6.3.9.8 Risk Acceptance. This is a risk that has been fully mitigated with the available resources. The risk has been reduced with regards to likelihood and consequence; however, the risk still remains open and will be tracked accordingly.

6.3.9.9 Risk Closure. This is a risk that has been fully mitigated using the available resources and is no longer a threat to the program/project.

6.3.9.10 Risk surveillance reporting. Risk review process established by the program/project risk implementation plan.

6.3.9.11 Risk supportability data. Data used in the mitigation of program/project risks.

6.3.9.12 Risk trends analyses. Analysis used by program/project risk management to provide early warning of risk escalation and the action necessary for risk mitigation.

6.3.10 All risks shall be documented and communicated throughout the program's life cycle. The results of the risk management process shall be incorporated into the final technical products.

6.3.11 MPR 2810.1 defines the Information Technology Security CRM planning and risk assessment processes and activities.

6.4 Implement a comprehensive risk management decision-making process.

6.4.1 The Program/Project Manager and risk management team members shall develop a Risk Management Plan that meets the program requirements for CRM processes as described in paragraph 6.3.

6.4.2 Risk identification shall involve the entire project team to assess all identifiable risks and project constraints up front. If an IA has been performed, the program/project shall include the risks identified during the assessment as input

6.4.3 The Program/Project Manager shall use the risk management process as a basis for decisions to mitigate cost, schedule, technical, environmental, security, or safety risk. Examples include, but are not limited to, mission success criteria; development schedule; budget limits; launch window and vehicle availability; international partner participation; critical single-source suppliers; security or environmental concerns; human space flight safety issues; "fail ops/fail safe" requirements; facilities and infrastructure limitations; technology readiness; surveillance requirements; and amount and type of testing.

6.4.4 A primary risk is defined as "Those undesirable events having both high probability and high impact/severity." (NPR 8000.4). For each primary risk, the program/project shall develop and maintain the following in accordance with the Risk Management Plan and, as appropriate, in the Program Commitment Agreement (PCA).

6.4.4.1 Description of the risk including primary causes and contributors, actions embedded in the program/project to date to reduce or control it, and information collected for tracking purposes.

6.4.4.2 Identify primary consequences including effects on safety, program/project cost, schedule, and performance should the undesired event occur.

6.4.4.3 Estimate of the probability (qualitative or quantitative) of occurrence together with the uncertainty of the estimate. The probability of occurrence should take into account the effectiveness of any implemented risk mitigation measures.

6.4.4.4 Characterization of the risk as "acceptable" or "unacceptable" with supporting rationale.

6.4.4.5 Characterization of a primary risk as "acceptable" shall be supported by the rationale, with the concurrence of the PMC, that all reasonable mitigation options (within cost, schedule, and technical constraints) have been instituted. Moreover, the PMC shall concur that, given the risks and their impact on the probability of the program/project meeting its requirements, the expected value of the program/project is still sufficient to justify the costs of undertaking it.

6.4.4.6 The risk management strategy summarizes the approach to be used for the program/project, including appropriate actions to mitigate risk, program descope plans, and identification of primary risks.

6.4.7 Throughout the execution of a program/project requiring Earned Value management (EVM), the Program/Project Manager shall ensure that the results of all analysis based on EVM are linked to the Risk Management Plan of the program/project (as applicable). All cost and/or schedule risks being managed by the Program/Project Manager should utilize EVM analysis and

other management tools to track, manage, and mitigate the risks. For programs/projects not requiring EVM (contract or in house), data that is utilized to assess performance should be used to track, manage, and mitigate the risks.

6.5 CRM Program Management Responsibilities

Table 1 outlines the appropriate section, roles, and responsibilities of CRM actions to be taken when implementing CRM into programs/projects.

Table 1. CRM Roles and Responsibilities for Programs/Projects.

Actionee		Action
Program/Project Manager	6.5.1	Shall ensure that CRM training is provided to all program/project personnel.
Program/Project Manager and Team	6.5.2	The program/project plan shall define the scope of the CRM activities including any program/project tailoring of the CRM process defined in NPR 7120.5 and NPR 8000.4. It shall also define the program/project acceptable risk and the type of program/project for minimum tool usage requirements (section 6.3).
Program/Project Manager and Team	6.5.3	Shall prepare a CRM plan that contains roles and responsibilities and a schedule for CRM process implementation, methods, and tools. Shall present the CRM process and plan to the PMC during the approval phase as outlined in NPR 7120.5 and NPR 8000.4. After the CRM process and planning are approved, the program or Program/Project Manager shall aggressively implement the Risk Management Plan. All prior risk processes and risk statements shall be promptly transitioned to the selected risk-handling tool (i.e., risk management database or risk management spreadsheet) to be handled in accordance with the approved plan. Lessons learned data, expert opinion, and technical analyses shall be used as an input to evaluate, classify, and prioritize risk. HA, FMEA, PRA, and FTA shall be used to identify and analyze risk as required by section 6.3. Risk mitigation plans, risk acceptance rationale, and tracking requirements shall be identified and documented in the risk management database or spreadsheet. The results of this process shall be documented on a risk information sheet or an equivalent spreadsheet or database. A sample risk information sheet is supplied in Appendix Z. The reporting requirements shall be specified in the CRM plan.

Program/Project Manager and Team	6.5.4	Shall routinely monitor risk metrics to verify the effectiveness of the mitigating actions. The metrics shall be used to decide whether to close the risk area or to modify the mitigation plan. The status of risk areas shall be reported as required by the CRM plan.
Program/Project Manager and Team	6.5.5	Shall ensure that program/project personnel are trained and equipped in the use of SRA tools and techniques. Shall support the program/project as requested in performing periodic SRA assessments.
Risk Management Review Board	6.5.6	A major review conducted by the program/project manager to discuss primary risks, risk mitigation, risk roll up, and residual risk issues. This board shall meet on a periodic basis as determined by the program/project risk manager. This board shall: • Review risk status and mitigation plans. • Identify and discuss new risks. • Approve risk mitigation and status. • Publish risk review findings for the program/project.
PMC	6.5.7	In the approval phase, the PMC shall evaluate/concur with program/project CRM process and planning including the defined level of acceptable risk, the identification of the program/project type, and the scope of analysis for PRA, FMEA, FTA, and HA, as appropriate. If the PMC approves the use of CRM tools that are not compliant with this MWI, the Program/Project Manager shall submit a waiver/deviation request that shall be processed in accordance with Marshall Procedural Requirements (MPR) 1410.2.
Safety and Mission Assurance (S&MA)	6.5.8	S&MA shall provide all risk management activities upon request from the Program/Project Manager. S&MA shall provide CRM training to the program/project. S&MA shall act as the CRM facilitator of the program/project risk activities. S&MA shall provide input and guidance into the development of the CRM plan. Shall provide input in the development of the risk statements, risk analysis, and the risk mitigation plans. Organizations supporting programs/projects shall support the respective team as specified in the CRM plan, which may include all or part of the activities described above. S&MA Shall periodically assess the CRM process to ensure that risks continue to be managed throughout the program/project life cycle. Shall evaluate implementation of CRM requirements in MSFC programs and programs/projects.
Procurement Office	6.5.9	Shall ensure that CRM is included in acquisition planning, as required by reference 4.14.

6.6 Continuous Risk Management Tools

6.6.1 For CRM purposes during the formulation phase of a program or project, the type of CRM tools shall be selected. Table 2 specifies the minimum application of CRM tools required for a given type of program/project.

Table 2. CRM Tools for Program/Project Type Procedural Requirements.

CRM Tools	Type I	Type II	Type III
The application of CRM Tools for a program/project	PRA FMEA FTA HA SRA	FMEA * FTA HA SRA	HA SRA FMEA** or FTA

* An FMEA may be prepared in lieu of an FTA if the risk analyst determines that the system is simple enough where concurrent faults will not affect the assessment.

**For programs/projects that do not plan to develop hardware, an FMEA shall not be required.

6.6.2 Program/Project Type Procedural Requirements

6.6.2.1 Type I – High national prestige: high complexity, or high cost, or long program/project life. Research, Development, Test and Evaluation (RDT&E) projects with values of $70 million or more and a period of performance exceeding one year. Also, production projects with values of $300 million or more.

6.6.2.2 Type II – Moderate national prestige: medium to high complexity, or medium cost, or medium program/project life. RDT&E projects with values greater than $25 million, but less than $70 million and a period of performance exceeding one year. Also, production projects with values greater than $70 million but less than $300 million

6.6.2.3 Type III – Little national prestige: low complexity, or low cost, or short program/project life. RDT&E projects with values greater than $2 million but less than $25 million and a period of performance exceeding 6 months.

6.6.3 The documents referenced in section 4 provide detailed instructions on the preparation of PRA, FMEA, FTA, SRA, and HA, and they also provide information on other types of CRM tools. These analysis/decision tools shall be utilized when risks are being identified and analyzed. In the formulation and approval phases of a program/project, the system architecture should be in a conceptual form so the detail of the risk assessment may not be as mature as when the program/project is in the implementation phase.

6.6.4 Figure 3 provides some guidance on how to apply these maturity tools to each project type. The scope and the preparing organization of the analyses shall be identified in the CRM

plan or program/project plan. The PMC shall concur with the scope of analysis that is specified in the plan. The analyses using the CRM tools shall be updated as the system or hardware changes or matures.

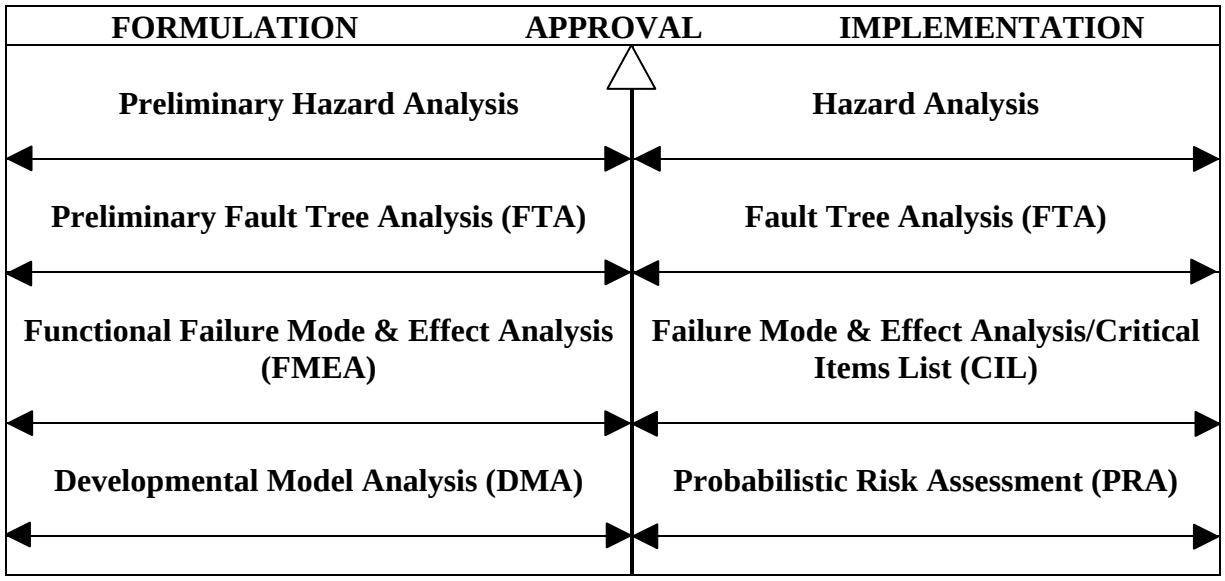

Figure 3. Program/Projects Risk Maturity Tools

7. NOTES

None

8. SAFETY PRECAUTIONS AND WARNING NOTES

None

9. RECORDS

9.1 The Program/Project Office shall maintain the following risk management records as part of their program/project files (per NPR 7120.5):

9.1.1 CRM Plan. Defined by the program/project on how the program/project will implement a risk management process.

9.1.2 Risk Analysis/Risk Information Sheets (or equivalent). This report documents key risks context information to include: risk likelihood, consequence, mitigation plan, risk statement, risk owner, etc.

9.1.3 Risk Mitigation Plans. This document identifies the mitigation process to reduce or eliminate the risks.

9.1.4 Risk Area Action Closures. This documents the formal closure of a risk.

9.1.5 Top Risk Matrix Report. This report covers the top risks as defined by the program/project.

9.2 CRM Training Records. The Learning & Organization Development Office shall maintain the NASA CRM training records (per MPR 3410.1, "Training") throughout the life of the program/project. After the conclusion of the program or project, the CRM records shall be dispositioned as specified in the program/project plans and in accordance with NRRS 1/120/E [1711].

10. PERSONNEL TRAINING AND CERTIFICATION

All civil service and contractor personnel that participate in risk management activities shall be trained in the NASA CRM training or similar NASA-approved training provided by the contractor. CRM training for program/project teams or groups of individuals is available upon request through the S&MA Directorate/QD40.

11. CANCELLATION

MWI 7120.6C dated October 15, 2004

Original signed by
Robin N. Henderson for

David A. King
Director

APPENDIX Z: Guidance

Continuous Risk Management Worksheet Concern/Risk Identification

Condition:				**Consequence:**					
Risk Statement (Title):									
Risk Description (Risk Context):									
Impact/Consequence to Program or Project:									
Risk Owner (RO):	**Phone No.**	**Organization:**	**Timeframe:**	**Likelihood**		**Cost**	**Schedule**	**Technical**	**Safety**
Schedule Milestone(s) Affected:		**Initiative Affected:**			**X**				
Closure/Acceptance Criteria:									
Closure/Acceptance Rationale:									
Current Status:									

Handling Plan

Mitigation Plan Overview:						
Mitigation Task No.	**Task Description**	**Initiative**	**Individual**	**ECD**	**ACD**	**Success Criteria**

Figure Z.1. Continuous Risk Management Worksheet for Concern/Risk Identification.

APPENDIX Z: Guidance (Continued)

Continuous Risk Management Worksheet Terms and Definitions	
Term	**Definition**
Condition	A single phrase briefly describing current key circumstances, situations, etc. that are causing concern, doubt, anxiety, or uncertainty.
Consequence	A single phrase or sentence that describes the key, negative outcome(s) of the current conditions.
Risk Statement (Title)	The risk statement is a combination of the condition statement and the consequence statement. It becomes the risk title.
Risk Description	This statement is a short paragraph that describes the risk and how it affects the program or project
Impact/Consequences to PROGRAM OR PROJECT	This statement is a short paragraph that describes the Impact or consequences to the program or project if the risk is allowed to occur.
Risk Owner	The name of the individual responsible for managing the risk.
Phone Number	The phone number of the individual responsible for managing the risk.
Organization	The organization is the program or project organization responsible for managing the risk.
Timeframe	The amount of risk handling/mitigation time when action should be taken to handle the risk or implement the mitigation plan. The three timeframe periods and theories are: near, midterm, and far. Program/project risk management plans define each time frame.
Likelihood	The likelihood the situation or circumstances will occur in the program or project.
Cost	Cost is a consequence value associated with a risk to the program or project budget drivers.
Schedule	Schedule is a consequence value associated with a risk to the program or project schedule drivers.
Technical	Technical is a consequence value associated with a risk to the program or project technical drivers.
Safety	Safety is a Consequence value associated with a risk to the program or project safety drivers.
Closure Acceptance Criteria	Closure acceptance criteria provide detailed information on criteria necessary needed to close out the risk.
Closure Acceptance Rationale	Closure rationale text box provides detailed information on rationale used to close out the risk.
Mitigation Plan Terms Defined	
Current Status	The current status provides details on the status of the risk.
Mitigation Plan Overview	This statement is a short paragraph that describes the mitigation plan for the risk.
Mitigation Task No.	This number describes sequence of mitigation task action plan for mitigating the risk.
Task Description	This statement describes the mitigation task action plan for mitigating the risk.
Initiative	The Initiative is the program or project organization responsible for managing the risk.
Individual	The name of the individual responsible for accomplishing the mitigation task of this risk.
ECD	Estimated Completion Date. The estimated date on completing the mitigation task of this risk.
ACD	Actual Completion Date. The actual date on completing the mitigation task of this risk.
Success Criteria	The minimum set of measures that establish the accomplishment of the mitigation task.