NASA Policy Directive

NPD 8720.1C
Effective Date: April 18, 2008
Expiration Date: April 18, 2023

COMPLIANCE IS MANDATORY

Printable Format (PDF)

Request Notification of Change (NASA Only)

Subject: NASA Reliability and Maintainability (R&M) Program Policy (Revalidated with change 2)

Responsible Office: Office of Safety and Mission Assurance

CHANGE LOG

Change No.	Date	Description
1	04/16/13	Revalidated with changes to incorporate NPR 1400.1 requirements, and added some references.
2	04/06/18	Revalidated with changes to update applicable documents/references, remove requirement links, and make text syntax consistent with current NPR language.

1. POLICY

a. It is NASA policy for all programs and projects to accomplish the following during all phases of development and operations commensurate with an ongoing pursuit of improved safety and mission success:

(1) Establish, document, and implement--

(a) System R&M design and operational performance requirements (qualitative and quantitative).

(b) System maintenance concepts, including, but not limited to, maintenance requirements, schedule, and responsibilities.

(c) R&M engineering, analysis, testing, and maintenance activities addressing hardware, software, firmware, and human elements.

(d) Timely and continuous assessment of compliance with the R&M requirements and the continuous identification of areas for improvement.

(e) Integration of R&M engineering activities with systems engineering, risk management, and other processes, assessments, and analyses including, but not limited to, safety, security, quality assurance, logistics, probabilistic risk assessment, life-cycle cost, configuration management, and maintenance.

(2) Share R&M data and experience for use as heritage data in support of current, follow-on, and new programs or projects.

2. APPLICABILITY

a. This NPD is applicable to NASA Headquarters and NASA Centers, including Component Facilities and Technical and Service Support Centers. This NPD applies to the Jet Propulsion Laboratory, a Federally Funded Research and

Development Center, other contractors, recipients of grants, cooperative agreements, and other agreements only to the extent specified or referenced in the contracts, grants, and agreements.

b. This NPD does not apply to facility projects. For implementation of R&M on facilities see NPD 8831.1, NPR 8820.2, and NPR 8831.2.

c. 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.

d. In this directive, all document citations are assumed to be the latest version unless otherwise noted.

3. AUTHORITY

NPD 8700.1, NASA Policy for Safety and Mission Success.

4. APPLICABLE DOCUMENTS

a. NPD 8831.1, Maintenance and Operations of Institutional and Program Facilities and Related Equipment.

b. NPR 8820.2, Facility Project Requirements (FPR).

c. NPR 8831.2, Facilities Maintenance and Operations Management.

d. NASA-STD-8729.1, NASA Reliability and Maintainability (R&M)Standard For Spaceflight and Support Systems

5. RESPONSIBILITY

a. The Chief, Safety and Mission Assurance:

(1) Oversees the implementation of R&M activities to assure that they are properly implemented on all Agency programs and projects.

(2) Oversees, by use of audits or other measures, the performance of the R&M design and operational requirements in all major programs and project.

(3) Informs Mission Directorate Associate Administrators regarding the performance of the R&M design and operational requirements in all major programs and projects under their cognizance.

b. Mission Directorate Associate Administrators shall:

(1) Evaluate the effectiveness of R&M activities and the R&M performance measures of programs and projects under their cognizance.

(2) Ensure that R&M data and experience are shared across programs and projects.

c. Program managers shall:

(1) Ensure that program-level R&M design and operational performance requirements (qualitative and quantitative) are established.

In addition to reliability performance measures, R&M requirements should address availability measures where applicable.

(2) Ensure that project-level system R&M design and operational performance requirements (qualitative and quantitative) are allocated and coordinated such that they are consistent with program-level R&M requirements.

(3) Assess the compliance with program-level R&M requirements, including the identification of areas for improvement, in a timely and continuous manner.

(4) Identify and pursue opportunities for collaboration between projects.

(5) Ensure the allocation of funding for R&M activities (including staffing, tools, and training) required to achieve compliance with R&M policies by the program.

(6) Ensure that R&M data and experience are shared across projects.

d. Project managers shall:

(1) Integrate all R&M activities with systems engineering, risk management, and other processes, assessments, and analyses including, but not limited to, safety, security, quality assurance, logistics, probabilistic risk assessment, life-cycle cost, configuration management, and maintenance.

(2) Establish a maintenance framework and approach early in the system's development.

(3) Ensure that compatibility is sustained among system design, maintenance planning, and logistics support activities.

(4) Establish and maintain a repository of R&M data and analyses that provides a basis for the assessment of R&M performance measures throughout the system's life cycle.

(5) Coordinate with the Center Safety and Mission Assurance (SMA) functional manager to ensure that R&M data is available for use as heritage data.

(6) Ensure that system R&M design and operational performance requirements (qualitative and quantitative) are established.

Note: In addition to reliability performance measures, R&M requirements should address availability measures where applicable.

(7) Ensure that R&M activities (addressing hardware, software, firmware, human elements, and interactions between them) are planned and implemented. R&M activities include, but are not limited to, requirements specification, failure mode identification, design validation, data collection, quantitative and qualitative modeling and analysis, and testing and demonstration (and the management of these activities). Guidance on R&M program management is provided in NASA-STD-8729.1.

(8) Ensure that R&M activities of contractor organizations are subject to requirements that enable compliance by programs and projects with applicable R&M policies and requirements.

(9) Ensure the availability of credible R&M data and analyses to support the assessment of compliance with R&M requirements.

(10) Assess the compliance with the R&M requirements, including the identification of areas for improvement, in a timely and continuous manner.

(11) Allocate funding for R&M activities (including staffing, tools, and training) required to achieve compliance by projects with R&M policies.

e. The Center SMA functional manager (as defined in NPD 8700.1) shall ensure that R&M data is available for use as heritage data to support the formulation of R&M goals and requirements, quantitative and qualitative reliability analysis, and other R&M engineering activities as part of current, follow-on, or new programs and projects, both at the local Center, and other Centers.

6. DELEGATION OF AUTHORITY

None.

7. MEASUREMENTS/VERIFICATION

Compliance with the requirements contained in this NPD is continuously monitored by the Centers and by the SMA Technical Authority. Compliance may also be verified as part of selected life cycle reviews, and by assessments, reviews, and audits of the requirements and processes defined within this NPD.

8. CANCELLATION

NPD 8720.1B, NASA Reliability and Maintainability (R&M) Program Policy, dated April 29, 2004.

REVALIDATED APRIL 06, 2018, WITH CHANGE 2, ORIGINAL SIGNED BY:

/s/ Michael D. Griffin
Administrator

ATTACHMENT A: REFERENCES

A.1 NPD 1200.1, NASA Internal Control.

A.2 NPD 1210.2, NASA Surveys, Audits, and Reviews Policy.

A.3 NPR 8705.6, Safety and Mission Assurance, Audits, Reviews, and Assessments.

(URL for Graphic)

None.

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