GLENN PROCEDURAL REQUIREMENTS

Directive: GLPR 1280.1C
Effective Date: **10/21/2021**
Expiration Date: **10/21/2026**

COMPLIANCE IS MANDATORY

Responsible Office: Q/Safety and Mission Assurance Directorate

Subject: Glenn Research Center Quality Manual w/Change 2 (02/09/2024)

TABLE OF CONTENTS

Preface

P.1 Purpose

a. To ensure NASA Glenn Research Center (GRC) customers receive products and services of high quality and to facilitate continual improvement, GRC has established a Quality Management System (QMS) that is compliant with the NASA Policy Directive (NPD) 1280.1 and corresponding Glenn Policy Directive (GLPD) 1280.1, and the American National Standard Quality Management Systems Requirements/International Organization for Standardization, (ANSI/ISO/ASQ) Q9001 standard, and the Society of Automotive Engineers (SAE) Aerospace (AS) 9100 standard.

b. This Glenn Procedural Requirements (GLPR) document describes the scope, requirements, and responsibilities for implementing the QMS at GRC. It also references other GRC directives and procedures, which provide additional QMS implementation requirements and guidance.

P.2 Applicability

a. This directive, and related documents, apply to all GRC employees, including contractors as it pertains to the implementation of GRC's aeronautics and space program and project plans.

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

c. This GLPR is applicable to all organizations at GRC Lewis Field and Neil A. Armstrong Test Facility.

d. This GLPR is applicable to documents developed or revised after the effective date of this GLPR.

e. In this GLPR, all mandatory actions (i.e., requirements) are denoted by statements containing the term "shall." The term "may" denotes a discretionary privilege or permission, "can" denotes statements of possibility or capability, "should" denotes a good practice and is recommended, but not required, "will" denotes expected outcome, and "are/is" denotes descriptive material.

P.3 Authority

a. NASA Policy Directive (NPD) 1280.1, NASA Integrated Management System Policy

b. NPD 8730.5, NASA Quality Assurance Program Policy

c. Glenn Policy Directive (GLPD) 1280.1, NASA Glenn Quality Management System Policy

P.4 Applicable Documents and Forms

a. ANSI/ISO/ASQ Q9001, American National Standard, Quality Management Systems Requirements

b. ANSI/ISO/ASQ Q9000, American National Standard, Quality Management Systems

Fundamentals and Vocabulary

c. ANSI/Electronic Industries Alliance (EIA) - EIA-649, National Consensus Standard for Configuration Management

d. ANSI/EIA-649-2, Configuration Management Requirements for NASA Enterprises

e. SAE AS9100, Quality Management Systems - Requirements for Aviation, Space and Defense Organizations

f. Federal Acquisition Regulations (FAR) 7.3, Contractor Versus Government Performance

g. FAR 7.5, Inherently Governmental Functions

h. FAR 46 and NFS 1846, Quality Assurance

i. FAR 49 and NFS 1849, Termination of Contract

j. FAR 52 and NFS 1852, Solicitation Provisions and Contract Clauses

k. FAR and NFS Subchapter G, Contract Management

l. Office of Management and Budget (OMB) Circular A-76 - Explanation and Discussion of the Recently Revised Federal Outsourcing Policy

m. OMB Circular A-123 - Management's Responsibility for Internal Control

n. NPD 1900.9, Ethics Program Management

o. NASA Procedural Requirements (NPR) 7120.5, NASA Space Flight Program and Project Management Requirements

p. NPR 7120.8, NASA Research and Technology Program and Project Management Requirements

q. NPR 7123.1, NASA Systems Engineering Processes and Requirements

r. NPR 8000.4, Agency Risk Management Procedural Requirements

s. NPR 9420.1, Budget Formulation

t. GLPD 1000.1, GRC Governance and Strategic Management Structure

u. GLPD 1280.1, NASA Glenn Quality Management System Policy

v. GLPR 1310.1, New Business Pursuit Process

w. GLPR 1410.1, Glenn Directives Management

x. GLPR 1420.1, Forms Management Program

y. GLPR 1440.1, Records Management

z. GLPR 5100.1, Procurement

z. GLPR 7120.5.10, GRC Space Flight Project Management Requirements and Best Practices

aa. GLPR 7120.5.30, Space Assurance Requirements

bb. GLPR 7120.5.50, Implementation – Experimental Testing

cc. GLPR 7120.8, GRC Research and Technology Project Management Procedure

dd. GLPR 7123.2, Systems Engineering for Flight and Ground Systems

ee. GLPR 7123.35, Glenn Research Center (GRC) Project Technical Review Procedure

ff. GLPR 7123.36, Engineering Review Board (ERB) Procedure

gg. GLPR 8000.4, Risk Management

hh. GLPR 8553.1, Glenn Research Center Environmental Management System

ii. GLPR 8730.6, Control of Measuring and Test Equipment

jj. GLPR 8739.1, Software Assurance

kk. Glenn Charter (GLC)-HRC-1000.1, GRC Human Resources Council

ll. (GLC)-MSC-1000.1, Mission Support Council

mm. GLC-SAC-CRB-8000.4, Center Risk Board

nn. Glenn Handbook (GLHB)-T-2190.1, Export Control Handbook

oo. Glenn Manual (GLM)-FE-8500.1, GRC Environmental Programs Manual

pp. Glenn Procedure (GLP)-FF-8072.1, Hardware Manufacturing Process

qq. GLP-FT-8080.17, Planning and Execution of a Ground Test Project

rr. GLP-Q-1280.2, Corrective and Preventive Action

ss. GLP-QS-1800.1, NASA Glenn Occupational Health Program Manual

tt. GLP-QS-8715.1, NASA Glenn Safety Manual

uu. Glenn Work Instruction (GLWI)-CH-1280.1, Procurement Division Preventive and Corrective Action Procedures

vv. GLWI-M-7120.1, Space Flight Systems (SFS) Project Review Board (PRB) Review Process

ww. GLWI-QB-9980.1, Internal Audit Work Instructions

xx. GLWI-QEA-8730.7, Qualified Suppliers List

P.5 Measurement/Verification

The requirements in this document will be verified by:

a. Official records from the meetings and reviews conducted per the GRC Governance Councils.

b. The performance of the GRC Internal Audit Program.

c. The third-party audits conducted once a year.

P.6 Cancellation

This GLPR cancels GLPR 1280.1B, Glenn Research Center Quality Manual w/Change 5 (05/11/2021), dated May 12, 2016.

Signature on file

Laurence A. Sivic
Associate Director

Chapter 1. Context of the Organization

1.1 The Organization and its Context

The NASA has defined the external and internal requirements that shape the way NASA plans and conducts its missions and operations. The Agency has established a Strategic Management System, which consists of a set of policy documents and processes to ensure components of NASA are aligned with its strategic goals and direction; programs and supporting functions are executable; and that progress toward plans is measurable. The Agency's planning phase is a continuous process of assessment and adjustment of NASA's mission objectives at both the strategic and detailed levels to reflect national priorities, Congressional guidance, other stakeholder input, and to take into account applicable emerging trends. (Refer to NPD 1000.0.)

1.2 Needs and Expectations of Interested Parties

1.2.1 The GRC has established a process for identifying specific stakeholders, and documenting their requirements and expectations, as part of the program and project technical planning process. These stakeholder expectations are established and maintained throughout the program/project lifecycle to ensure that program/project products and systems meet applicable requirements. (Refer to GLPR 7123.2)

1.2.2 A listing of interested parties is retained by the Chief of Staff.

1.3 Scope of the Quality Management System

The GRC QMS scope encompasses the design, testing, development, production, and installation of flight and research hardware, software, associated ground equipment and facilities.

1.4 Quality Management System and its Processes

1.4.1 The identification, development, and management of the procedures required to successfully manage the full life cycle of GRC's programs and projects shall be established within GRC's governance structure. The Center Management Council (CMC) oversees this process (Appendix E).

1.4.2 The GRC QMS is comprised of policies and procedures designed to establish quality requirements and implement effective controls to ensure our products and services adhere to customer, statutory and regulatory mandates, our quality policy, and GRC strategic goals and objectives.

1.4.3 The QMS also includes the identification of GRC's key processes and their sequence and interactions well as the governance structure that manages these processes and the supporting process interaction. Metrics are established at various levels to ensure process and quality goals are achieved. Audits and assessments are conducted to monitor critical activities for compliance and effectiveness. Corrective and preventive actions are tracked as well as other performance data analyzed. Results of these assessments are reported to senior management, through various management reviews, to measure process effectiveness and enable continual improvement of Center processes and products.

1.4.4 The QMS is a system of planned activities established to provide evidence of compliance to the

requirements of applicable regulations, codes, standards, specifications, drawings, and the GRC Quality Policy and Quality objectives. These activities are governed by procedures and written instructions supported with records of objective evidence of satisfactory compliance. GRC organizations shall establish measures to implement the requirements contained in this GLPR. This includes the preparation of procedures and documentation that assures compliance with the GLPR, and continual improvement of these processes.

1.4.5 The range and detail of the procedures that form part of the QMS depend on the complexity of the work, the methods used, and the skills and training needed by personnel involved in carrying out the activity. Procedures may make reference to work instructions that define how an activity is performed.

Chapter 2. Leadership

2.1 Leadership and Commitment

2.1.1 The GRC management is responsible for implementing, maintaining, and improving the QMS, and ensuring compliance of its policies and procedures.

2.1.2 Senior management shall:

a. Maintain the integrity of the QMS while changes are implemented.

b. Ensure that Center resources needed to meet customer requirements and to implement, maintain, and improve the QMS, are available.

c. Establish goals, metrics, and/or targets of the core processes that fulfill the Center's mission.

d. Measure product conformity and on-time delivery performance and take appropriate action if planned results are not, or will not be, achieved.

e. Ensure that customer requirements are determined and are met with the aim of enhancing customer satisfaction (Chapter 7).

2.1.2 Customer Focus

Customer requirements shall be established at relevant places within the product realization processes referenced in Appendix C, Figure 1,and at various levels of product development and documented in specific project plans.

2.2 Quality Policy

2.2.1 The GRC quality policy is:

a. Documented in GLPD 1280.1, NASA Glenn Quality Management System Policy.

b. Communicated throughout the organization via employee training and quality reviews with management and accessible to employees through the Business Management System (BMS) Library.

2.2.2 The GRC management shall be responsible for ensuring the quality policy is understood, implemented, and maintained at all levels of the organization.

2.3 Organizational Roles, Responsibilities, and Authorities

2.3.1 The GRC maintains responsibility for conformity to customer, statutory, and regulatory requirements.

2.3.2 The Center QMR

The GRC Director has delegated the authority to the Director of Safety and Mission Assurance

Directorate as the Center Quality Management Representative (QMR). The Center QMR shall:

a. Ensure that:

(1) A QMS is established, implemented, and maintained.

(2) The QMS compliance to ISO 9001 and AS9100 standards.

(3) Promotion and awareness of customer requirements throughout the Center.

b. Report to senior management on the performance and effectiveness of the QMS, and where improvements and/or opportunities for improvement are needed.

c. Resolve matters pertaining to quality.

2.3.2 The GRC management shall:

a. Be responsible for:

(1) Defining the processes needed for the QMS and their application throughout their organization.

(2) Defining the sequence and interaction of these processes.

(3) Defining criteria and methods needed for monitoring, measuring, and, where applicable, analyzing the operation and control of these processes to determine their effectiveness.

b. Ensure:

(1) The availability of resources and information necessary to support the operation and monitoring of these processes.

(2) Implementing actions necessary to achieve planned results and continual improvement of these processes.

2.3.3 Each GRC directorate shall:

a. Manage their respective QMS processes in accordance with the requirements of this GLPR.

b. Ensure control over such processes in accordance with GRC contract management requirements and GLPR 5100.1, Procurement, where a directorate chooses to outsource any process that affects product conformity to requirements

2.3.3 The GRC employees shall be responsible with fulfilling the GRC Quality Policy and adhering to the requirements of the QMS.

2.3.4 Documentation

a. Process and procedural documentation describe the responsibilities of employees involved in the subject process or procedure.

b. Individual performance plans also describe an employee's responsibilities and performance metrics. Responsibilities and level of authority are described in individual position descriptions.

c. Organizational charters shall follow GLPR 1150.1, Establishing Glenn Reseash Center Councils, Boards, Committees, Working Groups, and Teams, and can be found in the BMS Library.

Chapter 3. Planning

3.1 Actions to Address Risks and Opportunities

3.1.1 Risk management shall be implemented per GLPR 8000.4, GRC Risk Management, which defines the requirements for identifying, analyzing, communicating, and managing institutional and program/project risks. The procedure addresses the application of continuous risk management and risk-informed decision making to the safety, technical, cost, and schedule mission execution domains throughout the life cycle of institutional and program/project activities, including acquisition.

3.1.2 A risk management plan shall be generated in compliance with the GLPR 8000.4.

3.1.3 The Center conducts an annual assessment of the effectiveness of the internal controls for the Center's activities. The primary purpose of this annual assessment is to identify major risks of the internal controls and plans to mitigate the risks. This assessment is the foundation for the Center's Statement of Assurance over internal controls, based on the Office of Management and Budget (OMB) Circular A-123, Management's Responsibility for Internal Control.

3.1.4 The Center Risk Board is established to help senior management to address major institutional risks and perform effective risk management across GRC and is governed by charter GLC-SAC-CRB-8000.4, Center Risk Board.

3.2 Quality Objectives and Planning to Achieve Them

3.2.1 The Quality Objectives shall be measurable and consistent with GLPD 1280.1, and include core processes that are:

a. Established by senior management at the Strategic Advisory Council (SAC) to align GRC deliverables with customer requirements and the GRC quality policy.

b. Comprised of targeted goals and metrics, and collectively these goals and metrics represent GRC quality objectives.

c. Reviewed annually in the beginning of the fiscal year by the GRC Governance Councils (SAC, Center Management Council, and GRC Collaborations, Partnerships and New Business Council (CPNBC)).

3.2.2 Quality planning is an inherent responsibility of GRC management. Quality will be incorporated into GRC key processes (Appendix C); critical and complex activities, as defined in Appendix A, shall include the following:

a. Quality objectives and requirements for the product.

b. Identification of the processes, documents, and resources needed for the product.

c. Required verification, validation, monitoring, inspection, and test activities specific to the product

and the criteria for product acceptance.

d. Documented information needed to provide evidence that the design, development, and test processes, and the resulting products meet requirements.

e. Identification of resources to support operation and maintenance of the product.

3.2.3 Quality objectives for programs/projects are established and tracked through the normal flowdown of programmatic (mission) goals/objectives into the program/project planning. GLPR 7120.5.10, GRC Space Flight Project Management Requirements and Best Practices, requires projects to develop a Project Plan and a Safety and Mission Assurance Plan (SMAP).

3.2.4 Quality plans may be in the form of a reference to the appropriate documented procedures that are part of the GRC QMS.

3.3 Planning of Changes

3.3.1 Glenn Policy Directive (GLPD) 1000.1, GRC Governance and Strtegic Management Structure, shall establish the strategic management and governance structure for the GRC.

3.3.2 The Center utilizes a council hierarchy approach for its governance structure. Governance refers to how the Center executes and evaluates its programmatic and institutional activities in a manner that meets the strategic investment strategies and goals of the Center and of the Agency. (Refer to Section 6.3, Management Review.)

Chapter 4. Support

4.1 Resources

4.1.1 General

a. Planning, allocation, and evaluation of resources are important activities within the GRC governance process. Specific requirements and direction are provided in the following documents:

   (1) GLPD 1000.1, GRC Governance and Strategic Management Structure

   (2) NPR 9420.1, Budget Formulation

b. Congress appropriates NASA funding resources and NASA Headquarters determines GRC funding by examination of programmatic and institutional needs.

4.1.2 People

The GRC management shall determine, provide, and maintain personnel suitable for operation of processes and adherence to requirements.

4.1.3 Infrastructure

4.1.3.1 Senior management shall determine, provide, and maintain the infrastructure needed to achieve conformity to product requirements. Within the GRC's governance structure, the Mission Support Council (MSC) oversees and manages the Center institutional infrastructure needed to fulfill Center objectives and customer requirements. The MSC charter is documented in GLC-MSC-1000.1, GRC Mission Support Council.

4.1.3.2 The Facilities Utilization and Readiness Review Board (FURrB) and the Facilities Utilization Officer (FUO), as defined in GLC-MSC-FURrB-8800.1, and established in GLPD 1000.1, and with support from the Space Management Committee (SMC) Co-Chairs, Directorate Space Management representatives, and building managers, will assess the needs of the Center to optimally allocate available NASA facilities to meet its programmatic and institutional requirements.

4.1.4 Environment for the Operation of Processes

a. Work Environment. Work environment requirements shall be determined and managed in accordance with GRC's Safety, Occupational Health, and Environmental Management Systems, to ensure conformity to product and personal safety, and quality:

   (1) GLPR 8553.1, Glenn Research Center Environmental Management System

   (2) GLP-QS-8715.1, Glenn Safety Manual

   (3) GLP-QS-1800.1, Glenn Research Center Occupational Health Programs Manual

   (4) GLM-FE-8500.1, Glenn Research Center Environmental Program Manual

b. Physical. Physical factors requirements including temperature, noise, humidity, lighting, electrostatic discharge, cleanliness, pollution, and airflow shall be defined and maintained in project, safety, and quality assurance documentation.

4.1.5 Monitoring and Measuring Resources

4.1.5.1 The GRC organizations shall follow GLPR 8730.6, Control of Measuring and Test Equipment (MTE), to validate production equipment and ensure that MTE used for quality and safety measurements are properly calibrated before use. Activities in this GLPR include: calibration, records, impact of an MTE out-of-tolerance condition assessment process, and MTE recall corrective/surveillance process.

4.1.5.2 Users of MTE, which has been identified as quality and/or safety critical, shall conduct an impact analysis on any MTE found out-of-tolerance by the calibration authority, per GLPR 8730.6.

4.1.6 Organizational Knowledge

4.1.6.1 The NASA has established a knowledge management process and a lessons learned database to capture and share information from experiences, and continuously improve the performance of NASA in implementing its mission. (Refer to NPD 7120.6)

4.1.6.2 The GRC has established the Knowledge Management Implementation Plan and Best Practices, GLP-L-7120.6, program to identify, capture, distribute, and leverage key knowledge across the Center and to support the Agency's Knowledge Management activities.

4.2 Competence

4.2.1 Personnel Skill Requirements

Personnel shall be competent to perform their work based on appropriate education, training, skills, and experience. Center competency needs will be determined through skill mix inventories and core competency assessments. Competency requirements for each position will be defined in position descriptions. Personnel qualifications and certifications will be identified in project documents and in safety and quality assurance documents. The GRC positions will be filled through competitive placement or lateral reassignments of employees based on evaluations of employee's knowledge, skills, and experiences.

4.2.2 Training

a. The GRC Management: Shall identify the competency and training needs of personnel and provide appropriate training according to GLPR 3410.1.

b. Civil Servant Employees: Training records may be maintained in the System for the Administration, Training, and Educational Resources for NASA (SATERN) database.

c. Human Resources Council (HRC): Provides oversight, guidance, and selection for workforce technical and leadership development, outlined in GLC-HRC-1000.1.

4.3 Awareness

4.3.1 The NASA employees, including Special Government Employees and assignees/detailees under Intergovernmental Personnel Act (IPA) agreements, are responsible for:

a. Complying with all applicable ethics laws, regulations, Executive Orders, and other guidance, and avoiding even the appearance of impropriety.

b. Completing annual and other periodic ethics training as required.

c. Recusing themselves if there is a conflict of interest between their personal financial interests and their official work duties. (Refer to NPD 1900.9, Ethics Program Management)

4.3.2 The GRC management shall ensure that personnel are aware of the relevance and importance of their activities and how they contribute to the achievement of the objectives, including quality objectives.

4.4 Communications

Senior management shall:

a. Provide evidence of its commitment to the development and implementation of the QMS and continually improving its effectiveness by internal communications to the organization emphasizing the importance of meeting NASA, customer, statutory, and regulatory requirements;

b. Ensure that communication processes are established within GRC and that communication takes place regarding the QMS documentation, changes, and effectiveness of the QMS.

4.5 Documented Information

4.5.1 General

The QMS directive and procedural requirements documentation is accessible to employees through the BMS Library. Notifications of any changes are issued to affected personnel. Supervisors shall ensure that employees are aware of policies and procedures relevant to their work, and to customer, stakeholder, and Agency requirements.

4.5.2 Creating and Updating

The GRC shall follow GLPR 1410.1, Glenn Directives Management, for identification and description, formatting instructions, review, and approval of GRC Directives.

4.5.3 Control of Documented Information

a. Documentation: The GRC processes, subprocesses, and requirements for document controls are derived through the documentation structure defined in GLPR 1410.1. The GRC's centralized document repository is the BMS Library and is a tool to integrate documents and governance charters.

b. Records: The GRC's records control process shall be implemented in accordance with NASA

Records Management Program requirements in GLPR 1440.1, Records Management.

c. Forms: The GRC's forms management process shall be implemented in accordance with GLPR 1420.1, Forms Management Program.

Chapter 5. Operations

5.1 Operational Planning and Control

5.1.1 Managers for space flight programs and projects shall comply with the following documents to plan, define, and document the project and technical plans:

a. NPR 7120.5, NASA Space Fight Systems Program and Project Management Requirements

b. GLPR 7120.5.10, GRC Space Flight Project Management Requirements and Best Practices

c. GLPR 7120.5.30, Space Assurance Requirements (SAR)

Note: The GLPR 7120.5.10 adheres to the program and project lifecycles from Pre-Phase A to Phase F, as defined in NPR 7120.5. Activities in this directive include: scoping the project, defining and estimating the work, scheduling and pricing the work, developing agreements, and executing the project.

5.1.2 Managers for research and technology (R&T) development programs and projects shall comply with:

a. NPR 7120.8, NASA Research and Technology Program and Project Management Requirements

b. GLPR 7120.8, GRC Research and Technology Project Management Procedure

5.1.3 Managers for conducting tests and testing programs and projects shall comply with GLP-FT-8080.17, Planning and Execution of a Ground Test Project.

5.1.4 The GRC plans and controls the transfer of work (e.g., from one organization facility to another, from the organization to a supplier, from one supplier to another supplier) and verifies the conformity of the work to requirements in accordance with NPR 7120.5, GLPR 7120.1, and GLPR 1280.2.

5.1.5 Operational Risk Management

5.1.5.1 Risk management plans shall be generated in compliance with the GLPR 8000.4 (Refer to section 3.1)

5.1.5.2 Space Flight Systems Projects shall follow the GLPR 7120.5.10 for establishing controlled plans, including Risk Management Plans.

5.1.6 Configuration Management

5.1.6.1 To effectively manage configuration and data over the complete program and project lifecycle, including control of changes in requirements, product design, development, production and inspection, programs and projects shall ensure a Configuration and Data Management plan is created using the

framework established in the following standards:

a. EIA-649, National Consensus Standard for Configuration Management

b. ANSI/EIA-649-2, Configuration Management Requirements for NASA Enterprises

5.1.6.2 Configuration management activities shall include planning and management, configuration identification, configuration change control, configuration status accounting, audit and verification, data management, and data access management.

5.1.7 Product Safety

5.1.7.1 Product Safety is a systematic approach to the analysis of risks resulting from potential hazards that can affect humans, the environment, and mission assets. Flight project system safety shall follow GLPR 7120.5.30, which flows down the requirements from NPD 8715.3 and NPR 8705.2 when appropriate.

5.1.7.2 The projects shall develop a screening and qualification plan for safety critical components and fracture critical structures for controlling critical hazards according to GLPR 7120.5.30.

5.1.8 Prevention of Counterfeit Parts

The GRC programs/projects shall:

a. Follow GLPR 7120.5.30 and GLWI-QEA-8735.1, for guidance concerning nonconforming, defective, and suspected counterfeit electrical and mechanical parts.

b. Screen program/project part procurements for Government-Industry Data Exchange Program (GIDEP) notices and NASA Advisory impacts through the NASA Advisories, Notices and Alerts Distribution and Response Tracking system (NANADARTS).

c. Review parts lists for electrical and mechanical parts against GIDEP Failure Experience Data and NASA Parts Advisories.

5.2 Requirements for Products and Services

5.2.1 Customer Communication

5.2.1.1 Customers and parties involved in customers' agreements shall have involvement with concurrence and/or approval of project work products. Project reviews, technical interchange meetings, as defined in internal/external customer agreements, will be held throughout the product realization process.

5.2.1.2 External communication is important to the Center. The GRC handles customer inquiries and communicates to prospective customers, the media, academia, and the general public, information about its technologies and capabilities through formal technical publications and outreach activities. Communications with the media, general public, and/or outreach activities should be coordinated through the Office of Communications.

5.2.2 Determining the Requirements for Products and Services

5.2.2.1 Spaceflight programs and projects shall follow GLPR 7123.2, to effectively develop and manage customer expectations and technical requirements over the complete program and project lifecycle. Activities will include:

a. Documenting customer expectations and objectives.

b. Documenting and validating technical requirements.

c. Defining functional architecture.

d. Decomposing customer requirements.

e. Managing the requirements document.

5.2.2.2 The R&T programs/projects, both aeronautics and space, shall follow:

a. GLPR 7120.8

b. GLPR 7123.2, after appropriate tailoring for the R&T projects, approved per the GLPR 7123.2 process, has been defined.

5.2.2.3 The testing programs/projects, both aeronautics and space, shall follow GLP-FT-8080.17, Planning and Execution of a Ground Test Project

5.2.3 Review of the Requirements of Products and Services

5.2.3.1 Program/project managers and teams, shall:

a. Review technical requirements, products, and performance per GLPR 7123.35, Glenn Research Center Project Technical Review Procedure. This procedural document defines the technical review processes at major milestones throughout the space flight project lifecycle and includes entry and success criteria for each milestone.

b. Include activities for the project technical review procedure for developing the technical review plan, developing the technical review package, conducting the technical review, and closing the technical review.

5.2.3.2 For interim technical and project reviews, program and projects should follow:

a. GLPR 7123.36, Engineering Review Board (ERB) Procedure

b. GLPR 7120.5.10, GRC Space Flight Project Management Requirements and Best Practices

Note: These two procedures define processes used throughout the project lifecycle between the major milestones to review technical and project products and status.

5.2.3.3 The R&T programs and projects shall review product-related requirements at the Periodic Project Reviews as defined by GLPR 7120.8.

5.2.4 Changes to Requirements for Products and Services

Where product or service requirements are changed, GRC shall ensure that relevant documents are amended and that relevant personnel are made aware of the changed requirements.

5.3 Design and Development of Product and Services

5.3.1 General

The GRC management shall control and verify the design of all products (hardware and software) and facilities, as well as control Research, Technology and Development activities, in order to ensure that specified requirements are met. Procedural requirements for:

a. Design of flight hardware, flight software, and flight-associated GSE (i.e., the space flight program/project end products) are defined in NPR 7120.5, NPR 7150.2, GLPR 7120.5.10, GLPR 7123.2, Design of facilities is addressed in NPR 8820.2.

b. Design of non-flight and non-facility products (e.g., the supporting products that enable the development of flight end products) are defined in NPR 7150.2.

c. Research, technology, and development activities are defined in NPR 7120.8.

5.3.2 Design and Development Planning

Planning for the following shall be in accordance with:

a. Flight Projects: NPR 7150.2, NPR 7123.1, GLPR 7120.5.10, and the guidelines established by Office of Management and Budget Circular A-119 for selection of design specifications and standards.

b. Non-flight Hardware and Facility Design Planning: GLPR 7120.8 and NPR 8810.1 respectively.

c. Execution of Testing Activities in the Ground Test Facilities Operated by the GRC Testing Division: GLP- FT-8080.17, Planning and Execution of a Ground Test Project.

5.3.3 Design and Development Inputs

Design and development inputs shall:

a. Be identified, documented, and reviewed by the appropriate department or office for adequacy and accuracy.

b. Include functional and performance requirements, applicable statutory and regulatory requirements, information derived from previous similar designs (where applicable), and other requirements essential for design and development.

c. Be resolved with those responsible for imposing the requirements for ambiguous, incomplete, or

conflicting requirements.

d. Consider the results of the contract or other agreement reviews during design input.

5.3.4 Design and Development Controls

The following documents provide additional requirements and direction for inspection and test requirements:

a. GLPR 7120.5.30, Space Assurance Requirements

b. GLPR 7120.5.50, Implementation-Experimental Testing

c. GLPR 8739.1, Software Assurance

d. The R&T projects shall follow GLPR 7120.8.

5.3.5 Design and Development Outputs

5.3.5.1 Design and development outputs shall be documented and expressed in terms that can be assessed against the design and development input requirements. The design outputs will:

a. Meet the design and development input requirements;

b. Provide appropriate information for purchasing, production, and service provision;

c. Contain or reference acceptance criteria;

d. Specify design characteristics crucial for the safe and proper functioning of the product; and

5.3.5.2 Flight-related design shall:

a. Specify any critical items, including key characteristics, and specific actions to be taken for these items. (Refer to NPR 8735.2 for more information on identifying critical items and key characteristics in designs.)

b. Include appropriate information for identification, purchasing, production, inspection, and for service provision, as well as, operating, storage, handling, maintenance, and disposal requirements for design output.

5.3.6 Design and Development Changes

Design and development changes shall:

a. Be identified and records maintained.

b. Be reviewed, verified, and validated, as appropriate, and approved before implementation.

c. Include the review of design and development changes and evaluation of the effect of the changes on constituent parts and products already delivered.

d. Be in accordance with GLPR 7120.5.10, GLPR 7123.25, GLPR 7120.5.20 for changes and modifications to flight designs and specifications shall

e. Be in accordance with GLPR 7120.8 and NPR 8810.1, respectively, for non-flight hardware and facility design changes.

5.4 Control of Externally Provided Processes, Products, and Services

5.4.1 General

5.4.1.1 The GRC is responsible for the quality of products purchased from suppliers, including customer-designated sources.

5.4.1.2 The Government's acquisition process is a regulated process that is controlled by the FAR and NASA FAR Supplement (NFS). To the extent allowable under the FAR/NFS, purchases shall be made from suppliers qualified through acceptable Government purchasing procedures and regulations, which includes assessment of the risk associated with utilizing a supplier. The following documents provide requirements and direction for the purchasing process, that comply with, and supplement the FAR and NFS requirements:

a. GLPR 5100.1

b. FAR 46/NFS 1846

c. FAR 49/NFS 1849, Termination of Contracts

5.4.2 Type and Extent of Control

5.4.2.1 The Safety and Mission Assurance Directorate shall evaluate potential sources and maintain a list of potential suppliers per GLWI-QEA-8730.7, Qualified Suppliers List.

5.4.2.2 The GRC delegates contract administration and audit functions as necessary to verify that its suppliers comply with applicable contract process quality requirements. Such delegations are made in accordance with FAR/NFS Subchapter G, Contract Management.

5.4.2.3 Decisions to outsource GRC processes can be made at any time. Periodically, GRC shall identify functions which are inherently governmental, commercial, or which might be suitable for a public-private conversion, or competition using NASA's Federal Activities Inventory Reform Act survey process. (See Office of Management and Budget Circular A-76, FAR 7.3 and FAR 7.5.)

5.4.2.4 Purchasing information of the product to be purchased shall be achieved via statement of work (SOW) and/or detailed specifications.

5.4.2.5 Verification process of purchased product shall be governed by the purchasing documents and agreements, including the applicable inspection/acceptance/rejection clauses, and Certificate of Conformance clause specified in FAR 46/ NFS 1846, Quality Assurance.

5.4.2.6 When a purchased product is found not to meet contract requirements, the item shall be

identified as nonconforming, and properly dispositioned, in accordance to the process identified in GLPR 7120.5.30.

5.4.3 Information for External Providers

5.4.3.1 Whenever GRC outsources processes that might affect product conformity (that is, contracts for services to assist in the manufacture of GRC products, or services that receive, inspect, test, or approve components to be incorporated in GRC products), all requirements for performance of those processes shall be flowed down to the outside entity in contract SOW or specification, appendices, and/or applicable contract FAR/NFS clauses. (See FAR 52 and NFS 1852 for standard boilerplate clauses.)

5.4.3.2 The GRC shall delegate appropriate verification/certification activities to the supplier through the contract SOW or specification, and/or applicable inspection and acceptance/rejection clauses specified in FAR 46/NFS 1846.

5.4.3.3 The QMS requirements flow down from NPR 8735.2, Hardware Quality Assurance Program Requirements for Programs and Projects.

5.5 Production and Service Provision

5.5.1 Control of Production and Service Provision

a. Guidance and requirements include: scoping the project, defining and estimating the work, scheduling and pricing the work, developing agreements, and executing the project.

b. Production operations are carried out in accordance with GLP-FF-8072.1, Hardware Fabrication Process.

c. To plan and carry out project production and services, SFS programs and projects shall follow:

   (1) GLPR 7120.5.10

   (2) GLPR 7120.5.30

d. The GLP-FF-8072.1 governs article inspection.

e. The following documents provide additional requirements and direction for inspection and test requirements:

   (1) GLPR 7120.5.30

   (2) GLPR 7120.5.50, Implementation-Experimental Testing

   (3) GLPR 8739.1, Software Assurance

f. The R&T projects shall follow GLPR 7120.8.

g. Validation of processes for production and services provision, where subsequent monitoring or

measurement cannot verify the resulting output, is achieved per NPR 7123.1. This includes any processes where deficiencies become apparent only after the product is in use or the service has been delivered.

5.5.2 Identification and Traceability

5.5.2.1 Product development and research activities often generate many samples, test specimens, test data, numerous variants of test equipment, and configurations. Since these items and data often have small differences that are not easily identified by visual inspection, it is important to clearly identify these items and data. The SFS projects shall follow GLPR 7120.5.30, for identification and traceability of SFS-related products.

5.5.2.2 The GRC shall identify the product throughout the product realization process, including differences between the actual configuration and the agreed-to configuration.

5.5.2.3 When acceptance authority media are used (e.g., stamps, electronic signatures, passwords, etc.) GRC establishes and documents control for the media.

5.5.2.4 Material and product traceability may be required by external regulations or a customer. According to the level of traceability required by contract, regulatory, or other established requirements, the organization's system provides for:

a. Identification to be maintained throughout the product life.

b. All the products manufactured for the same batch of raw material or from the same manufacturing batch to be traced, as well as the destination (delivery, scrap) of all products of the same batch.

c. For an assembly, the identity of its components and those of the next higher assembly to be traced.

d. For a given product, a sequential record of its production (manufacture, assembly, inspection) to be retrieved.

5.5.2.5 The following documents provide additional requirements on this topic:

a. EIA-649

b. ANSI/EIA-649-2

5.5.3 Property Belonging to Customers or External Providers

5.5.3.1 Customer-supplied products are items given to GRC by external customers for the purposes of product development and/or testing. When an external customer provides a GRC organization with materials, products, intellectual property (including furnished data used for design), production, and/or inspection equipment, that item is identified, controlled, and handled in a way that prevents damage or degradation of the property per the external customers' supplied requirements.

5.5.3.2 In addition to physical control of property, GRC personnel control access to and protect proprietary information, personal data, and property in accordance with specified customer agreements and requirements.

5.5.3.3 The GLHB-T-2190.1, GRC Export Control Handbook, provides additional requirements for product preservation and delivery.

5.5.4 Perservation

The Space Flight Systems (SFS) programs and projects shall follow GLPR 7120.5.30, Space Assuance Requirements for preservation of product, hardware item quality and accumulated quality pedigree to be preserved during production, operations, handling, storage, and shipping by process controls that prevent:

a. Inadvertent damage due to unapproved operations or failure to follow procedures.

b. Chemical and particulate contamination.

c. Incursion of Foreign Objects Debris (FOD). The requirements of NASA-STD-6016 require suppliers to develop a FOD control plan that is consistent with the guidance found in NAS 412 Revision 1.

d. Poor tool, fixture, and equipment controls.

e. Nonconforming environmental controls, both of ambient and test environments.

f. Nonconforming item handling, packaging, storage, and shipping materials and processes.

g. Damage due to uncontrolled ESD.

5.5.5 Post-Delivery Activities

5.5.5.1 Spaceflight projects shall:

a. Require product acceptance data packages be prepared for end-item deliverables as outlined in GLPR 7120.5.30, Space Assurance Requirements.

b. Follow the GLPR 7120.5.30 in perfoming Product Acceptance Data Reviews to ensure records of , or traceability to, ojective evidence of product conformance and follow GLPR 7123.5, GRC Project Technical Review Procedure, for conducting independent technical reviews. The GLPR 7120.5.30 outlines product acceptance data packages and reviews for spaceflight projects.

5.5.5.2 The R&T development projects follow GLPR 7120.8for project transition/closure.

5.5.6 Control of Changes

5.5.6.1 Project Managers review all major changes and modifications to projects technical, budget, and schedule performance in accordance with GLPR 7120.8, GRC Research and Technology Project Management Procedure, and GLPR 7120.5.10, Space Flight Project Management Requirements and Best Practices. The output is the Project Manager’s Report to the Project Review Board.

5.5.6.2 The GRC has two Project Review Board (PRB) Chairs and they include Aeronautics Research (Code K) and Space Flight Systems (Code M). The PRB Chairs review all major changes and modifications to the projects and recommend whether to elevate to the CMC. Project control changes

include deviations/waivers, Material Review Boards, Project Control Boards, and other reviews.

5.6 Release of Products and Services

5.6.1 The SFS managed programs and projects shall follow GLPR 7123.35, to monitor, measure, and report to management and team leaders, the progress of the product development throughout the project lifecycle.

5.6.2 The R&T development programs/projects shall follow GLPR 7120.8.

5.6.3 During hardware production, the program and project shall follow GLP-FF-8072.1, to monitor and measure the product.

5.7 Control of Nonconforming Outputs

The GLPR 7120.5.30 provides requirements and procedures to ensure that nonconforming products are prevented from unintended use, delivery, and/or installation.

Chapter 6. Performance Evalution

6.1 Monitoring, Measuring, Analysis, and Evaluation

6.1.1 General

6.1.1.1 The GRC has established goals, objectives, and milestones, which assist the Center in meeting its program/project requirements, as well as statutory, regulatory, and Agency requirements. As a function of these goals, objectives, and milestones, GRC products and processes are measured and analyzed in order to determine the overall performance of the organization. The GRC's programmatic or institutional reviews are conducted at various levels of Center governance throughout the year.

6.1.1.2 During a programmatic or institutional review, when identified processes are not meeting established metrics, corrective actions shall be taken at the appropriate governing council.

6.1.1.3 The GRC shall apply suitable methods for monitoring and, where applicable, measurement of the QMS processes. These methods demonstrate the ability of the processes to achieve planned results. When planned results are not achieved, corrective actions are taken, as appropriate, to ensure conformity for the product.

6.1.1.4 Management reviews shall be conducted to determine the suitability, adequacy, and effectiveness of the QMS. This review includes assessing opportunities for improvement and the need for changes to the QMS.

6.1.1.5 In the event of process nonconformity, GRC shall identify and control the product in accordance with GLPR 7120.5.30.

6.1.2 Customer Satisfaction

6.1.2.1 Directorates shall define methods for gathering and analyzing customer feedback to ensure that customers are satisfied and their requirements are being met. Methods may include surveys, Web site feedback, project reviews, and direct customer correspondence.

6.1.2.2 Organizational feedback data shall be reviewed periodically. The standard forum for presenting customer satisfaction data is at the directorate/office-level. Issues with organizational customer satisfaction data are reviewed at the MSC or CMC, as applicable.

6.1.2.3 Additionally, Center-level external customer satisfaction surveys shall be conducted periodically.

6.1.3 Analysis and Evaluation

6.1.3.1 The implementation and effectiveness review of the QMS shall include assessment opportunities for improvement and the need for changes to the QMS.

6.1.3.2 The GRC determines, collects, and analyzes appropriate data to demonstrate the suitability and effectiveness of the QMS and to evaluate where continual improvement of the effectiveness of the

QMS can be made.

6.1.3.3 Analysis shall include data generated as a result of monitoring measurement and from other relevant sources, and provides information relating to customer satisfaction, conformity to product requirements, characteristics and audit findings of processes and products including opportunities for preventive action and supplier performance.

6.2 Internal Audit

6.2.1 The GRC conducts internal audits to ensure effective process implementation and compliance to QMS policies and procedures, including contract and/or regulatory requirements. Auditors, who are independent of the process, conduct the QMS internal audits.

6.2.2 A plan of Center audits is developed, documented, and presented to the MSC, at least once per year. It is updated, as required.

6.2.3 Audit plans, reports, and nonconformances are documented in the Corrective and Preventive Action (CAPA) system. Findings resulting from internal audits are entered and tracked to closure using the CAPA system, per GLP-Q-1280.2, Corrective and Preventive Action.

6.2.4 The internal audit work instruction, GLWI-QB-9980.1, Internal Audit Work Instruction, provides details about the responsibilities, requirements, and methods for planning and conducting audits, reporting results, and maintaining records of QMS internal audits.

6.3 Management Review

6.3.1 General

6.3.1.1 The GLPD 1000.1, GRC Governance and Strategic Management Structure, shall establish the strategic management and governance structure for the GRC.

6.3.1.2 The Center utilizes a council hierarchy approach for its governance structure. Governance refers to how the Center executes and evaluates its programmatic and institutional activities in a manner that meets the strategic investment strategies and goals of the Center and of the Agency. The GRC governance is carried out through five primary councils:

a. Strategic Advisory Council (SAC). The SAC's primary responsibility is providing Center-level oversight over all programmatic and institutional activities at the Center to achieve the goals set forth in the NASA Strategic Plan.The SAC oversees the CMC, MSC, CPNBC, and the HRC. The SAC is also responsible for managing and evaluating the Center's strategic goals and objectives, workforce, and overall risk posture.

b. Center Management Council (CMC). The CMC's primary responsibility is providing project oversight (cost, schedule, technical, and management) and milestone approval authority prior to input to the Agency, including key decision points, annual performance indicators, risks, and other milestones.

c. Mission Support Council (MSC). The MSC's primary responsibility is to provide institutional, infrastructure, and facilities project oversight (cost, schedule, technical, and management) and

resolve major institutional issues and risks that are within the Center's control.

d. Collaborations, Partnerships, and New Business Council (CPNBC). The CPNBC is responsible for evaluating and approving new business opportunities for the Center, usually brought forth by the Aeronautics Directorate, Space Flight Systems Directorate, or Office of Technology Incubation and Innovation. The CPNBC annually sets the strategy for the Center's new business opportunities.

e. Human Resources Council (HRC). The HRC is responsible for providing oversight, guidance, and selection for workforce technical and leadership development, as well as workforce recognition programs.

6.3.1.3 Each governing council and any other permanently assigned group, sanctioned by a council, shall have a defined charter per GLPR 1150.1.

6.3.1.4 The management review process is depicted in Appendix C, Figure 1.

6.3.1.5 The implementation and effectiveness of the QMS shall:

a. Be reviewed bi-annually by GRC senior managers at the GRC SAC.

b. Include assessment opportunities for improvement and the need for changes to the QMS in the review.

6.3.2 Management Review Inputs

6.3.2.1 The input to management reviews shall include information on results of audits, customer feedback, process performance and product conformity, status of preventive and corrective actions, follow-up actions from previous management reviews, and recommendations for improvement. Identify changes that could affect the QMS, including the adequacy of resources and effectiveness of actions taken to address risks and opportunities.

6.3.2.2 The GRC CMC, chartered by the SAC, conducts monthly reviews of the programmatic implementation status of all programmatic efforts. These efforts span from early project formulation to final operation phase of the development cycle. The reviews include cost, schedule, technical and management impacts and deviations. Reviews are aligned with the Project Formulation and Implementation Processes. When there is no programmatic efforts with a Preliminary Design Review milestone in a given fiscal year, the Project Formulation Process will not be assessed at the bi-annual Management Review conducted at the SAC; early project cycle key decision points are reviewed at the CMC as a means to provide management oversight and ensure effectiveness.

6.3.2.3 The GRC CPNBC, chartered by the SAC, conducts monthly assessments of GRC new business pursuits as a means to provide management oversight and ensure effectiveness of the new business process.

6.3.3 Management Review Outputs

The output of the management reviews shall include any decisions and actions related to improving the effectiveness of the QMS and its processes, improving the product and service related to customer requirements, and resources needs.

Chapter 7. Improvement

7.1 General

The GRC:

a. Shall continually improve the effectiveness of the QMS through the use of the Quality Policy, Quality objectives, audit results, analysis of data, corrective and preventive actions, and management review.

b. Monitors the implementation of improvement activities and evaluates the effectiveness of the results throughout the organization. Incorporation of lessons learned, Lean Six Sigma events, benchmarking, and routine problem-solving efforts are opportunities for continual improvement.

7.2 Nonconformity and Corrective Action

The GRC shall follow GLP-Q-1280.2 to identify and track CAPAs at the Center.

7.3 Continual Improvement

The GRC:

a. Shall continually improve the effectiveness of its products, services, and the overall management system by embracing the Quality Policy, realizing Center quality objectives, addressing audit findings, responding to customer feedback, analyzing product and process metrics, conducting management reviews, and tracking and analyzing corrective and preventive actions.

b. Implements Knowledge Management to identify, capture, distribute, and leverage key knowledge across the center as described in the GLP-L-7120.6.

Appendix A. Definitions

Note: In general, the definitions in ANSI/ISO/ASQ Q9000, American National Standard, Quality Management Systems-Fundamentals and vocabulary apply. However, to aid in understanding the application of the ANSI/ISO/ASQ Q9001 standard to GRC, the following definitions are provided.

Complex work. Involves either: a) the design, manufacture, fabrication, assembly, testing, integration, maintenance, or repair of machinery, equipment, subsystems, systems, or platforms; or b) the manufacture/fabrication of parts or assemblies which have quality characteristics not wholly visible in the end item and for which conformance can only be established progressively through precise measurements, tests, and controls applied.

Contractor. The external organization that provides a product or service to GRC in a contractual situation.

Critical work. Any hardware task that, if performed incorrectly or in violation of prescribed requirements, could result in loss of human life; serious personal injury; loss of a Class A, B, or C payload (see NPR 8705.4); loss of a Category 1 or Category 2 mission (see NPR 7120.5); or loss of a mission resource valued at greater than $2M.

Customer. The recipient of a GRC product or service. A customer may be internal, such as another GRC organization, or external to the Center.

Customer Agreement. A document which defines GRC and its customers' obligations in providing and accepting a product or service. Examples of internal and external agreements include space act agreements, international letter agreements, cooperative agreements, program/project plans, research agreements, GRC internal customer agreements, and task orders.

Management (or GRC Management). Refers to the Civil Servant workforce that manages and/or controls programs/projects or resources (either human, financial, or schedule).

Organization. Group of people and facilities with an arrangement of responsibilities, authorities, and relationships.

Procedure. Specified way to carry out activities of a process.

Process. Set of interrelated activities that transform inputs into outputs.

Product. Result of GRC process activities such as hardware, software, data (including research results), and processed materials.

Risk. An undesirable situation or circumstance that has both a likelihood of occurring and a potentially negative consequence.

Senior Management. From an organizational structure, Senior Management refers to the Center

Director down to the Directorate Management, including Deputy and Associate positions.

Service. Consulting, physical, and/or intellectual work.

Appendix B. Acronyms

ACSI	American Customer Satisfaction Index
ANSI	American National Standards Institute
AS	Aerospace
BMS	Business Management System
CAPA	Corrective and Preventive Action Report
CM	Configuration Management
CMC	Center Management Council
CPNBC	Collaborations, Partnerships, and New Business Council
EIA	Electronic Industries Alliance
ERB	Engineering Review Board
FAR	Federal Acquisition Regulation
GLC	Glenn Charter
GLID	Glenn Interim Directive
GLM	Glenn Organizational Manual
GLP	Glenn Lower-level Procedure
GLPD	Glenn Policy Directive
GLPR	Glenn Procedural Requirements Directive
GLWI	Glenn Work Instruction
ISO	International Organization for Standardization
MSC	Mission Support Council
MTE	Measuring and Testing Equipment
NFS	NASA FAR Supplement
NPD	NASA Policy Directive
NPR	NASA Procedural Requirements
NRA	NASA Research Announcement
OMB	Office of Management and Budget
PRB	Project Review Board
QMR	Quality Management Representative
QMS	Quality Management System
R&T	Research and Technology
SAC	Strategic Advisory Council
SAE	Society of Automotive Engineers
SATERN	System for the Administration, Training, and Educational Resources for NASA
SFS	Space Flight Systems
SMAP	Safety and Mission Assurance Plan
SOW	Statement of Work

Appendix C. GRC Business Model (QMS Key Process Map)

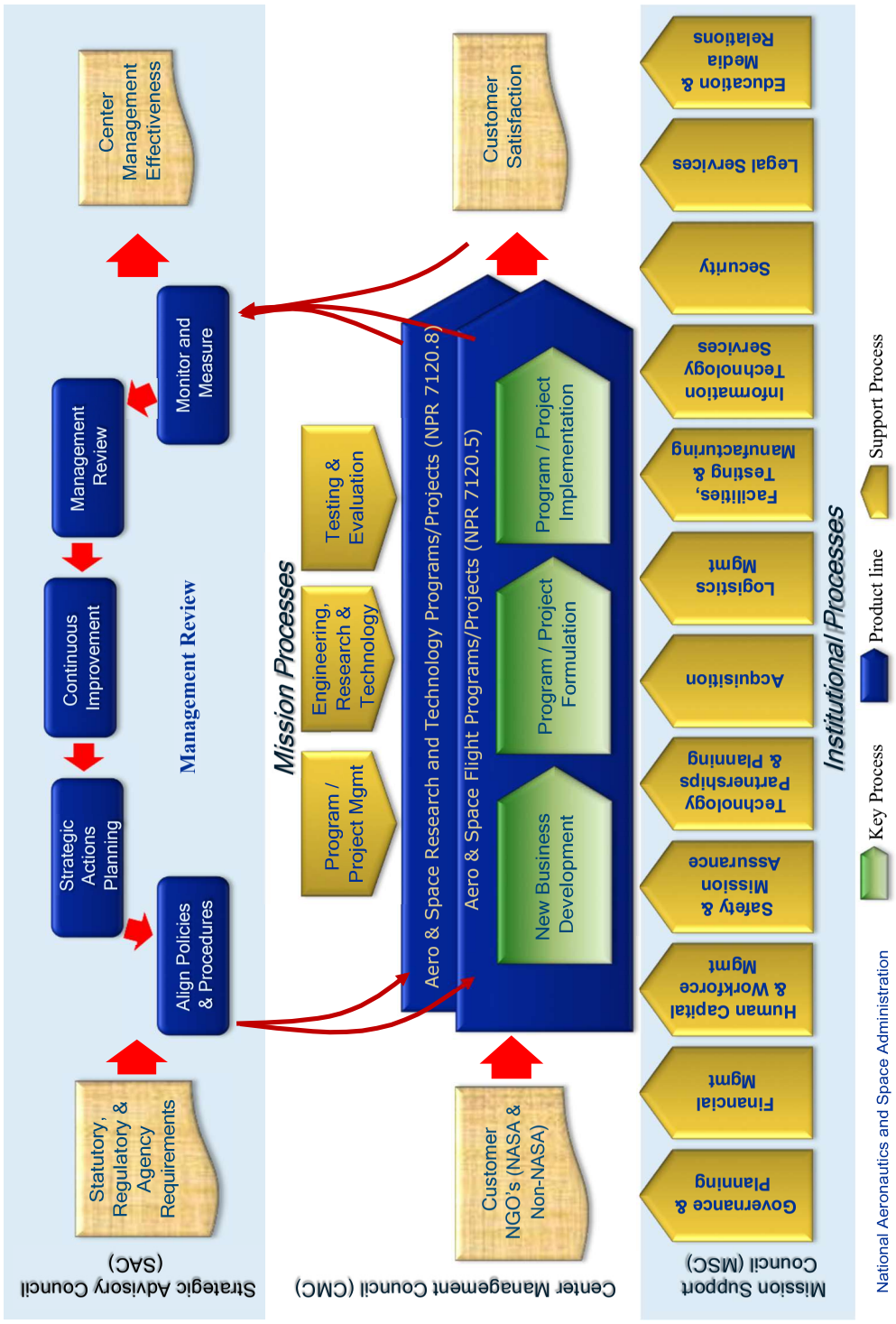

Figure 1: QMS Key Process

Appendix D. GRC Key Process and Corresponding Major Sub-process Diagrams

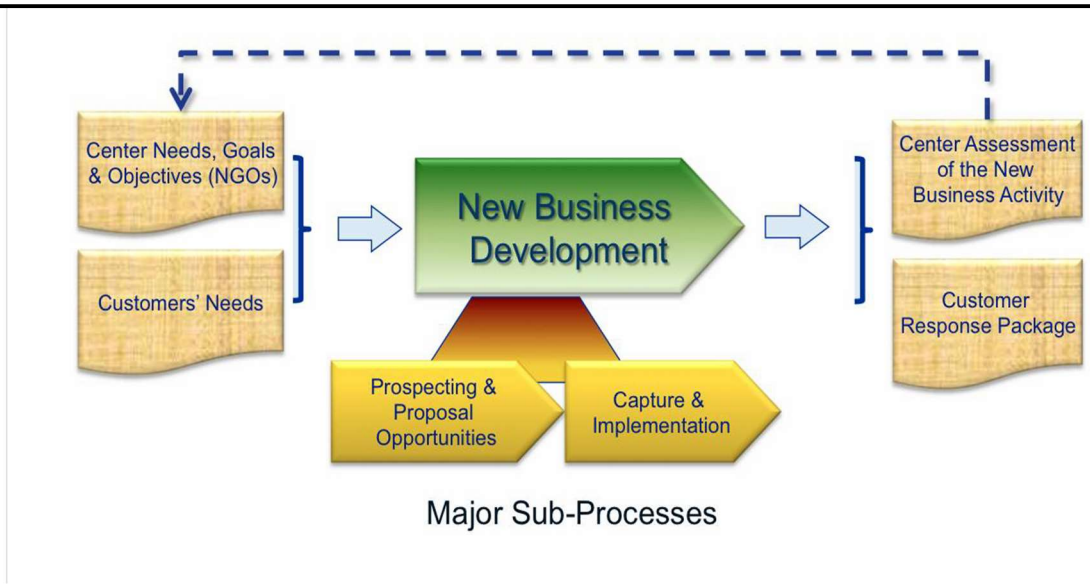

Figure 2: New Business Development Process

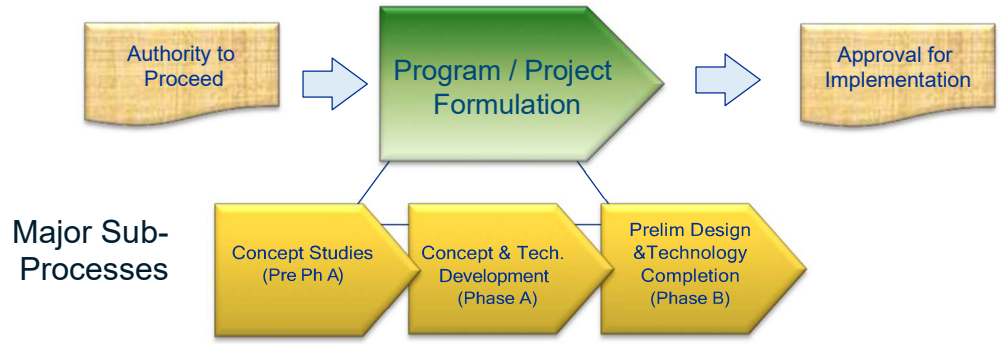

Figure 3: Program/Project Formulation

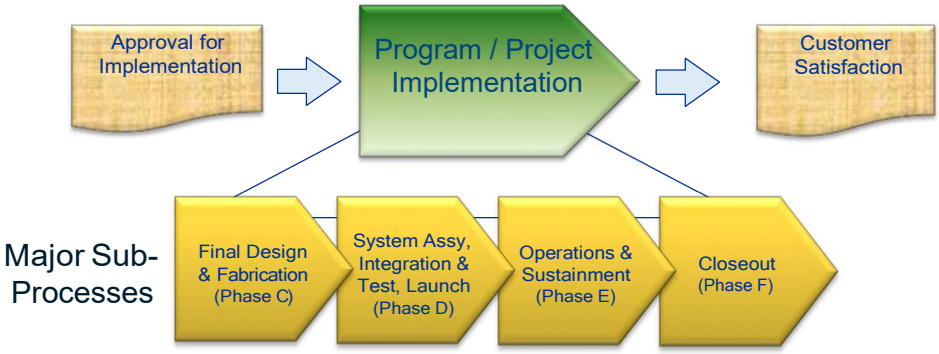

Figure 4: Program/Project Implementation

Appendix E. GRC Governance Structure

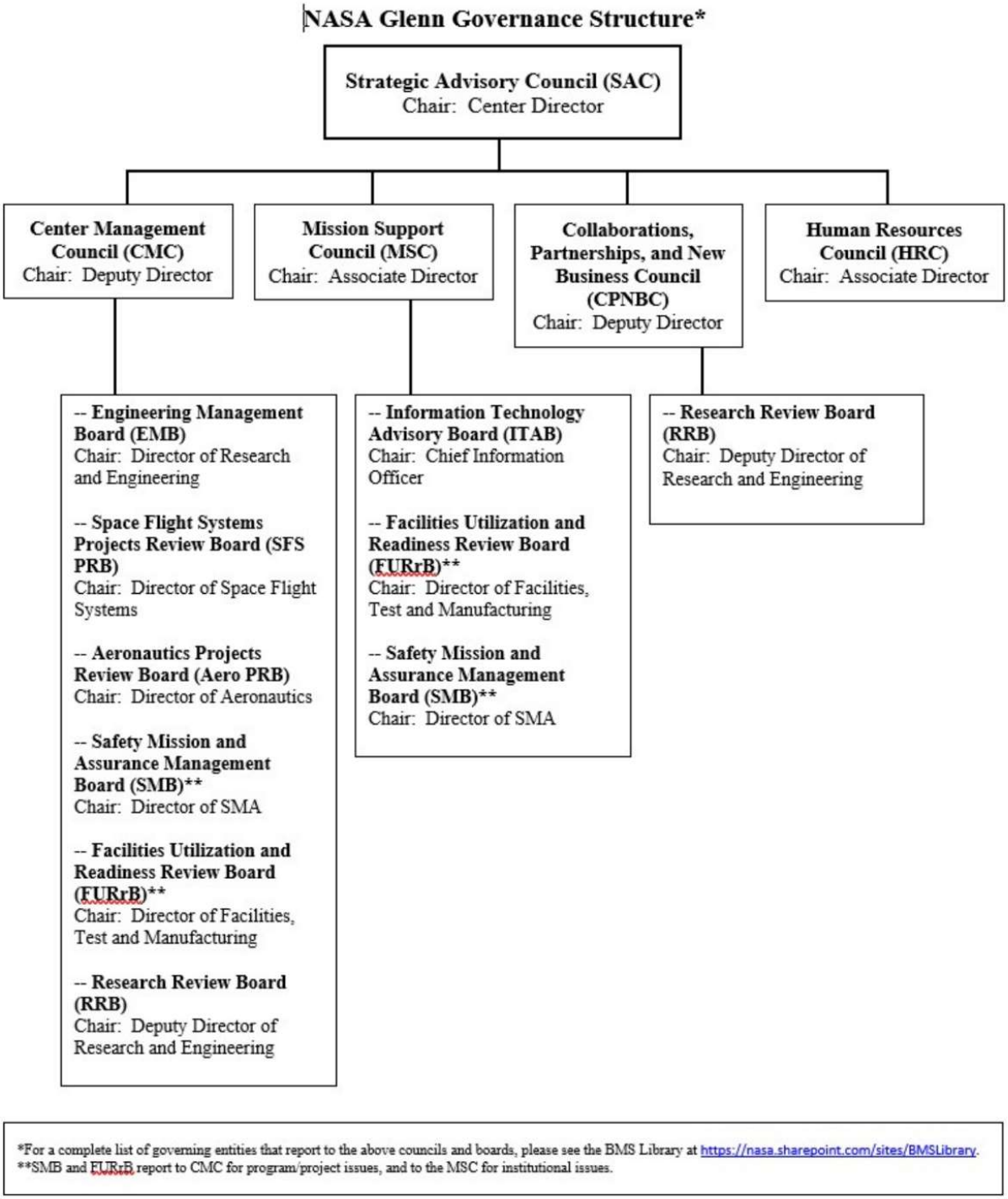

Figure 5: NASA Glenn Governance Structure

Change History

Change	Date	Description/Comments
Basic	9/4/2007	Document converted from CLP (GRC-P4.1.3) to GLPR; document updated to reflect implementation of Glenn Governance Model, AS9100 and ISO14001 standards.
A	9/25/2012	Revised to reflect updated GRC management structure and processes and conform to current GLPR content and format requirements.
B	5/12/2016	Renamed this GLPR from "Glenn Research Center Management Review" to "Glenn Research Center Quality Manual" to fully align with NPR 1280.1, and Center's Quality Management System Policy (GLPD 1280.1). Incorporated quality manual content including applicable documents, forms, and appendices, to fully align with AS9100 and ISO9001 standards. These changes cancel GLPR 8730.5H (See Cancellation). Identified the term QMS (Quality Management System) appropriately throughout the GLPR.
Change 1	03/01/2018	Administrative Change: Section P.4 updated with current references and removed obsolete documents. Obsolete documents removed from any citations within the body of the text.
Change 2	12/14/18	Administrative Change: Section 8.2.3 - Removed reference to American Customer Satisfaction Index and independent polling company from process.
Change 3	06/28/2019	Administrative Changes: P.2.e revised to meet current requirements of NPR 1400.1 3.3.3 Added clarification to how objectives will be measured. 3.5.5 and 3.5.6 Added clarification to management review.
Change 4	08/16/2019	Administrative Changes: Replaced reference to GLPR 7123.11 and GLPR 7123.22 to NPR 7123.1
Change 5	05/11/2021	Administrative Change: Extend expiration date from 05/12/2021 to 11/12/2021 to complete substantive changes per GLPR 1410.1. Updated link to new BMS Library.
C	10/21/2021	3.5. Updated the AS9100 requirements to reflect the management review process 3.5.5 Changed requirement to reflect the level of review at the Strategic Advisory Council replacing "CDR to Preliminary Design Review "PDR" 5.3.2 Requirement removed aerospace P.4 Updated with current references and removed obsolete documents. Obsolete documents removed from any citations within the body of the text. Appendix E: Center Governance Structure reflects updated board names Updated from Plum Brook Station to Armstrong Test Facility throughout Changed CPAR to CAPA throughout directive Updated to meet requirements of GLPR 1410.1
Change 1	5/21/2022	Administrative Change: Added Section 1.1.3 to include scope of QMS.
Change 2		Administrative Changes include: Content was revised (reorganized) to better align with AS9100 revision D standard. Introduction (Chapter 1) removed per duplication of requirements in body of document. Updated to meet requirements of GLPR 1410.1