Ames Procedural Requirements

APR 1280.4
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COMPLIANCE IS MANDATORY

Subject: Ames Quality Management System (AQMS) Requirements

Responsible Office: Code D / Office of the Center Director

CHANGE LOG

Status [Baseline /Revision /Cancelled]	Document Revision	Date of Change	Description
Baseline	-	3/2/2023	New directive.
Revision	1	4/24/2023	Added content from cancelled APR 1220.1 regarding Organizational Profiles into section 1.3.

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PREFACE

P.1 PURPOSE

a. This APR establishes the requirements for implementing the Ames Quality Management System (AQMS) in compliance with Agency and Center policies, procedures, instructions, standards, specifications, and customer requirements.

b. This APR specifies the requirements for the AQMS continual improvement action, corrective action, and preventive action processes, for the purpose of improving the effectiveness of the AQMS.

P.2 APPLICABILITY

a. This directive is applicable to ARC and associated facilities performing duties within the scope of the AQMS as defined in APD 1280.1.

b. This directive applies to contractors, grant recipients, or parties to agreements only to the extent specified or referenced in the appropriate contracts, grants, or agreements.

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 an 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.

P.3 AUTHORITY

APD 1280.1, Ames Quality Management System (AQMS)

P.4 APPLICABLE DOCUMENTS AND FORMS

None.

P.5 MEASUREMENT/VERIFICATION

Verification of conformance to requirements in this directive are measured through Center and Responsible Organizational management reviews, self-assessments, and subsequent analysis and reports of conformance to requirements, as well as periodic internal audits.

P.6 CANCELLATION

a. APR 1280.2, Ames Quality Management System Internal Audits dated May 21, 2018.
b. APR 1280.3, Ames Quality Management System (AQMS) Continual Improvement and Corrective Action dated July 11, 2018.

Eugene Tu
Director

DISTRIBUTION STATEMENT:

Internal and external distribution.

CHAPTER 1 RESPONSIBILITIES

1.1 **Deputy Center Director** shall:

a. Ensure objectives for quality are established, measurable, consistent with the Quality Policy, and derive from the NASA Strategic Plan

b. Conduct Center-level management reviews and ensure the availability of resources.

c. Be the Center Management Representative for ISO9001 and AS9100 and:

(1) Ensure processes needed for the AQMS are established, implemented, and maintained.

(2) Ensure the promotion and awareness of Agency, Center, and customer requirements throughout the Center.

(3) Resolve matters pertaining to the AQMS.

(4) Review the performance and effectiveness of the AQMS with Center Management no less than quarterly (see section 4.2).

(5) Chair the AQMS Executive Steering Committee (ESC).

1.2 **AQMS Executive Steering Committee (ESC)** shall:

a. Ensure AQMS planning is conducted to align and achieve Center objectives and requirements.

b. Define and communicate responsibilities and authorities within their organization.

c. Ensure the integrity of the Ames Quality Management System is maintained when change occurs, whether planned or unplanned.

d. Identify and meet Agency, Center, and customer requirements with the aim of enhancing customer satisfaction.

e. Assess opportunities for improvement.

f. Measure product/service conformity and on-time delivery performance and take appropriate action if planned results will not be achieved.

g. Ensure the Center develops and implements plans for customer satisfaction improvement addressing deficiencies identified in the evaluation of customer satisfaction.

1.3 **Organization Directors** shall implement the AQMS in their organization by:

a. Assuring the quality of work by understanding how the AQMS applies to their operations and ensuring personnel are using approved processes and procedures.

b. Ensure their Organizational Profiles (OPs) reflect the mission, functions, and customers of their organization and are reviewed every three years or when there are changes to their organization (e.g., research, products and services, processes, and support processes, customers internal or external to Ames).

c. Establishing objectives for the quality of, or the planned results for, Directorate products and services.

d. Aligning objectives with center and agency goals, objectives, and priorities.

e. Implementing, monitoring, measuring, analyzing, and improving the processes needed to achieve objectives.

f. Ensuring the appropriate data is determined, collected, and analyzed to demonstrate the suitability and effectiveness of the quality management system.

g. Ensuring the data analysis provides information relating to customer satisfaction, suppliers, conformity to product or service requirements, characteristics and trends of processes, products, and services, including opportunities for preventive action.

h. Continually improving operational effectiveness using monitoring and measurements, audits, assessments, reviews, analysis of data, corrective and preventive actions, and management review.

i. Obtaining process and product information from individual product and service process owners to review at the Directorate level to determine whether planned results are being achieved.

j. Ensuring the QMS is reviewed and improved by reviewing the organization's implementation of the AQMS and the level of performance and effectiveness achieved, at least semi-annually (see section 4.3).

k. Appointing a member of the organization's management as the AQMS Working Group Management Representative.

1.4 **AQMS Working Group (WG) management representatives** shall:

a. Coordinate resources to work with teams established by the AQMS ESC or AQMS WG to resolve actions in a timely manner.

b. Facilitate AQMS office access to facilities, personnel, and supporting documents and data for internal audits.

c. Notify the AQMS office when any external quality audit, inspection, HQ review, etc., is planned or scheduled.

d. Invite the AQMS office to the in-brief and out-brief of these audits, inspections, etc.

e. Inform the AQMS office of the results of audits (first, second, and third party), inspections, assessments, etc., along with any actions that result.

1.5 **The Ames Quality Management System Office** shall:

a. Assist the Center Management Representative (see section 1.1) in:

(1) Maintaining AQMS compliance.

(2) Ensuring that the AQMS content is adequate, resources are assigned, requirements are met.

(3) Ensuring that processes needed for the AQMS are established, implemented, and maintained.

(4) Participating in agency-wide AQMS forums to communicate and act on common issues, improvements, best practices, and lessons learned to enable NASA to meet its mission and management system requirements.

(5) Reviewing the performance and effectiveness of the AQMS with the AQMS ESC (see section 4.2).

(6) Reporting to upper management and coordinating Center wide responses to external audits.

b. Conduct internal audits and interface with the external auditors for maintaining compliance of the Internal Audit Program to Agency requirements, including:

(1) Plan, establish, implement, and maintain a AQMS internal audit program including frequency, methods, responsibilities, planning requirements, and reporting, taking into consideration the importance of the activity concerned, changes affecting the organization, and the results of previous audits.

(2) Ensure that audits conducted by the AQMS office:

(a) Determine conformance to Agency and Center requirements documents, statutory and regulatory requirements, AS 9100, and ISO 9001.

(b) Verify and validate that processes are effectively implemented and maintained. (Performance indicators can be evaluated to determine if the AQMS is effectively implemented and maintained.)

c. Include the results of all Directorate level organization self-initiated assessments or audits (see Chapter 2) in planning the coverage of AQMS Center wide internal audits, provided that:

(1) The Directorate level organization audits and auditors satisfy all requirements for Center wide internal audits specified in this APR.

(2) A written audit plan is submitted to the AQMS Office that specifies the criteria, scope, and methodology of the audit.

(3) Appropriate and timely actions are taken in response to audit findings to eliminate detected nonconformances and their causes.

Note: The goal of this section is to avoid duplication of audit activity. If a Directorate level organization has conducted a self-initiated audit that satisfies all the requirements of the APR, the results of this audit may be accepted by the AQMS office and incorporated into the Center wide audit coverage that is required by the standard. No additional audits of the area audited by the Directorate level organization along the same line of inquiry would be required.

d. Maintain a schedule for each overall audit cycle.

e. Lead follow-up audit activities that verify the implementation and effectiveness of the corrective action plan.

1.6 **Supervisors and staff** shall:

a. Communicate product or service capabilities and information to customers.

b. Obtain and utilize customer feedback, including customer complaints.

c. Define, plan, measure, review, and improve processes and customer interactions.

d. Assign a responsible entity for the control and operation of each work process.

1.7 **AQMS Auditors** shall:

a. Perform internal audits and collect objective evidence by observation and sampling of relevant data that will illustrate compliance to requirements.

b. Document internal audit results in an audit report.

c. Review the draft audit report and reconcile any differences with the Responsible Manager/Organization and report irreconcilable differences to the AQMS Manager.

d. Ensure the final audit report is provided to the AQMS Manager, Responsible Manager, and Directorate Representative.

e. Provide documentation and information to relevant databases for AQMS activities, such as recording audit findings, performing verification activities on assigned corrective actions, uploading supporting documentation, and requesting a subject-matter expert to assist in the verification process, if needed.

CHAPTER 2 INTERNAL AUDITS, ASSESSMENTS, AND REVIEWS

2.1 Internal Audit Program

2.1.1 The Internal Audit Program, which includes audits, assessments, and reviews, is intended to continually assess the Center's compliance with Agency and Center policies, procedures, instructions, specifications, and customer requirements.

2.1.2 ARC conducts audits, assessments, and reviews of operations and procedures within the scope of the AQMS (see APD 1280.1) to verify whether quality and operational activities comply with requirements, and to determine the effectiveness of the quality management system.

2.1.3 The internal audit program, whether scheduled or unscheduled, shall include examination and evaluation of actual operations against established requirements.

2.1.4 The audit schedule will be updated in response to the result of audits and other incidents. In all cases, the schedule for internal audits shall cover all aspects of an audited standard within a two-year period. However, this schedule may be reset when an update of AS9100, AS9003, or ISO 9001 occurs.

2.1.5 The AQMS WG management representative attends the opening and closing meeting of Center-wide internal and third-party audits, as appropriate.

2.1.6 The results of the internal audit program, including recommendations for remedial, preventive, and follow-up actions, shall be documented and brought to the attention of the directorate representative and personnel having responsibility in the area audited, assessed, or reviewed.

2.1.7 Organizations performing audits, assessments, or reviews (AARs) shall adopt the processes of the AQMS or develop their own procedure that specify:

a. Responsibilities and requirements for planning and conducting the AAR.

b. How results of the AAR are reported, including the mechanism by which results are used as inputs to organizational management reviews.

c. How records for AAR are maintained.

2.1.8 Records of each AAR shall include:

a. The process, area, or organization audited.

b. The location of the audit.

c. The line of inquiry used, which includes specifying the requirements audited against (NPD/NPR, APD/APR, AS9100, AS9003, or ISO 9001).

d. Any tools used such as checklists, questionnaires, etc.

e. Any non-conformances or observations identified.

2.1.9 All organizations performing internal AARs shall ensure that:

a. Appropriate actions are taken in response to audit findings without undue delay to eliminate any detected nonconformances and their causes.

b. The results of their audits along with any actions that resulted from the audit to the AQMS Manager so that the results can be included in the planning of audits by the AQMS Office.

2.1.10 The internal audit program follow-up actions shall be carried out in accordance with documented procedures, i.e., process-specific work instructions. Appropriate actions are taken in response to audit findings, as defined within the time period specified during the audit closing meeting, nominally 30 calendar days.

2.1.11 AQMS Internal Auditors shall verify the effectiveness of follow-up actions taken and ensure that:

a. Actions (corrective or preventative) taken were appropriate to the audit finding.

b. The actions taken followed controlled procedures.

c. The actions taken were tracked through closure.

CHAPTER 3 CUSTOMER SATISFACTION

3.1 Customer Satisfaction

3.1.1 ARC shall obtain and assess customer satisfaction data within the scope of the AQMS to assess the need for process changes (continual improvement), corrective actions, and/or preventive action.

3.1.2 Center customer satisfaction process measures the suitability, adequacy, and effectiveness of Center products and services, and establishes the process for senior management to set and monitor external customer satisfaction reviews.

Note: Organizations may conduct their own external/internal customer surveys outside the scope of the AQMS at their discretion.

3.1.3 Organizations are responsible for identifying internal/external customers to be contacted, soliciting customer and relevant stakeholder (if applicable) feedback regarding their product/service quality, implementing corrective action as appropriate, and reporting these results annually to the AQMS ESC.

3.1.4 Organizations may collect feedback using a combination of proactive and reactive techniques. The customer contact will cover typical project management parameters such as cost, schedule, product quality, performance, etc., in addition to unique concerns determined by the Directorate or the AQMS ESC.

3.1.5 Each organization shall obtain, evaluate, and monitor information relating to customer feedback as to whether the organization has met customer requirements, including:

a. Product conformity.

b. On-time delivery (as appropriate).

c. Customer complaints.

d. Corrective action requests from the customer.

3.1.6 Organizations will take immediate action to rectify any significant negative concerns revealed by the customer feedback (unless documented by organizational leadership as a non-issue).

3.1.7 The AQMS WG will review the results from the customer feedback at least quarterly, analyze the information for potential trends, issue actions where appropriate to improve performance, and ensure that actions taken were effective.

3.1.8 Directorates will present the customer feedback results annually at the AQMS ESC and describe any corrective actions that have been implemented.

3.1.9 Each organization shall:

a. Include customer satisfaction in its continual improvement efforts (see section 4.1.3).

b. Assess the effectiveness of the results of its customer satisfaction improvement effort by:

(1) Providing resources needed to enhance customer satisfaction and communicating to the organization the importance of meeting customer as well as statutory and regulatory requirements.

(2) Demonstrating commitment to the operation and improvement of the AQMS by ensuring the availability of resources needed to enhance customer satisfaction and communicating to the organization the importance of meeting customer as well as statutory and regulatory requirements.

(3) Determining, providing, and maintaining the infrastructure needed to achieve conformity to product or service requirements.

> *Note: Infrastructure includes buildings, workspace, and associated utilities, process equipment (both hardware and software), and supporting services (such as transport, communication, or information systems).*

CHAPTER 4 CONTINUAL IMPROVEMENT AND REVIEWS

4.1 Continual Improvement

4.1.1 ARC shall continually improve the effectiveness of the quality management system by implementing necessary process changes, monitoring, and verifying the changes have met their intended results.

4.1.2 Methods for obtaining data for areas needing improvement include audits, assessments, reviews, customer satisfaction, lessons learned, employee suggestions, nonconformance and mishap trends, root cause analysis, assessment of new technology, and other methods.

4.1.3 Each organization shall:

a. Identify all Directorate products, services, and processes.

b. Use financial analysis, process analysis, and understanding of customer needs to determine which products, services, and processes are of greatest value to the organization or customers.

c. Define, plan, and implement the measurement and monitoring activities needed to collect the appropriate data to demonstrate the suitability and effectiveness of these products, services, and processes.

d. Analyze data collected to identify opportunities for continual improvement.

e. Decide which continual improvement opportunities to pursue based on a review of the situation, the available resources, and the potential benefit to be gained from improvement action.

f. Develop and implement improvement plans.

g. Assign responsibility for actions, monitor progress to completion, and evaluate the effectiveness of the effectiveness of the results of the improvement effort.

4.2 Center-Level AQMS Management Reviews and Improvements

4.2.1 The AQMS ESC will review the performance and effectiveness of the AQMS no less than quarterly.

4.2.2 Minimum inputs to a AQMS management review over an annual period, including trends are:

a. The results of audits.

b. Customer satisfaction and feedback from relevant interested parties (obtained from customer surveys, customer complaints, or reviews with customers).

c. Process performance and conformity of products and services.

d. Status of preventive and corrective actions.

e. Status of document reviews (including expiration of Directives).

f. On-time delivery performance.

g. Status of actions from previous management reviews.

h. Changes that could affect the AQMS.

i. Recommendations for improvement.

j. The performance of external suppliers.

k. The adequacy of AQMS resources.

l. The effectiveness of actions taken to address risks and opportunities.

m. Changes in external and internal issues that are relevant to the quality management system.

n. Output from the review includes metrics, any decisions, and actions related to:

(1) Improvement of the effectiveness of the AQMS and its processes.

(2) Improvement of product or services related to customer requirements, and resource needs.

(3) Any need for change to the quality management system and.

(4) Any risks identified.

4.3 Directorate-Level AQMS Reviews and Improvements

4.3.1 To ensure the AQMS is reviewed and improved, Directorates shall annually review the organization's implementation of the AQMS and the level of performance and effectiveness achieved, using information obtained from project reviews, product/service and process monitoring and measurements, surveillance, and data analysis, to demonstrate AQMS performance and effectiveness within the Directorate, and to identify opportunities for improvement.

4.3.2 Minimum inputs to a Directorate level AQMS review over the course of a year, including trends, are:

a. Organizational web sites and organizational profiles communicating local structure and functional activities.

b. The results of audits.

c. Customer satisfaction and feedback from relevant interested parties (obtained from customer surveys, customer complaints, or reviews with customers).

d. Process performance and conformity of products and services.

e. Status of preventive and corrective actions.

f. Status of reviews of documents owned by the Directorate (e.g., directives, work instructions, project documents, etc.).

g. On-time delivery performance.

h. Status of actions from previous management reviews.

i. Changes that could affect the AQMS.

j. Recommendations for improvement.

k. The performance of external suppliers.

l. The adequacy of Directorate resources.

m. The effectiveness of actions taken to address risks and opportunities.

n. Changes in external and internal issues that are relevant to the quality management system.

o. Output from the review including metrics, decisions, and actions related to:

(1) Improvement of the effectiveness of the AQMS and its processes.

(2) Improvement of product or service related to customer requirements, and resource needs.

(3) Any need for change to the quality management system.

(4) Any risks identified.

4.3.3 Minutes, along with data packages, and lists of participants are retained as records and submitted to the Ames Quality Management Systems office, when requested, for inclusion in the Center level AQMS management review.

APPENDIX A. DEFINITIONS

Assessment	An activity that uses a set of concepts and principles, not a standard, to evaluate the accuracy, efficiency and/or effectiveness of an entity (see NPR 8705.6).
Audit	A formal evaluation of compliance with SMA policies, procedures, processes, requirements, specifications, baselines, standards, instructions, codes, and contractual and licensing requirements (see NPR 8705.6).
Audit Plan	A summary of an internal audit that describes the audit including the elements that will be audited, personnel with roles/responsibilities, and is posted in the Audit/NCR System.
Audit Report	A written record of an internal audit, assessment, or review that includes the elements audited, personnel involved with the findings and is stored in a document repository.
Center Management Representative	Appointed by the Center Director and having the responsibility and authority for oversight of the AQMS requirements. The management representative has organizational freedom and unrestricted access to resolve quality management issues. At Ames, this is the Deputy Center Director.
Management Representative	Organizational Director, or their designee, with the authority to act on behalf of their organization and perform assigned Corrective Action/Preventive Action responsibilities.
Internal Audit	A formal evaluation of compliance with AQMS policies, procedures, processes, and requirements.
Management System	The system of processes and procedures that comprises the collection of directives and associated forms issued by ARC for implementing higher level NASA, ARC, ISO 9001, AS9003, and AS9100-derived requirements.
Nonconformance	Non-fulfillment of a requirement.
Objective Evidence	Quantitative or qualitative information, records, or statements of fact pertaining to the quality of an item or service or to the existence and implementation of a quality system element. It is based on observation, measurement, or test that can be verified.

Observation	An item of evidence found during an audit that relates to the quality of the product, process, or quality system that does not merit a nonconformance. Observations may be positive or negative. A positive observation acknowledges a particularly effective implementation of a requirement. A negative observation acknowledges a potential problem.
Responsible Manager	Any employee, regardless of position, designated by a Directorate Representative, and assigned to perform corrective action work.
Review	An activity that proposes to figure out how well the thing being reviewed is capable of achieving established objectives. Reviews ask whether the subject (or object) of the review a suitable, adequate, effective, and efficient way of achieving established objectives (see NPR 8705.6).

APPENDIX B. ACRONYMS

AAR	Audit, Assessment, or Review
APD	Ames Policy Directive
APR	Ames Procedural Requirement
AQMS	Ames Quality Management System
ARC	Ames Research Center
ESC	Executive Steering Committee
ISO	International Organizations for Standardization
NPD	NASA Policy Directive
NPR	NASA Procedural Requirement
WG	Working Group

APPENDIX C. REFERENCES

C.1 NPR 8705.6, Safety and Mission Assurance (SMA) Audits, Reviews, and Assessments

C.2 AS9100, Quality Systems - Aerospace

C.3 AS9003, Inspection and Test Quality Systems Requirements for Aviation, Space, and Defense Organizations

C.4 ISO 9001, Quality Management Systems