QUALITY ASSURANCE PROGRAM STANDARD

Rev. A: June 10, 2008

Japan Aerospace Exploration Agency

The official version of this standard is written in Japanese. This English version is for the convenience of English speakers. If there are any differences between the Japanese and English versions, the former has precedence.

This is an English translation of JMR-005A(Notice-4).
If there is anything ambiguous in this document, the original document (the Japanese version) shall be used for clarification.

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JMR-005A

Quality Assurance Program Standard

1. JMR-005A is hereby established.

2. For any questions concerning this standard, contact the Safety and Mission Assurance Department of the Japan Aerospace Exploration Agency (JAXA).

Establishment: Safety and Mission Assurance Department Director

June 10, 2008

Title	Quality Assurance Program Standard
Key Words	Quality, Quality Assurance, Quality Assurance Program, Development, Production, Technique, Design, Procurement, Fabrication, Inspection, Test, Metrology Control, Noncompliance, Tailoring

Summary

This standard describes the requirements for the program related to the quality assurance that is planned and implemented by each contractor in accordance with contracts for launch vehicles and spacecraft developed and manufactured by the Japan Aerospace Exploration Agency.

The primary requirements of this standard include quality assurance program management and planning, technical management, identification and retrieval, fabrication control, inspections and testing, noncompliance control, metrology control, stamp control, and JAXA property management.

This standard specifies that the requirements described in this standard can be tailored where more appropriate requirements can be reasonably applied, according to the purpose, criticality, or scale of articles developed and fabricated.

QUALITY ASSURANCE PROGRAM STANDARD

CONTENTS

1. GENERAL

1.1 Purpose

This quality assurance program standard (hereinafter referred to as the “standard”) specifies the requirements for the quality assurance program that is planned and implemented by the contractor in accordance with the contract for a launch vehicle and spacecraft developed and fabricated by the Japan Aerospace Exploration Agency (herein after referred to as “JAXA”.)

1.2 Scope

1.2.1 Application

This standard shall be applicable when any of the following apply:

(1) This standard is referred to in a contract or in procurement specifications.

(2) The contractor proposes to apply this standard to a program, and when it is approved by JAXA.

(3) This standard is referred to in JAXA requests for proposals.

1.2.2 Relation to other contract requirements

The relation between this standard and other contract requirements shall be as follows:

(1) If a conflict exists between the requirements of this document and those stated in a contract or procurement specifications, the latter documents shall take precedence.

(2) This standard does not require a duplication of tasks for other program requirements in a contract, but is to complement them.

1.2.3 Tailoring

This standard may be tailored on a contractual basis according to the purpose, importance, or scale of target articles.

2. REFERENCE DOCUMENT

2.1 Applicable Documents

The following documents form a part of this standard within the scope defined by this standard. Unless otherwise specified, the latest version prepared at the conclusion of the contract applies.

2.1.1 JAXA’s documents

(1) Notification No. 16-1 from the Managers of the Safety and Mission Assurance Department and the Contract Department, Inspection

Implementation Procedure
(2) JMR-004 Reliability Program Standard
(3) JMR-006 Configuration Management Standard
(4) JERG-0-018 HANDBOOK FOR METHOD OF HUMAN FACTORS ANALYSIS (*)
(5) JERG-0-020 HANDBOOK FOR METHOD OF "QUALITY HIYARI-HATTO" DATA APPLICATION (*)

2.2 References
(1) JERG-0-050 Quality Improvement Guideline for Imported Parts in Satellite Development (*)
(2) JERG-0-051 Quality Improvement Guideline for Imported Components in Satellite Development (*)

(*) Document available only in Japanese

3. DEFINITION OF TERMS
Appendix 1 shows the definitions of terms used in this standard.

4. GENERAL REQUIREMENTS
4.1 Basic Requirements
The contractor shall plan and implement a quality assurance program to assure that the end item satisfies the quality requirements of the contract.

The quality assurance program shall be as follows:

(1) Identify the quality assurance requirements to ensure that they shall be met by all of the contractor's organization.

(2) Ensure that quality assurance requirements are established and satisfied throughout all phases of contract implementation.

(3) Ensure that quality assurance is fully incorporated in design phases, and is maintained continuously in fabrication and through the operation of the end item.

(4) Provide functions to detect, document and evaluate explicit or implicit defects that could result in unsatisfactory quality, signs that quality requirements may not be satisfied, and trends or conditions which cause a divergence in quality.

(5) Ensure appropriate treatment and corrective actions by

investigating, identifying, documenting, collecting, and analyzing the causes of divergence in quality.

4.2 JAXA Actions and Prerogatives

4.2.1 Reviews and confirmation by JAXA

The contractor shall accept JAXA reviewing (including pre-shipment reviews) and confirming the contract implementation status including examining the following:

(1) If the contractor management system meets the contract requirements.

(2) If the product satisfies the quality requirements, and complies with the contract requirements.

The reviews and confirmations shall be conducted by inspectors or assistant inspectors (hereinafter called JAXA Inspectors) appointed and assigned according to Notification No. 16-1 from the Managers of the Safety and Mission Assurance Department and the Contract Department.

These reviews and confirmations shall also apply to the suppliers of the contractor.

4.2.2 Support to JAXA inspectors

The contractor shall perform the following and ensure safety for JAXA inspectors pursuing their tasks:

(1) Present necessary documents, data, and records

(2) Prepare inspection equipment, samples, and materials

(3) Provide appropriate facilities

4.3 Quality Assurance Program Management and Planning

4.3.1 Organization

The contractor shall establish an organization to satisfy the following items:

(1) Allocation of each task to the most appropriate contractor organization to effectively implement the quality assurance program.

(2) The contractor organization that implements the quality assurance program shall be responsible for resolving problems in implementing the quality assurance program, and shall have the authority and independence to report or recommend directly to the director of the contractor.

(3) Assignment of a manager responsible for supervising and managing the quality assurances program. The manager shall periodically report the program status and validity to a senior manager.

4.3.2 Quality assurance program plan

4.3.2.1 General

The contractor shall prepare and maintain a quality assurance program plan that satisfies the requirements specified in paragraphs 4.3.2.2 to 4.3.2.4 to realize the requirements in the quality assurance program of the contract. The contractor shall implement a quality assurance program consistent with this plan.

4.3.2.2 Establishment of standard and individual quality assurance program plan

The contractor shall establish a standard quality assurance program plan, describing the standardized implementation of the quality assurance program according to the requirements of this standard.

The contractor shall establish individual quality assurance program plans as required for each contract.

This individual quality assurance program plan shall identify the items that follow the standard quality assurance program plan, and shall describe the details of those items which are at variance from the standard quality assurance program plan when the items are contract-specific or have been tailored.

4.3.2.3 Approval of quality assurance program plan

The contractor shall obtain JAXA approval regarding application of the standard and individual quality assurance program plans. The contractor shall report to JAXA where any change is made in the content of the quality assurance program plan, and is required to obtain re-approval whenever JAXA judges it to be important.

4.3.2.4 Contents of quality assurance program plan

The contractor shall describe at least the following items in the quality assurance program plan. The format of this plan shall be easily identified with each cited requirement in this standard. The plan shall cover all quality assurance for the period specified in the contract and shall serve as the master planning and control document.

(1) A description concerning all organizations involved with a quality assurance program and their functions and responsibilities.

(2) Descriptions of when, by which organization, and by which methods each task relating to a quality assurance program will be executed and how each task is managed.

(3) Lists showing the relationship of each task with quality assurance program documents, including internal documents or regulations that are applied for quality assurance.

(4) Identification in the quality assurance program documents list specified in (3) of the documents that utilize existing quality assurance program documents, require changes, or require that new documents be prepared. This must include time schedules for implementing changes or enacting new documents.

(5) Lists of quality records.

(6) Identification of tasks that duplicate or complement other program requirements in the contract, as well as details of these tasks.

(7) Quality assurance must address specific factories, test facilities or launch sites that may differ from the contractor's usual place of activity.

4.3.3 Quality assurance program documents and quality record

4.3.3.1 Preparation and maintenance of quality assurance program documents and quality records

The contractor shall comply with the following requirements regarding the quality assurance program documents and quality records (hereinafter referred to as "quality assurance program documents"):

(1) The contractor must prepare and maintain the quality assurance program documents as internal documents, regulations or technical documents necessary for implementing the planned quality assurance program. Appendix 2 shows the list of quality assurance program documents required in this standard.

(2) The contractor must report any change in the quality assurance program documents in the form of a quality status report required in paragraph 4.3.5.

(3) The contractor must record the results of implementing the quality assurance program. Appendix 3 shows the list of the quality records required in this standard.

(4) The contractor must submit or present the quality assurance

program documents required by JAXA inspectors, regardless of whether or not it is specified in the contract to submit or present them.

(5) The contractor must store the quality assurance program documents in an appropriate place where the documents can be retrieved. The contractor must also outline an appropriate period for keeping the quality assurance program documents which must be documented.

4.3.3.2 Submitting quality assurance program documents

The contractor shall submit the quality assurance program documents, in accordance with the following criteria specified in the contract, for the approval, review and notification categories. Appendix 4 shows the documents to be submitted.

(1) Approval: Documents need JAXA approval prior to application, based on the contract.

(2) Review: Documents need JAXA evaluation prior to application, based on the contract.

(3) Notification: Documents received by JAXA based on the contract.

4.3.4 Quality information

The contractor shall collect, analyze, and record quality assurance data obtained from the design, procurement, fabrication, inspection, testing and operations of articles and materials (hereinafter referred to as “articles”.)

The quality assurance data useful for implementing a quality assurance program or improving article quality shall be distributed in a timely way to all related departments within the contractor’s organization and related suppliers for their use in maintaining and/or improving quality.

4.3.5 Quality status report

Te contractor shall periodically submit quality assurance status reports to JAXA. The report shall include at least the following items:

(1) Changes in organization and personnel individually described in the contract who are involved in the quality assurance program.

(2) Major problems with respect to the quality assurance program, its articles, and an outline for resolution.

(3) Disposition and corrective actions for nonconformance decided at the

Preliminary Review 2 (PR-2) and the Material Review Board (MRB).

(4) Results of procurement activities regarding inspections and testing, as well as those relating to suppliers.

(5) Audit status for the quality assurance program.

(6) Progress status of the process.

(7) Any changes to the contents in the quality assurance program documents.

4.3.6 Audit for quality assurance program

The contractor shall plan and implement an audit for the quality assurance program implementation.
In the audit, the following items shall be considered:

(1) The audit shall be implemented using written procedures, implementation instructions, and check sheets.

(2) The audit shall be implemented by personnel who have mastered the written procedures, standards or quality assurance program applicable to the target tasks or work site.

(3) The audit shall include a review of documents, works or articles to confirm the effectiveness of the quality assurance program activities.

(4) The audit shall be implemented on an ongoing basis. Surprise or occasional audits shall be implemented to effectively evaluate the work progression of the current work.

(5) The contractor shall submit an audit report to the manager responsible for program implementation, including recommendations to correct problems or noncompliance. The contractor shall ensure that the problems or noncompliance have been corrected, and report to the manager responsible for program implementation.

(6) The audit report shall be utilized as quality assurance information.

4.3.7 Education and training

The contractor shall plan and provide the necessary education and training to all personnel involved in quality assurance activities such as management, design, fabrication, inspection, testing, and procurement

to satisfy the quality assurance requirements and quality assurance program requirements of the contract.

The contractor shall also record the results of the education and training programs for quality assurance.

4.3.8 Use of previously developed articles

The contractor shall prove that the quality assurance program applied to the fabrication of the previously developed articles conforms to, and does not conflict with, the requirements of this standard when proposing the use of articles procured or fabricated for which the qualification test and development have been completed.

4.4 Technical Controls

4.4.1 Control of technical documents

4.4.1.1 Technical document preparation

The contractor shall create technical documents according to the requirements regarding design, fabrication, inspection, and testing as well as those regarding safety, reliability, maintainability, and quality. The contractor shall maintain and manage these technical documents and implement tasks based on these documents.

Technical documents include the following and shall be consistent with the configuration control requirements.

(1) Technical instruction documents such as specifications, design documents, plans, and drawings.

(2) Fabrication instruction documents such as process charts, work standards and written procedures.

4.4.1.2 Contents of the technical documents

The contractor shall include the following in the technical documents when applicable:

(1) Characteristics and design criteria necessary for work such as procurement, fabrication, inspection, and testing.

(2) Characteristics attendant to tolerance ranges as the basis for the work.

(3) Requirements demanding special control with respect to quality assurance.

(4) Requirements concerning identification.

4.4.1.3 Document review

The contractor shall have the appropriate department conduct technical document reviews as applicable. The contractor shall also establish a system for enacting and revising the documents and shall document it. The reviews shall assure that documents include all required information and that the requirements are clearly specified. The results of the document review shall be recorded.

4.4.2 Change control

4.4.2.1 Change control system

The contractor shall establish a system that controls changes in design, fabrication processes, inspection methods, and test methods. This change control system shall be documented including the following items:

(1) Prior to change implementation, engineering changes including change identification methods and change application timing shall be reviewed by the related departments and approved by the person responsible for change implementation.

(2) All related documents required for change implementation shall be issued and revised according to the requirements in paragraph 4.4.1. These documents shall be distributed to the proper positions at the appropriate times, and obsolete documents shall be completely removed from the operating areas.

(3) Change control shall be coordinated with the control system based on the configuration control requirements including reporting to, and obtaining approval from, JAXA, and shall be effectively executed.

(4) Changes that involve interface relationships or affect articles not under the design control of the contractor shall be coordinated with the affected parties. The contractor shall obtain the agreement of the affected parties with the proper documentation.

4.4.2.2 Application of change

The contractor shall clearly specify the time changes were applied and ensure the following:

(1) Changes are accomplished on the affected articles or materials during or after the authorized time.

(2) Changed articles are appropriately marked or identified.

(3) Associated documents are revised accordingly.

(4) Inspections and testing of changed articles or materials shall be appropriate for the content changes.

4.4.3 Confirmation by quality assurance department at reviews

4.4.3.1 Design review support

The quality assurance department of the contractor shall confirm the following to evaluate the design validity during the design reviews:

(1) Requirements regarding the characteristics required for the various processes to include procurement, fabrication, inspection, and testing. The standards, criteria, or specifications applied to these processes must be specified, and their contents must be deemed appropriate.

(2) Inspection and test plans are appropriate with respect to quality assurance, and judgment criteria are clear.

(3) Products are easy to manufacture, inspect, and reproduce.

(4) Identification control requirements are appropriate.

(5) Quality assurance requirements in the interface control documents are appropriate.

(6) Previous actions of noncompliance of applicable contents are documented.

(7) Documents required for a quality assurance program are prepared and maintained.

4.4.3.2 Post-Qualification-Test Review

The quality assurance department of the contractor shall confirm the following items to establish designs, fabrication processes, and other related matters at the post-qualification-test reviews (including post-proto-flight-test reviews).

(1) Qualification test results are accurately recorded, and technical assessments are conducted.

(2) All conditions for qualification are satisfied.

(3) Changes in design and fabrication process are initiated after critical

designs are validated.

(4) Any noncompliance is processed according to the standards in paragraph 4.9, and re-testing is confirmed to be unnecessary.

4.4.3.3 Pre-Shipment Review

The quality assurance department of the contractor shall confirm the following items at the pre-shipment reviews to ensure that end items are able to be delivered to JAXA.

(1) Acceptance test results are accurately recorded, and technical assessments are conducted.

(2) All records on quality are maintained and managed.

(3) All quality related requirements in the contract are satisfied.

(4) All noncompliance processing is completed.

(5) Data packages are completed.

(6) It is necessary to confirm all changes in design initiated after qualification tests are validated, and that such changes are incorporated in the related documents.

4.5 Identification and Data Retrieval

4.5.1 General

The contractor shall establish and maintain an identification and data retrieval system for articles and materials to satisfy the following items, including:

(1) Identification to clarify the relations between the records of procurement, fabrication, inspections, and testing.

(2) Means for locating articles and materials.

(3) Differentiation of the same or equivalent articles and materials.

The contractor shall establish this identification and data retrieval system in conjunction with other control systems including those for technical documents, configuration, maintainability, resources, and logistical support. Common identification numbers and procedures shall be used among all control systems.

4.5.2 Identification methods

The contractor shall identify each article model and material using a unique part or type number. Any of the following identification methods shall be used where articles and materials require individualized control or lot control, unless a specific reason is provided.

(1) Date Codes
Date codes indicate date of manufacture.

(2) Lot Numbers
Lot numbers identify articles or materials produced in the same lot when separate item data are not required but group data is required. Billet, heat treatment, and batch numbers are used as lot numbers.

(3) Serial Numbers
Serial numbers identify individual articles or materials for which unique data must be maintained or for which individual controls are required for other reasons.

(4) Other Identification Methods
Other identification methods, such as paint marks, may be used in lieu of, or in addition to, the methods specified above. If other identification methods are to be employed, JAXA inspector approval is required.

4.5.3 Documentation

The contractor shall include detailed rules regarding the method for displaying the part or type number on articles and materials, and include the locations and identification method of this number in the technical documents.

4.5.4 Identification control and traceability

The contractor shall establish a control method to assign a part or type number to articles and materials which must not be duplicated and which must be sequential. Quality assurance records on the articles and materials shall identify the part or type number to ensure their traceability and to show parts or materials used in fabrication, as well as to show locations of the same article models and materials used in the same fabrication process or in the same assembly. Serial and lot numbers used for disposed articles and materials may not be reused for other articles or materials.

4.5.5 Identification list

In the design phase, the contractor shall prepare and maintain identification lists corresponding to articles and materials of the

contractor and suppliers. This list may initially be prepared using general names at the beginning of the design, but as the design progresses, specific part numbers and related information shall be added.

4.5.6 Record retrieval

The contractor shall implement identification control to ensure that records of procurement, fabrication, inspections, and testing of articles and materials correspond to the applicable articles and materials specified in the identification lists. The identification system shall be organized and maintained so that the location of these records and related articles and materials shall be known and can be retrieved when confirmation or removal of articles or materials becomes necessary.

4.6 Procurement Controls

4.6.1 General

The contractor shall be responsible for the quality of all articles and materials procured (including contracted services). The contractor shall plan, implement, and maintain quality assurance regarding procurement.

4.6.2 Assessment of supplier selection

The contractor quality assurance department shall participate in the selection of a supplier by assessing the supplier's quality assurance capability for the product based on any one of the following options:

(1) Confirmation using records that include previous qualitative and quantitative information that will ensure the quality of articles and materials being procured or of a similar article-type being procured.

(2) Implementation of a pre-order survey of the supplier's facility and quality assurance system, as well as the status of the quality assurance to determine if the supplier is capable of satisfying quality requirements regarding articles and materials based on the contract and the quality assurance program requirements, or, confirmation using survey records conducted by the official certification organization.

(3) When articles or materials being procured are not fabricated specifically for contracts with JAXA or JAXA subcontracts by the contractor or their suppliers, when the contractor does not have previous quality assurance records of the supplier for such articles and materials, and when a pre-order survey is not conducted, it is necessary to confirm the quality assurance of the supplier with thorough inspections in accordance with technical documents to ensure that quality assurance requirements are met.

4.6.3 Procurement documents

4.6.3.1 Review of procurement documents

Prior to the release of procurement documents, the contractor's quality assurance department shall review the quality assurance requirements and the requirements in the quality assurance program. The results of this review shall be documented.

This review shall include the following:

(1) Confirmation that the assessment of the supplier selection is conducted in accordance with paragraph 4.6.2 and satisfies the applicable requirements.

(2) Requirements of paragraph 4.6.3.2 have properly been prescribed.

4.6.3.2 Contents of procurement documents

The contractor shall include the following requirements in the procurement documents. If technical documents are quoted, the quoted documents shall be clearly named and provided to suppliers as necessary.

(1) Quality assurance program requirements

The contractor shall require suppliers to establish a quality assurance program compatible with the purposes and importance of the items to be purchased. The individual requirements shall not contradict corresponding requirements in this document. The following additional requirements shall be included as necessary:

a. Approval
To prescribe the requirements for design, fabrication method, fabrication process, special process, testing, and inspections by the supplier that require contractor approval.

b. Changes
To specify that suppliers obtain written approval from the contractor before changing any design, fabrication method, fabrication process, special process, testing, and inspection procedures previously approved by the contractor. Changed articles shall be identified differently from previous articles. When the contractor procures a proprietary item, suppliers shall be required to notify the contractor of changes.

c. Purchased raw materials
To prescribe that purchased raw materials shall be accompanied

by chemical and/or physical test results. (Hereinafter referred to as “material test”.)

d. Materials used for purchased articles
To prescribe that material certificates, or chemical and/or physical test results, as required, for materials employed in the fabrication of articles purchased and that are required to satisfy specification requirements, shall be available to the contractor for confirmation.

e. Inspection and test characteristics
To prescribe that characteristics to be inspected or tested by suppliers shall be specified.

f. Inspections and test records
To prescribe that inspection and test records to be maintained by suppliers to provide evidence of supplier inspections and tests shall be clearly specified. Records to be provided to the contractor's source inspection personnel or the supervisor shall be clearly specified.

g. Redelivery of non-conforming articles or materials
Non-conforming articles or materials returned by the contractor to the supplier and subsequently redelivered by the supplier to the contractor shall bear adequate identification of such redelivery.

h. Contractor quality assurance activities at the supplier location.
To prescribe the activities hen contractor quality assurance activities are to be performed at the supplier’s plant.

i. Items subject to quality assurance inspection of JAXA subcontracted goods
Goods designated as items subject to the quality assurance inspection of JAXA subcontracted goods in paragraph 4.6.5 shall be specified accordingly. For goods not designated as items subject to the quality assurance inspection of JAXA subcontracted goods, the purchase document shall clearly state that JAXA has the authority to conduct a quality assurance inspection of the subcontracted goods.

(2) Technical requirements
The contractor shall specify or refer to technical requirements, including quality requirements, for the articles.

4.6.4 Contractor’s quality assurance activities at supplier’s plant
The contractor shall perform appropriate quality assurance, including

observation of fabrication processes and implementation of source inspections if any of the following items correspond to the plan, JAXA inspectors shall be informed, as necessary, of the implementation of quality assurance at the supplier’s location.

(1) Quality of articles cannot be determined solely by inspection or testing at the contractor's plant.
(2) Inspections or tests are destructive in nature and quality cannot be verified solely by inspection or testing at the contractor's plant.

(3) The environments required cannot be reproduced or test equipment cannot be made available at the contractor's plant, or performing the quality assurance at the supplier’s plant is more economical than performing it at the contractor’s plant.

(4) Past quality assurance results of the supplier are uneven.

(5) Qualification tests of articles to be purchased are conducted by supplier.

(6) Articles or materials are designated for direct shipment from the supplier to JAXA or the usage site.

4.6.5 JAXA subcontractor supervision

The contractor shall determine the articles subject to JAXA supervision of subcontractors by discussing this with the senior supervisor.

The subcontractor supervision conducted by JAXA shall not replace the contractor's source inspection nor relieve the contractor of responsibility for quality assurance.

4.6.6 Receiving inspection

4.6.6.1 General

The contractor shall conduct a receiving inspection which is necessary to ensure that procured articles and materials meet procurement requirements and are acceptable. This receiving inspection shall verify, at the very least, the characteristics and design criteria of the articles and materials that have not been verified by the source inspection and are verifiable without degrading the article or the material quality.

4.6.6.2 Receiving inspection system

The contractor shall establish and maintain a receiving inspection system that meets the following items:

(1) To prepare technical documents including proper written procedures

to conduct receiving inspections and perform inspections following such technical documents. Also to prepare the equipment necessary for receiving inspections.

(2) To maintain the quality of articles and materials during receiving inspections. To do so, the articles and materials shall be placed separately and identified according to the following categorization:

a. Items awaiting judgment based on the inspections results

b. Conforming items

c. Non-conforming items

(3) To indicate the judgment results clearly indicated on the articles and materials or their records when the receiving inspection is completed. To strictly control non-conforming articles to prevent unauthorized use.

(4) To control articles and materials after proper completion of the receiving inspection to include proper handling, storage, and usage.

4.6.6.3 Utilization of supplier inspections and tests

When deemed impossible or inappropriate for the contractor to conduct a receiving inspection, the contractor shall substitute inspections or tests conducted by the supplier for part of the contractor's own receiving inspection by confirming the following during the receiving inspection:

(1) To confirm all the necessary records, including the data of supplier inspections and tests conducted in accordance with the procurement requirements, are attached to the procured articles and materials.

(2) To confirm the data from supplier inspections and tests meet the requirements.

(3) To confirm articles and materials, or their attached records, indicating that the source inspection has been performed when procurement requirements require a source inspection.

(4) To confirm appropriate dismantling inspection or nondestructive inspection is conducted as necessary to further confirm the details of the requirements specified.

(5) To confirm the requirements for identification and retrieval are met

and maintained and that articles and materials correctly match the corresponding supplier's data.

(6) The articles and materials subject to the requirements in paragraph 4.7.3.2 display the data necessary to control operating life limitation items or have the necessary data attached.

(7) To confirm, when required by the procurement documents, that material testing is conducted using specimens randomly selected from the articles and materials procured, and that the test data and specimen are submitted.

4.6.6.4 Receiving inspection records

The contractor shall indicate, at a minimum, the following items in the records of a receiving inspection for the articles and materials:

(1) Date of receipt and implementation of the receiving inspection.

(2) Results and data of the receiving inspection.

(3) The fulfillment of corresponding requirements of (1) through (7) of paragraph 4.6.6.3

(4) Signature or seal of the inspector who conducted the receiving inspection.

(5) Written procedures used for the receiving inspection.

Pertinent supplier documents received regarding the above-mentioned records shall be stored with a clear indication of their relation to the receiving inspection records and the location stored.

4.6.7 Supplier rating system

The contractor shall establish and maintain a supplier rating system, based on the following items, to facilitate supplier selection. The ratings data shall be used in conjunction with other data as reference materials for supplier selection.

(1) Continuously updated records of qualitative performance, including workmanship shown in the products of individual suppliers, trends indicating number of occurrences of noncompliance, and quantitative performance. The records will also include the inspection passage rate or the number of critical noncompliance items based on the receiving inspection results and any noncompliance that occurred during these processes.

(2) The confirmation results of the supplier's quality assurance through means such as audits specified in paragraph 4.6.8.

4.6.8 Audits for suppliers

The contractor shall perform an audit for the suppliers as follows:

(1) The contractor shall plan and conduct audits of suppliers and for corresponding suppliers, items and timing, considering the following items:

a. Criticality of the article procured
b. Supplier's quality assurance history
c. Supplier's capability for purchasing, fabricating, inspection, and testing, etc.
d. Remaining time to delivery by supplier.
e. Other problems related to purchasing.

(2) The audits shall be performed in accordance with the requirements described in paragraph 4.3.6.

(3) The contractor shall advise the supplier that the corrective action for any problem found in the audits be taken in timely manner. The results of the audits, including the problems and corrective action plans, shall be recorded.

4.6.9 Compatibility with supplier-conducted inspections and tests

The contractor shall confirm with selected suppliers to ensure compatibility of supplier inspections and tests with contractor inspections and testing of the procured article or material. The contractor shall cooperate with suppliers and provide technical assistance and training for the suppliers as necessary.

4.6.10 Notification of noncompliance information

The contractor shall quickly report to suppliers with information concerning supplier-responsible noncompliance that is detected during procurement, inspection, fabrication, testing, or operational use. The contractor shall ensure that the supplier promptly implements disposal and corrective action and shall confirm the results.

4.6.11 Measures to prevent the recurrence of serious quality problems

When a supplier causes a serious problem in quality, the contractor shall immediately prepare a report concerning the prevention of a recurrence according to the procedure for preparing a report concerning

the prevention of the recurrence of serious quality problems. (This is the newest version of CQM-103003). Then, the contractor shall obtain the signature of the person responsible for the quality system, and submit it to the Safety and Mission Assurance Department.

4.6.12 Purchasing of imported parts and components

The contractor must pay special attention to the following activities at each stage, including the selection, setting of technical specifications and procurement requirements, the review meeting, the witnessing of manufacturing, and the acceptance inspection, with respect to imported parts and components onboard rockets and satellites (hereinafter called imported parts and components), which are described in JERG-0-050 “Quality Improvement Guidelines for Imported Parts in launch vehicle and Satellite Development” and JERG-0-051 “Quality Improvement Guideline for Imported Components in Satellite Development.” For setting the purchasing requirements of relevant items, see and reflect the above guidelines.

4.7 Fabrication Controls

4.7.1 General

The contractor shall control the fabrication processes to ensure that the articles and materials conform to the characteristics and design criteria specified in the technical documents. Therefore, the contractor shall record the fabrication tasks, including the data (polarity checklist, photographic records, etc.) obtained during fabrication.

4.7.1.1 Process quality evaluation

The contractor shall monitor the important quality characteristics and important processing parameters of the critical items per the Reliability Program and maintain these records. The data shall be compared to previous similar items (including engineering models) prior to proceeding to the subsequent processes. The quality assurance and fabrication departments shall monitor the data. If there is a discrepancy or change in the data that is deemed to be an anomaly, the departments shall document the situation and the departments, including the engineering department, shall decide the disposition. As a result of the decision, if the data is judged as an anomaly, the departments shall take measures according to the noncompliance processing procedure. Also, the departments shall re-evaluate the quality assurance evaluation results in the pre-shipment review.

4.7.2 Fabrication instructions

Detailed fabrication and inspection procedures shall contain the following, or quote other documents that include the following items.
If there are any items that apply to important quality assurance characteristics or processing parameters, the manufacturing instruction document shall clearly state it accordingly.

(1) Nomenclature and identification number of the article to be fabricated and articles and materials needed during fabrication.

(2) Tooling, jigs, fixtures, software and other fabrication equipment to be utilized in fabrication.

(3) Characteristics and tolerance.

(4) Detailed procedures for controlling processes.

(5) Special conditions to be maintained such as environmental conditions and specific cleanliness levels, and precautions to be observed.

(6) Workmanship standard.

(7) Inspection and test procedures if necessary.

4.7.3 Article and material controls

4.7.3.1 Work-site controls

The contractor shall implement control of the work-site by utilizing articles and materials conforming to the requirements and by removing articles or materials not required for the current fabrication work. The articles and materials shall only be subject to operations based on formal instructions.

4.7.3.2 Operation life limitation article and material controls

The contractor shall display, record, and maintain the time or cycles required to control the operational life for all articles and materials with definite quality degradation characteristics or characteristic changes with age or use. The articles and materials whose operation life has expired shall be disposed of, or clearly identified as such to prevent reuse.

4.7.3.3 Controls for articles and materials for which degradation should be prevented

The contractor shall conduct inspections and testing for articles and

materials fabricated in environments controlled for temperature, humidity, and cleanliness in a similar environment to the extent necessary to prevent quality degradation.

4.7.4 Cleanliness control

The contractor shall control the fabrication, inspection, and test sites in accordance with documented cleanliness requirements for environments, handling, workbenches, tools, and storage containers, and devices or equipment used to prevent the contamination of materials. The technical documents shall include the cleanliness requirements and methods to maintain and measure cleanliness. The contractor shall measure cleanliness at pre-specified intervals for locations where cleanliness control is required and confirm that the cleanliness requirements are satisfied.

4.7.5 Special process controls

4.7.5.1 Special processes

The contractor shall identify the special processes that require effectiveness be confirmed and controlled by using written procedures where 1) article uniformity or quality are affected by worker skills or equipment characteristics or 2) where inspection processes are performed to assure fabrication processes and quality. This only applies to special processes that cannot be fully assured by usual inspections.

These processes shall include, but not be limited to, thermal treatment, welding, bonding, surface treatment, nondestructive inspection, and chemical processes. Nondestructive inspections shall be controlled, as necessary, to confirm that the results show the article’s quality level.

4.7.5.2 Written procedure for special process control

The contractor shall prepare written procedures for special process control including detailed work methods and control methods, and shall work and control based on these procedures. These procedures shall include the following items. If any items apply to important quality characteristics or processing parameters, the procedures shall clearly state it accordingly.

(1) List of devices, equipment, and facilities used

(2) List of articles and materials to be processed or treated

(3) Detailed methods for processing and treatment

(4) Conditions to be sustained in every process phase, including environmental controls

(5) Methods to confirm secondary sources, facilities, and environments as well as their associated control items

4.7.5.3 Facilities certification for special processes

The contractor shall provide for facility certification for special processes. Facilities shall be re-certified if the need for re-certification is determined based on the process evaluation results specified in paragraph 4.4.5.7, when changes are made which may affect process integrity, or when the certification is about to expire.

4.7.5.4 Personnel certification for special processes

The contractor shall examine the personnel for special processes in which personnel skill affects product uniformity, product quality or process effectiveness. The contractor shall engage only personnel who have passed the examination to perform the job during the valid period and shall supervise their job. The examination shall include written, practical, and other tests to objectively determine personnel skills. In order to verify the validity of examinations conducted by the contractor, JAXA inspectors shall check the examinations and may have the contractor conduct examinations again. Personnel who have passed the examination shall be provided with a card, badge, or similar certificate to identify them as qualified personnel. Examination for renewal shall be conducted before the expiration date.

4.7.5.5 Personnel re-certification for special processes

The contractor shall conduct re-certification testing for personnel who engage in special processes if any of the following issues apply. Personnel who fail re-certification tests shall not be assigned to conduct or supervise tasks requiring certification.

(1) Work performed is unsatisfactory.

(2) Significant change in work content or required skill level.

(3) Over the period specified for such process or tasks, or if such period is not specified during the period the certification is valid, the certified person has not performed the process or tasks.

4.7.5.6 Certification record for special processes

The contractor shall maintain the records of certification for facilities and personnel, and testing for personnel involved with special processes,

and shall present them upon request from JAXA inspectors.

4.7.5.7 Evaluation for special processes

The contractor shall evaluate the fabrication processes including welding, bonding, soldering, and surface treatment of special processes. If the product meets or exceeds the contractual requirements, it passes the evaluation. The evaluation records shall be maintained during the contract period. If a tendency not to satisfy the requirements is noticed, the process shall be modified. This requirement shall also apply to all suppliers.

4.7.6 Workmanship standards

he contractor shall specify the specimen and boundary samples showing the acceptable level of workmanship standard after approval of the JAXA inspector. These standards shall be reviewed and revised as necessary to satisfy the updated requirements.

4.7.7 Electrostatic discharge controls

The contractor shall establish and comply with the standards for electrostatic discharge controls for electronic parts susceptible to electrostatic discharge and assemblies or devices containing such parts. The electrostatic discharge control standards shall contain the rules for work-site protection, storage, handling procedures, training, packaging for shipment, packaging methods, and quality compliance checks.

4.7.8 Control of temporary installed items

The contractor shall control the articles temporarily installed in hardware under fabrication for launch vehicles and satellites (hereinafter referred to as “temporary installation”) based on the following items:

(1) Temporary installations shall be clearly identified.

(2) Installation and removal of temporary installations shall be recorded in the fabrication records.

4.7.9 Establishing and maintaining fabrication processes

The contractor shall establish and maintain the fabrication processes according to the following procedure:

(1) The completion of a Critical Design Review (CDR) and matters necessary to take proper measures for the CDR shall be the baseline of change management to establish and maintain the fabrication process (including the special process). Therefore, a fabrication instruction document list shall be prepared and maintained.

(2) A process change for a qualification test or after the manufacture of equivalent specimens is started shall be evaluated by the fabrication

department, as well as by the design department.
In particular, if the contractor decides that a change affects function or performance, the contractor shall submit a fabrication process change proposition to JAXA containing the following.

- Contractor's name, department in charge, submission number, and date of submission
- Name of the product
- P/N, S/N, etc. of the product
- Contents of the change
- Reason for the change
- Evaluation of the adequacy of the change
- Evaluation of an effect caused by the change

(3) The contractor shall confirm in a review after the certification test or an equivalent review that the fabrication process has been verified. The confirmation shall constitute the establishment of the authorized fabrication process.
Flight hardware shall be fabricated according to the fabrication instruction document for the established fabrication process. Even if a partial change is made, re-qualification shall be conducted. If there is only a minor change using higher-level quality products, and that a demonstration by test or an analysis clearly shows the subsequent processes is not affected, re-qualification may be omitted by providing sufficient technical grounds.

(4) A change in the fabrication process shall be implemented upon request from a JAXA inspector.

4.8 Inspections and Tests

4.8.1 General

The contractor shall plan and implement the inspections and testing necessary to ensure that the articles conform to the requirements in the contracts, drawings, and specifications. The results of these inspections and testing shall be utilized to ensure the contractual requirements are met and shall be documented as objective evidence. The contractor shall establish an organization whose functions are planning and implementing the inspections and tests, and recording and evaluating the results in all contract phases.

4.8.2 Planning for inspections and tests

The contractor shall develop plans for inspections and testing with consideration of the following:

(1) Conducting inspections and tests in proper order and timing in all phases of contact execution

(2) Economic and effective use of personnel, facilities, and measurement equipment

(3) Use of calibrated measurement devices

(4) Application of sampling inspection method

(5) Inspections and tests conducted or attended by JAXA inspectors

(6) Utilization of control techniques to detect deviations from the criteria in early stages

(7) Inspections and tests for critical items identified in the reliability program

(8) Inspections and tests to ensure conformity with the design requirements

4.8.3 Test specifications

The contractor shall prepare and utilize specifications for tests. These specifications shall always be available to inspection and test personnel. The test specifications shall include the following items as necessary:

(1) Nomenclature and identification number of the article subject to test

(2) Test objectives, quantity of articles to be tested, and test location

(3) Reliability goal

(4) Test parameters, acceptance and rejection criteria, and tolerances

(5) Environmental conditions to be maintained

(6) Hazardous operations or situations

(7) Reference to applicable safety standards, rules, and regulations

(8) Allowable adjustment or exchange operations

(9) Requirements for data recording, analyzing, re-testing, and reporting test results

(10) Handling test articles after test

4.8.4 Written procedures for inspections and tests

The contractor shall prepare and utilize written procedures for all inspections and tests. These procedures shall always be available to inspection and test personnel, and the updated procedures shall be available at the inspection or test location. These procedures shall include the following items as applicable, or reference the technical documents:

(1) Nomenclature, identification number, and configuration of the article or material subject to inspection or testing

(2) Characteristics and design criteria including standard values for acceptance or rejection and tolerances

(3) Identification of inspections and tests conducted or attended by JAXA inspectors.

(4) Detailed steps and operations to be taken in sequence, including verifications to be made before proceeding

(5) Range, type, and control number of the measuring equipment or nondestructive inspection equipment to be used that correspond to the characteristics of the test articles

(6) Details or instructions for operation of special data recording equipment or other automated test equipment

(7) Layout and interconnection of test equipment and articles

(8) Hazardous operations or situations

(9) Precautions to ensure personnel safety and prevent damage or degradation of articles and equipment for inspections and tests

(10) Environmental conditions to be maintained

(11) Workmanship standard

(12) Constraints on inspections and tests

(13) Special explanations for noncompliance, or their results

(14) Applicable sampling inspection methods

(15) Personnel required for inspections and their roles

4.8.5 Performing the inspections and tests

4.8.5.1 General

The contractor shall conduct inspections and testing according to test specifications, inspection procedures, and other technical documents. The inspections and testing shall be performed on procured and fabricated articles prior to their installation into the next higher level of assembly.
The inspections and testing shall also include a review of the inspection and test records. The contractor shall keep records to ensure that each inspection or test is traceable to the individual responsible for its completion.

4.8.5.2 Control of articles at inspection and tests

The contractor shall hold the articles inspected and tested until completion of all inspections and testing, except when inspection and testing are performed in accordance with paragraphs 4.8.3 (8) or 4.9. The contractor shall control environmental conditions and equipment for inspections in accordance with proper technical documents to preserve article quality, as well as inspection and test accuracy, and their results.

4.8.5.3 Criteria for re-inspecting and retesting

The contractor shall re-inspect or retest at any phase whenever the following is applicable:

(1) The inspections or tests performed are not in accordance with test specifications or written procedures for inspections or tests.

(2) Malfunctions of inspection or test equipment are detected during or after inspections or tests, casting doubts on the test results.

(3) The article or material is subject to drift or degradation during storage or handling. In this case, the time for re-inspecting or retesting shall be determined.

(4) Noncompliance in accordance with paragraph 4.9 eliminates any necessity for re-inspecting or retesting.

4.8.6 Qualification tests

4.8.6.1 Control of qualification test articles

The contractor shall control articles subject to qualification testing

according to the following:

(1) Test articles shall pass the tests to ensure that they can withstand actual flight or operational use in an environment more severe than can be realistically expected (hereafter referred to as “actual flight or operational use”).

(2) Test articles shall be identified so they may be distinguished from identical articles for flight or operational use.

(3) Test articles shall be representative of the articles for actual flight or operational use that are generally fabricated according to the same processes and using the same configuration.

(4) Test articles shall be selected as randomly as possible.

(5) The results of the tested articles shall be recorded after testing. Such articles shall not be used for actual flight or operational use.

4.8.6.2 Re-qualification tests

The contractor shall conduct re-qualification tests when changes have been made to the design, fabrication, or inspection of the qualified articles; when the procurement source is changed; when articles have repeated noncompliance; or when inspection, test, or operational data of actual flight or operational use indicate the need for re-qualification.

When one of the above conditions occurs, the contractor shall conduct the following:

(1) Provide JAXA with written notification of the changes requested.

(2) Specify the need for and extent of the re-qualification test.

(3) Obtain approval of the JAXA inspector when conducting re-qualification tests.

4.8.6.3 Qualification based on similarity

The contractor may request JAXA approval for similar articles outside the scope of the corresponding contract that have been subjected to qualification testing based on their similar uses and utility. In such cases, the contractor shall ensure that the similarity between the articles is established and that the articles have undergone environmental testing resulting in similar, levels, times, and operating conditions at least as stringently as qualification levels required for the articles under the applicable contract. The contractor shall submit the data to JAXA for

approval.

4.8.7 Inspections and tests of end-item

4.8.7.1 General

The contractor shall perform inspections and tests specified in the contracts for the end items. The requirements specified in paragraph 4.8.7.2 shall be followed for the end items requiring qualification testing, proto-flight testing, acceptance testing and/or post-launch-site-delivery-testing (hereinafter referred to as the “acceptance test”).

4.8.7.2 Acceptance test for end items

The contractor shall perform tests with consideration for the following when the contract requires acceptance tests:

(1) Confirm that the test is feasible by conducting a task briefing prior to the test.

(2) Conduct the test according to the test specifications and written procedures prepared for each article.

(3) Conduct the test under the conditions specified in the development specifications, product specifications, etc. If the test conditions are not specified, determine the test conditions based on test purposes. It is necessary to fully consider the usage and environmental conditions during actual flight or operational use and the stress applied to the test articles.

(4) Conduct the test at the level, for the duration, and for the number of times sufficient to ensure that test articles satisfy the contractual requirements and present the required level of quality and workmanship.

(5) Report immediately to the JAXA inspector when any unusual phenomena, events, difficulties, or questionable conditions are detected during the test, in addition to judging the acceptance or rejection of articles based on the contract.

(6) Immediately stop the test when personnel safety is in jeopardy or there is damage to the test article or associated test equipment as soon as possible.

(7) Complete the disposition of noncompliance detected during and after the test before proceeding to subsequent operations including shipment according to paragraph 4.9.

(8) Confirm the test results by conducting task reviews after the test.

(9) Follow the contractual requirements for the actual flight or operational use of the tested articles.

4.8.7.3 Re-acceptance tests

The contractor shall obtain prior approval from the JAXA inspectors for adjustments, repairs, rework, or replacements after the acceptance test, if it is necessary. In this case, the contractor shall evaluate the effects of the test results and recommend the necessary extent of re-acceptance testing to JAXA inspectors.

4.8.8 Records of inspections and tests

4.8.8.1 General

The contractor shall prepare and maintain the records of all inspections and tests performed, including those performed during fabrication processes. The records shall include the data obtained. The records shall be described in enough detail for the particular type, scope, and importance of the articles. Inspections and tests performed must also clarify the dates, testing personnel, inspectors, acceptance and rejection criteria, and results. The inspection seal shall be provided as necessary.

4.8.8.2 Reports of acceptance tests

The contractor shall prepare reports for every acceptance test according to the contractual requirements. Each report shall include, but not be limited to, the following items:

(1) Nomenclature and identification number of articles

(2) Nomenclature and identification number of the articles removed or replaced during testing

(3) Copies of approved deviations or waivers

(4) Summary of test data and results

(5) Historical log of noncompliance

(6) Lists of critical items and articles with operating life

(7) Cumulative operating time or cycle data for articles

4.8.9 Roles of contractor’s quality assurance department in

conducting tests

4.8.9.1 General

The contractor’s quality assurance department shall satisfy the requirements specified in paragraphs 4.8.9.2 through 4.8.9.4 to ensure that all planned tests are performed and their goals achieved.

4.8.9.2 Confirmation before tests

Prior to testing, the contractor's quality assurance department shall confirm the following as applicable:

(1) The applicable written test procedures have been updated.

(2) The articles are identified.

(3) Configuration of articles is the same as that specified in the written procedure document.

(4) Test equipment is calibrated, and the calibration is valid during testing.

(5) The test equipment is consistent with what is specified in the written procedures. The written procedures shall include, as a minimum, the standards on temperature and humidity control, cleanliness control, and electrostatic discharge control.

(6) Tools, secondary resources, and software necessary for the test are available.

(7) Test preparations, including inspection history, necessary documents, and equipment conditions, are completed.

(8) Confirmation of noncompliance issues that have not been resolved must not affect test results, nor can these issues be exacerbated by testing.

(9) Suppliers' equipment, facilities, and documents necessary for testing are available.

(10) All personnel required, including personnel certified for the testing, are present.

4.8.9.3 Confirmation during tests

During testing, the contractor's quality assurance department shall confirm the following items as applicable:

(1) Testing is performed in proper order in accordance with test specifications and written procedures.

(2) Test data are accurately recorded.

(3) Procedural changes during testing are recorded.

(4) Noncompliance is treated according to the noncompliance processing procedures.

(5) Tests are performed in the environments required.

(6) Re-testing is performed according to paragraph 4.8.5.3.

4.8.9.4 Confirmation after tests

Subsequent to testing, the contractor's quality assurance department shall confirm the following items as applicable:

(1) The testing was effective and all required acceptance criteria are satisfied.

(2) Noncompliance during testing has been disposed of and corrective actions have been determined.

(3) The articles have been properly treated.

(4) The test results and reports are accurate and are traceable to the test articles.

(5) Inspections are conducted to confirm the changes in appearance of the articles that are likely to occur as a result of testing.

(6) Compare the as-built configuration and as-designed configuration of the test articles, confirming the consistency with both configurations.

4.9 Noncompliance Control

4.9.1 General

The contractor shall establish and maintain a documented noncompliance processing system to identify and isolate noncompliant articles, disposing of them properly. The system will ensure that corrective actions (hereinafter referred to as “noncompliance dispositions”) are taken when the articles do not comply to the requirements specified in the applicable drawings and specifications and when the article’s performance is questionable. This system shall be coordinated with the problem/failure requirements specified in the reliability program.

4.9.2 Identification and isolation of non-conforming articles

The contractor shall clearly identify the non-complying articles by attaching tags or marks. The noncompliant articles shall be held until the noncompliance dispositions are determined and subjected to the necessary actions such as removal from the test site. The non-conforming articles shall be presented when the JAXA inspector requests.

4.9.3 Documentation of noncompliance

The contractor shall document all noncompliance. The documentation concerning noncompliance shall state the following items as a minimum:

(1) Document number

(2) Nomenclature and identification number of the non-conforming articles.

(3) Date and process in which noncompliance is detected.

(4) Noncompliance descriptions and requirement characteristics or acceptance, and rejection criteria.

(5) Causes of noncompliance.

(6) Description of noncompliance dispositions determined in the Preliminary reviews or Material Review Board (MRB).

(7) Distinctions between the Preliminary reviews 1, 2 and MRB

(8) Confirmed results of the dispositions and the titles and document numbers of the technical documents, repair procedures, and related documents

(9) Descriptions of corrective actions

(10) Names of persons who recorded the descriptions indicated above and signature of the designated board members

With respect to the noncompliance for which suppliers are responsible, and for which disposition is executed by suppliers, the documents describing the disposition shall be quoted in the contractor's noncompliance documents.

4.9.4 Cause investigation and analysis

Prior to determining the disposition of noncompliant articles, the contractor shall determine the causes and mechanism for noncompliance as necessary, properly evaluate the level of potential effects, and investigate or analyze the articles to determine the most effective solution.

4.9.4.1 Noncompliance background factor analyses

When noncompliance occurs that will seriously affect the development schedule, costs, or interface, the contractor shall consult with JAXA inspectors to decide if any background factor analyses are necessary. If they are necessary, the contractor shall conduct the following analyses, which will help take remedial action. For background factor analyses, the contractor shall use the “HANDBOOK FOR METHOD OF HUMAN FACTORS ANALYSIS” (JERG-0-018). If an approach equivalent to those described in this handbook or a superior approach is available, it may be used. The results of the background factor analyses conducted shall be reported to JAXA through MRB.

(1) Variation tree analysis

If two or more departments or agencies are involved in the process of addressing noncompliance, a variation tree analysis shall be conducted. It should be noted that a variation tree analysis is combined with a “Why-Why Analysis” described below as needed.

(2) Why-Why Analysis

A Breakdown Cause Analysis or "Why-Why" Analysis shall be methodically conducted without omission to search for noncompliance factors including the motivating background. The reason for noncompliance shall be investigated until the root causes leading to corrective action is identified.

4.9.5 Preliminary Reviews (PRs)

4.9.5.1 Disposition determination in Preliminary Review 1 (PR-1)

The designated board member of the contractor's quality assurance department shall review the noncompliance and select one of the following dispositions for the noncompliant articles.

(1) Rework

If all work on the articles has not been finished or if the noncompliance is too insignificant to impact safety, reliability, functions, and performance of the end items, and if the articles can be completed to meet the requirements specified in the drawings and specifications with work performed according to the existing technical documents or work instructions, the articles shall be reworked. The rework shall be recorded, and the articles reworked shall be subject to the standard inspections and

tests during or after the rework.

(2) Scrap
If the noncompliant article is obviously unfit for use, it shall be scrapped. The articles shall be identified for scrap by using stamps, labels, tags, etc., according to the contractor's procedures for identifying, controlling, and disposing of the items to be discarded.

(3) Return to suppliers
Noncompliant procured articles or materials found in acceptance testing shall generally be returned to the supplier. The contractor shall provide the supplier with noncompliance descriptions, and with recommendations as necessary, when returning the noncompliant articles.

(4) Submission to Preliminary Review 2
When noncompliance disposition is unable to be determined at PR-1 or when the quality assurance department alone cannot determine noncompliance disposition due to the necessity of a technical investigation, the noncompliant article shall be submitted to PR-2.

4.9.5.2 Disposition determination in Preliminary Review 2 (PR-2)
The designated board member of the contractor's quality assurance department and the designated board member of the contractors' engineering department responsible for designing the noncompliant article shall review the noncompliant article, selecting one of the following disposition methods after consulting with each other. They shall also confer with the fabrication, procurement, and other associated departments as necessary.

(1) Rework
If all work has not been completed on the articles or if the noncompliant article is too insignificant to impact safety, reliability, functions, and performance of the end items, and if the articles can be completed to meet the requirements specified in the drawings and specifications with work performed according to the existing technical documents or work instructions, the articles shall be reworked. The rework shall be recorded, and the articles reworked shall be subject to the standard inspections and tests during or after the rework.

(2) Repair
If the causes of noncompliance are clear, and if the noncompliance is clearly so insignificant that repair will not affect safety, reliability, functions, and performance of the end items, or if standard repair procedures approved by the MRB apply, the articles shall be repaired. However, noncompliance occurring in the parts which interface with other articles

and which causes recurring noncompliance shall be submitted to the MRB. When the standard repair procedures require changes, the procedures need to be re-approved by the MRB. The repair shall be conducted following the procedures and shall be recorded.

(3) Scrap
If the noncompliant article is obviously unfit for use, it shall be scrapped. The articles shall be identified for scrap by using stamps, labels, tags, etc., according to the contractor's procedures for identifying, controlling, and disposing of these items.

(4) Use-As-Is
If the causes of noncompliance are clear, and if noncompliance is clearly so insignificant that the use of the noncompliant articles as they are will not affect safety, reliability, functions, or performance of the end items, or if the noncompliant articles will pass the judgment criteria approved by the MRB, the articles shall be used as they are. Noncompliance occurring in parts interfacing with other articles and with recurring noncompliance shall be submitted to the MRB. The rationale for use “as is” shall be stated in the noncompliance documents.

(5) Return to suppliers
A noncompliant article or noncompliant material procured after acceptance testing shall generally be returned to the supplier. The contractor shall provide the supplier with noncompliance descriptions, and with recommendations as necessary, when returning the nonconcompliant article.

(6) Submission to MRB
When noncompliance disposition is inappropriate to be determined at PR-2, the noncompliant article or material shall be submitted to MRB for final disposition.

4.9.5.3 Quality inspection conducted by JAXA Inspectors
The contractor shall undergo a quality inspection by JAXA Inspectors for the record of noncompliant articles disposed of only in preliminary reviews 1 and 2.

4.9.6 Material Review Board (MRB)
4.9.6.1 Membership
The Material Review Board (MRB) shall be comprised of at least a representative of the contractor's quality assurance department, a representative of the contractor's engineering department, which is responsible for design of non-conforming articles, and a JAXA inspector. Each member may designate one or more agents. The board members of

the contractor and their agents shall possess the authority and technical expertise adequate to determine appropriate dispositions. The chief supervisor shall approve participation of the board members of the contractor and their agents. When determining the disposition, opinions of associated departments of the contractor shall be referenced.

4.9.6.2 Responsibility

The Material Review Board shall perform the following:

(1) Determine the disposition of the noncompliant articles or materials based on the results of analysis and investigation, and confirm that proper dispositions have been implemented according to the decisions made.

(2) Ensure that appropriate and effective corrective actions are documented on the noncompliance document.

(3) Submit the application to JAXA for noncompliance dispositions requiring JAXA approval according to paragraph 4.9.7, and verify their implementation after JAXA approval is obtained.

(4) Ensure that MRB decisions are recorded.

4.9.6.3 Disposition determination by MRB

The MRB shall select one of the following for disposing of noncompliant articles or materials submitted to it. Concurrence of all board members is required to select any disposition other than scrap. The MRB shall consider the effects of the noncompliance with regard to the purposes of article usage, check the record of judgment on previous noncompliance applied to identical articles, and consider the opinions of experts when determining dispositions.

(1) Rework

If all the work on the articles has not been completed or if the noncompliance is too insignificant to impact safety, reliability, functions, and performance of the end items, and if the articles can be completed to meet the requirements specified in the drawings and specifications with work performed according to the existing technical documents or work instructions, the articles shall be reworked. The rework shall be recorded, and the reworked articles shall be subject to the standard inspections and tests during or after rework.

(2) Repair

When the MRB acknowledges that the noncompliant articles may be satisfactorily repaired, they shall be repaired. The MRB shall establish or

approve the required repair procedures. These procedures include the appropriate inspections and tests to confirm the acceptance or rejection of the test results. Repair work shall be performed according to the procedures and shall be recorded. When the contractor repairs the procured articles on its own, it shall do so after conferencing with the supplier and obtaining the advice and approval of the supplier. When the supplier repairs the noncompliant articles that are determined to be returned to the supplier because of their noncompliant disposition, the contractor and MRB shall review the articles, depending on the nature of the repair.

(3) Scrap
If the MRB judges the noncompliant article or material unfit for use, it shall be scrapped. The articles or materials shall be identified for scrap by using stamps, labels, tags, etc., according to the contractor's procedures for identifying, controlling, and disposing of the items.

(4) Use-As-Is
If the noncompliance will affect the fundamental objectives of the contract such as safety, reliability, durability, functions, performance, interchangeability, and weight, and if the MRB judges that using the noncompliant articles without repair is appropriate, the articles shall be used as they are. The rationale for their use “as is” shall be stated in the noncompliance documents.

(5) Return to suppliers
When a procured article or material is found to be noncompliant in the processes after the acceptance test, and when the MRB decides to return it to the supplier, it shall generally be returned to the supplier. The contractor shall provide the supplier with noncompliance descriptions, and with recommendations as necessary, when returning the noncompliant article or material.

(6) Recommendations to JAXA
When noncompliance adversely affects the fundamental purposes of the contract such as safety, reliability, durability, functions, performance, interchangeability, and weight, or when the MRB recommends repair to mitigate adverse effects of the noncompliant articles , recommendations shall be submitted to JAXA according to paragraph 4.9.7.

4.9.7 Application to JAXA
The contractor shall apply to JAXA for a waiver in accordance with configuration control requirements, where applicable to paragraph 4.9.6.3 (6). The application shall include application details, reasons and the MRB’s recommendations, and shall be approved by JAXA through the MRB.

4.9.8 Confirmation of disposition implementation

The contractor's quality assurance department shall confirm that the dispositions of the articles or materials shall be implemented as determined in the preliminary reviews and the MRB.

4.9.9 Corrective actions

The contractor shall implement effective and timely corrective actions. To achieve this, the contractor shall conduct the following actions:

(1) Ensure that the preliminary reviews and the MRB have determined the corrective actions for the noncompliance, and that the corrective actions are documented in the noncompliance documents.

(2) Ensure that the causes of noncompliance have been adequately investigated and analyzed.

(3) Report the noncompliance and corrective actions to the accountable departments and suppliers, and promote implementation of the corrective actions.

(4) Ensure that a responsible person is designated to confirm implementation of corrective actions.

(5) Ensure that implemented corrective actions are recorded.

(6) Review the open items of corrective actions and promote implementation of proper actions.

(7) Report noncompliance and dispositions to JAXA inspectors.

(8) Investigate whether the noncompliance has recurred or not and confirm the effectiveness of the corrective actions.

(9) Confirm that the result is reflected in the contents of the corrective action if the noncompliant background factor analyses described in Paragraph 4.9.4.1 are conducted.

4.9.10 Measures to prevent the recurrence of serious quality problems

If a serious quality problem occurs during the fulfillment of the contract or the defect liability period, the contractor shall immediately prepare a report concerning the prevention of the recurrence of serious quality problems, obtain the signature of the person responsible for the quality system, and submit it to the Safety and Mission Assurance Department,

as in Paragraph 4.6.11.

4.9.11 Material Review Board at Supplier

The contractor may, with approval of the chief supervisor, delegate the MRB responsibility for the applicable articles or materials to suppliers. In such a case, the contractor shall review and confirm the MRB results at the supplier's as part of the procurement control.

4.9.12 Statistical analysis of noncompliance

The contractor shall statistically analyze the noncompliant articles and materials including classification according to causes and processes to utilize in the mitigation of future noncompliance and process controls.

4.9.13 Utilization of JAXA database

The contractor shall submit the following noncompliance data for input into the electronic database system designated by JAXA. The contractor shall also utilize the JAXA database for noncompliance control at facilities.

(1) Major noncompliance at the development and production phases shall be reported to the Critical Design Review.

(2) Nonconformance submitted to MRB

4.9.14 Utilization of "QUALITY HIYARI-HATTO" data

When a QUALITY HIYARI-HATTO event occurs, the contractor shall collect, analyze, and use QUALITY HIYARI-HATTO data to prevent noncompliance. To do so, the contractor shall use the HANDBOOK FOR METHOD OF QUALITY HIYARI-HATTO DATA APPLICATION (JERG-0-020).
The contractor shall report regularly or as necessary concerning QUALITY HIYARI-HATTO events that may seriously affect the development schedule, costs, or interface when ordered by JAXA Inspectors.
If an approach equivalent to those described in this handbook or a superior approach is available, it may be used. In that case, too, the contractor shall report to JAXA Inspectors as described above.

4.10 Records of Articles

The contractor shall prepare and maintain the records of each article to be delivered in order to control the delivery and storage history of the articles.

Each record shall identify the pertinent articles and be prepared starting from the lowest level of assembly, and recording the sequence of fabrication, inspection, and test operations, as well as storage and transportation, as well as identify the recorder and his/her post. The record shall either include the following or reference other documents:

(1) As-designed configuration data
Baseline configuration, approved changes, and deviations

(2) As-build configuration data
Parts lists, drawings, specifications, changes, deviations, waivers, and identification data

(3) Fabrication history
Assembly and disassembly instructions and histories of coordination, repair, rework, or exchange

(4) Inspections and tests records
Specifications, written procedures, results, and variables data

(5) Noncompliance records
Noncompliance descriptions and dispositions

(6) Cumulative operating time or cycles
Operating time or cycles of tests and storage duration

4.11 Metrology Control

4.11.1 General

The contractor shall establish a metrology system as part of ensuring the objectivity of quality assurance, as well as utilizing the system to control measurement equipment, instruments, and standard devices (hereinafter referred to as “measurement equipment”) to the degree necessary to satisfy the following requirements. Measurement and calibration processes shall be performed in accordance with established written procedures.

4.11.2 Acceptance of measurement equipment

The contractor shall conduct inspections when accepting all newly acquired measurement equipment or whose calibration was performed externally. The contractor must confirm the measurement equipment conforms to requirements, and store the recorded results.

4.11.3 Evaluation of special measurement equipment

The contractor shall evaluate and confirm the following items for special measurement equipment (e.g., automatic test and checkout equipment) used for specific articles and materials only under specified operating conditions. The evaluation results shall be satisfied if the following conditions are met:

(1) The measurement equipment can measure the desired characteristics to the required accuracy and provide the necessary indications or records.

(2) The configuration of other test equipment simultaneously can be used with the measurement equipment and the environmental conditions.

(3) The descriptions of the items necessary for operation are described in the operating manuals of the measurement equipment.

4.11.4 Measurement accuracy

When measuring articles and materials, the contractor shall use measurement equipment ensuring that random and systematic errors in any article or material measurement shall not exceed 10% of the tolerance of the article or material characteristic being measured. The JAXA inspector may be requested to authorize exceptions for equipment that cannot satisfy this requirement.

4.11.5 Calibration accuracy

When calibrating equipment, the contractor shall use standard devices ensuring that random and systematic errors in any calibration measurement

shall not exceed 25% of the tolerance of the parameter being measured. The JAXA inspector may be requested to authorize exceptions for equipment that cannot satisfy this requirement.

4.11.6 Calibration controls

4.11.6.1 Calibration standard devices

The contractor shall use standard devices whose accuracy is ensured for calibrating measurement equipment, or shall utilize the services of outside facilities that can ensure the calibration accuracy.

4.11.6.2 Traceability

The contractor shall calibrate each individual piece of measurement equipment by using basic physical constants or providing traceability with national or international standards. If neither standard devices nor physical constants are available, the contractor shall document the references used for calibration.

4.11.6.3 Display of calibration status

The contractor shall display the calibration status and due date for the next calibration of the measurement equipment, using labels, tags, or color-codes. Measurement equipment with usage limitations shall be identified as such and shall identify the details of these limitations. Measurement equipment not requiring calibration shall be identified with labels etc., showing the equipment is not subject to further calibration.

4.11.6.4 Calibration intervals

The contractor shall set calibration intervals by assigning the maintenance of quality as the highest priority. The application, model, required accuracy, and other measurement equipment conditions shall be considered in setting the calibration intervals. The calibration intervals shall be reviewed as needed, depending on the calibration failure rate.

4.11.6.5 Re-calibration

The contractor shall recalibrate measurement equipment at predetermined calibration intervals within the calibration validity period. When the calibration validity period expires, the contractor shall terminate use of the measurement equipment and identify it as such. If continued use is necessary, the contractor shall obtain approval from JAXA Inspectors. If measurement equipment may affect the quality of products, even within the calibration validity period, the contractor shall immediately recalibrate it or terminate its use.

4.11.6.6 Calibration records

The contractor shall maintain individual records of measurement equipment.

These records shall include, but not be limited to, the following:

(1) Nomenclature and identification number of the measurement equipment

(2) Identification of standard device, equipment, and calibration procedure document utilized in calibration

(3) Calibration intervals or due date of the next calibration

(4) Calibration sites and environmental conditions

(5) Dates of each calibration and the disposition results including the data

(6) Noncompliance descriptions of the measurement equipment and remedial actions if applicable

(7) Individual(s) performing calibration and those who are responsible for calibration

4.11.7 Environmental conditions

In the measurement process, the contractor shall select and use the measurement equipment considering the environment (e.g., temperature, humidity, vibration, and cleanliness) where the articles and materials to be measured are placed. The environment for the calibration process shall be compatible with the requirements necessary for calibration.

4.11.8 Handling, storage, and transportation

The contractor shall handle, store, and transport the measurement equipment in a manner that shall not adversely affect equipment accuracy, nor cause equipment failure.

4.11.9 Remedial actions

The contractor shall implement remedial actions if noncompliance is detected in the measurement equipment. In such cases, a technical investigation shall be conducted immediately on the effects of the values measured based on corresponding measurement equipment from past data and shall be documented, as necessary.

4.11.10 Fabrication jigs and tools used for inspections

The contractor shall confirm the accuracy of fabrication jigs and tools used for inspections prior to their use, and thereafter shall confirm their accuracy at proper intervals according to the type, usage purpose, usage frequency, and status of the jigs and tools. When software is used for inspections, its appropriateness shall be confirmed similarly as the

fabrication jigs and tools. The confirmation results shall be recorded and stored.

4.12 Display of the status of articles and materials

The contractor shall display the status of the inspection or processes for all articles and materials according to the following:

(1) Identify and display the status such as acceptance, rejection, holding, or task completion regarding fabrication, inspection, or testing by directly applying markings or official seals or stamps to the extent that the quality of the articles and materials will not be affected, or by attaching the tags, labels, fabrication records, and inspection records to the applicable official seals and stamps.

(2) Document the sealing and stamping locations, and methods and display shall comply with the document.

(3) The inspector should apply and confirm the identification markings, seals, or stamps on the articles and materials. A record of the inspector's name shall be clearly noted in the documents.

(4) The sealing and stamping methods and materials must be compatible with the articles and materials and their usage.

4.13 Stamp Controls

The contractor shall establish and implement a documented stamp, seal and signature control system including the following.

(1) Stamps, seals, and signatures, including inspection and acceptance seals, are used to identify that the articles and materials have been subjected to source inspections, receiving inspections, fabrication inspections, and tests specified for the processes.

(2) Stamps and seals shall be traceable to the users.

(3) Stamps and seals with different usages shall be designed differently.

(4) Worn or damaged stamps and seals shall be removed from service and shall be replaced.

(5) Stamps and seals of the individuals who left the job shall be retrieved, and shall not be reissued for at least half a year.

(6) Stamps and seals used by the contractor shall be unique from other stamps and seals, including the JAXA inspection seal.

4.14 Handling, Storage, Rust Prevention, Marking, Labeling, Packaging, Packing and Shipping

4.14.1 General

The contractor shall establish and document the procedures for operations including handling, storage, packaging, and shipping the articles and materials. Measures against electrostatic discharge or vibration shall be implemented according to the characteristics of the articles and materials subjected to such requirements.

4.14.2 Handling

The contractor shall take protective measures for the articles and materials to prevent damage during from the fabrication phase through the storage phase. Special handling instructions shall be forwarded to the handlers. Handling equipment shall be checked prior to use or checked periodically, and the checkout records shall be maintained.

4.14.3 Storage

The contractor shall store the articles and materials under the environmental conditions required to prevent quality deterioration and damage. Articles and materials with a specified operating life shall be stored according to the requirements in paragraph 4.7.3.2. Procedures shall be specified and applied to maintain and identify articles and materials, as well as to determine periodic inspections and tests.

4.14.4 Rust Prevention

The contractor shall prevent rust from forming on the articles and materials susceptible to quality deterioration, contamination, or corrosion through exposure to air, moisture, or other environmental conditions during fabrication and storage. If any rusting should occur, the contractor will clean the rust off immediately.

4.14.5 Marking and labeling

The contractor shall verify that appropriate marking and labeling for the packaging, shipment and storage of the articles and materials are performed in accordance with applicable specifications and contractual requirements. Special attention shall be given to the articles whose quality may deteriorate due to marking and labeling.

4.14.6 Packaging

The contractor shall package the articles and materials according to the packaging specifications to prevent quality deterioration, corrosion, damage, and contamination. When special consideration or maintenance of certain environmental conditions is required to protect the articles and materials during transportation and delivery, the procedural documents or

manuals shall be prepared and pertinent requirements shall be displayed on the package surfaces. When the existing packaging procedures are not effective in preventing quality deterioration, special packaging methods shall be established, documented, and utilized.

4.14.7 Packing

The contractor shall provide proper padding, cushioning, blocking, bracing, or bolting to prevent damage of flexible barriers, undesired free movement within containers, and physical damage due to impact or vibration. Tests shall be conducted when packing suitability has been verified.

4.14.8 Shipping

4.14.8.1 Control

The contractor shall perform or verify the following when an article and/or material are shipped:

(1) All fabrication, inspection, and testing operations requirements have been completed.

(2) Attaching documents have been properly identified as to inspection status by the appropriate inspection seals or stamps of the contractor.

(3) The articles and materials have been preserved from rust and packaged in accordance with applicable technical documents or written procedure.

(4) The articles and materials have been identified and marked in accordance with applicable technical documents or written procedure.

(5) If there are no packing and marking requirements in the contract or subcontract, packing and marking of articles and materials shall comply with related laws and regulations and the contractor's requirements, and shall ensure safe arrival and ready identification at the destination.

(6) Ensuring devices and transportation method are suitable for the articles and materials to prevent damage.

(7) The packing and transportation methods comply with applicable specifications and requirements.

(8) The required permits have been obtained for hazardous articles and materials.

(9) When special handling is required for shipping and accepting the

articles and materials, the handling manuals shall be distributed to the departments prior to shipping or acceptance.

(10) Stamps and seals shall be utilized as necessary.

4.14.8.2 Data package

When submission of the data package with shipment is specified in the contract, the contractor shall attach the data including the component list, equipment log, or noncompliance historical log, as well as necessary documents for identification, maintenance, corrosion prevention and handling of the articles to be shipped. The data package shall include the historical logs of the items whose records are particularly effective for quality assurance, in addition to those of the items identified as reliability control items in the Reliability Program. The contractor shall coordinate with (chief) supervisors beforehand and determine the items to include the historical logs in the data package,The packages or containers for storing or shipping the end-items shall display the locations of the data package as necessary. The data package attached to the JAXA-furnished articles and JAXA properties shall be maintained to the extent necessary.

4.15 Utilization of Statistical Methods

4.15.1 Statistical process control

The contractor shall utilize statistical process control if it is effective for controlling fabrication and inspection operations. When statistical process control is utilized as a major control tool, the control chart method, process capacity analysis, and statistical problem solving method shall be applied.

4.15.2 Sampling inspection

Contractors performing inspections and tests will generally inspect or test all articles. However, a sampling plan may be used when the inspection or test is destructive, or when data, characteristics, or non-critical applications of the article or material indicate that a reduction in inspection or testing can be achieved without jeopardizing quality, reliability, or design intent. When sampling techniques are to be employed, existing military sampling inspection documents or the Japanese Industry Standard (JIS) will be applied. Approval of the chief supervisor shall be obtained before utilizing other sampling plans.

4.16 JAXA Properties Control

4.16.1 Contractor's responsibility

The contractor shall be responsible and account for all JAXA property supplied by JAXA in accordance with the contract standards. The supplier shall be similarly responsible and account for all such JAXA property as well when the supplier is in possession or control of JAXA property. The contractor's responsibility shall include, but not be limited to, the following

items:

(1) Upon receipt, the contractor shall perform a receiving inspection. The inspection shall examine the quantity, appearance, type, and dimensions of the articles, according to the shipping documents, while investigating for damage during transport.

(2) The contractor shall establish the control procedures, including protection, maintenance, calibration, periodic inspection, and separation, necessary to prevent damage or deterioration during handling, storage, installation, or shipment. If the data package is attached to an article or material, the data package storage location shall be indicated.

(3) The contractor shall maintain records that include the following:
   a. Identification of JAXA property
   b. Dates, contents, and results of contractor inspections, tests, maintenance, and transportation
   c. Location(s) where the property is to be installed or stored

(4) The contractor shall verify that the articles are capable of the necessary functions prior to assembly or installation.

4.16.2 Unsuitable JAXA property

The contractor shall comply with paragraph 4.9.2 and report to a JAXA inspector when any JAXA property is found to be malfunctioning or unsuitable. The disposition of the unsuitable JAXA property shall be determined at the MRB specified in paragraph 4.9.6 unless otherwise returned to JAXA at the receiving inspection.

5. DETAILED REQUIREMENTS

Not applicable.

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Appendix 1

DEFINITION OF TERMS

Analysis (of noncompliance)
: The study of a specific noncompliance in order to determine its causes and mechanism, and implement remedial and preventive action.

Approval (by (chief) supervisor)
: Approval obtained from the (chief) supervisor for technical notifications sheets.

Approval (by JAXA)
: Formal approval by JAXA on approval inquiry documents.

Article
: Hardware or a part of hardware required in the contract. The articles include software integrated into the hardware.

As-Build Configuration
: Article configuration after completion of fabrication and testing.

As-Designed Configuration
: Article configuration at the determination of design.

Audit
: The act of confirming and evaluating that documents are prepared according to the requirements, and tasks are performed in accordance with appropriate documents, and to recommend or amend necessary corrective actions. The audit includes in-house audits and audits performed on suppliers.

Billet

A piece of raw material such as a steel ingot before processing.

Calibration

Comparison of two instruments or measuring devices, one of which is a standard device of known accuracy, matching national standard devices, to detect and adjust any discrepancies.

Certification (of facilities)

The act of verifying with documentation that a facilities used for special processes conform with the specified requirements, according to objective qualitative evidence.

Certification (of personnel)

The act of verifying with documentation that confirm personnel have completed required training and have demonstrated specified proficiency through testing.

Characteristics

Dimensional, visual, functional, mechanical, electrical, chemical, physical and material characteristics of articles and materials or their nature. Design, fabrication, and operational control factors for articles and materials are described and established based on their characteristics.

Contractor

An individual or corporation who enters into a prime contract with JAXA.

Corrective Action

Action taken to preclude the cause of noncompliance and to prevent recurrence of the same or similar noncompliance. Such actions can be changes in design, fabrication, inspection, test methods and procedures, training, education, or transportation. It is synonymous with permanent action and treatment to prevent recurrence.

Deterioration

To become impaired in quality or performance, and therefore not meeting specified limitations.

Disposition

Actions performed on a non-conforming article to restore it to a usable condition by removing unsatisfactory conditions, or the act of re-fabricating the article. The details of dispositions are determined in a Preliminary Review or by a Material Review Board. Disposition can include: the article's use 'as is', where the article is used despite a noncompliant condition even though it is still usable; the article is returned to supplier; or the article is scrapped, where the article will be resubmitted or re-fabricated.

End Item

The articles delivered to JAXA according to the contract.

Fabrication

The act of manufacturing, inspection and/or testing of the launch vehicles and satellites of which design has been determined to deliver to JAXA.

Inspection

A process of confirming and judging whether an article or service conforms with corresponding drawings and specified requirements by measuring, testing, or other methods. The inspection includes confirming and judging it, utilizing the data obtained and measured by workers at fabrication and testing.

Items subjected to subcontractor supervision

The articles or materials selected to be supervised by a subcontractor.

Manufacturing

The act of producing the article as instructed in drawings; the processes include parts processing, fabrication and completion of the assembly. Machining, processing, bonding, welding, soldering, thermal treatment, finishing, or assembly, are included in the manufacturing.

Materials

The substances that comprise an article through processing. The materials include steel products, wires and adhesive agents.

Measurement Process

The process of determining the magnitude of characteristics and parameters of articles. Measuring equipment, written procedures, environment and workers are major components.

Modifying Action (of measuring equipment)

Action taken to correct noncompliance in the measurement equipment and to take remedial action.

JAXA Property

Any articles, test equipment or facilities supplied, leased or entrusted by JAXA in accordance with the contract.

Noncompliance

A condition of any article or material or service in which one or more characteristics do not comply with specified requirements. These include failures, discrepancies, defects, insufficiencies and malfunctions.

Qualification

Determination of an article being capable of meeting all prescribed requirements. Objects include design, manufacturing, inspection, testing, and their associated technical documents.

Quality Assurance Program Documents

Generic name of the documents necessary to implement the quality assurance of the products, but the quality record will be excluded. See Appendix 2 for the quality assurance program documents required by this standard.

Quality Assurance Program Requirements

The requirements necessary to implement the tasks required for the quality assurance program.

Quality Assurance

A planned system of all actions necessary to ensure that the end items will satisfy all quality requirements specified.

Quality Information

Information for the quality or quality assurance that is part of the information obtained from implementing the contract.

Quality Record

Generic name for documents in which the results of quality assurance programs, or data for article quality, are recorded. See Appendix 3 for the quality record required in this standard.

Quality Requirements

The requirements regarding quality characteristics that the articles should satisfy.

Quality

The necessary composites of all the attributes or characteristics, including performance of an item or product, to satisfy the mission of end-items such as functions, performances, and weights.

Rework

Work or continuation of work to complete the articles or comply with drawings, specifications, written procedures, or contractual requirements where the articles are incomplete or in a slight noncompliant state.

Repair

Work performed on a noncompliant article or material to place it in a useable and acceptable condition. Repair work usually requires additional written procedures and additional work.

Source Inspection

An inspection performed by the contractor at the supplier’s site where the articles and/or materials are manufactured.

Subcontract

A contract or purchase order made by a supplier under a JAXA contract. The subcontract includes orders issued to subdivisions of the contractors.

Subcontractor Supervision

JAXA’s act of supervising the subcontractor (supplier) in coordination with the contractor to make sure that the supplier will satisfy the quality requirements determined and developed under the contract between JAXA and the contractor of the critical items it fabricates.

Suppliers

Person, company or business office dealing directly with the contractor and supplying articles and materials to the contractor. Suppliers include subdivisions of the same company and collaborative companies.

Quality inspection of subcontracted articles

JAXA’s act of deciding important articles with the contractor in developing a product and inspecting the quality of the product, and checking whether suppliers who fabricate the items have satisfied the quality requirements.

Subcontracted articles subject to quality inspection

Subcontracted articles or materials that are subject to quality inspection [The term is the definition?]

Subcontract

A contract made or business performed by a supplier under contract with JAXA. The subcontract includes orders issued to the subdivisions of the contractor.

Serious quality problem

① When deliveries are delayed or the (probable or definite) cause of an operation (launching or tracking control) accident or noncompliance is attributable to a serious error or oversight in the design, fabrication, or operation process

② When serious noncompliance in the quality system is found in

the reliability/quality assurance audit or the system element evaluation

③ When noncompliance caused by a deliberate act such as the falsification of data is found just before or after delivery

Important quality characteristics

Characteristics of items, components, or materials (half-finished or finished goods) of which variations critically affect the performance, service life, mission accomplishment, etc. For example, the amount of lubricant inserted into a bearing unit, the activation timing or the leakage amount of valves in the assembly of an engine.

Important processing parameter

A controllable factor (parameter) in processing that seriously affects the important quality characteristics of an item. For example, brazing blazing (?, meaning extremely hot) temperature and heating time, arc welding current value and speed.

Tailoring

The act of changing the requirements to comply with applicable objects by selecting or rewriting the existing requirements, considering the conditions of the object the requirements are to be applied to.

Temporary Installations

Articles installed temporarily while producing the articles for fabrication, inspection, or testing reasons.

Test

The act of confirming function, performance or characteristics of samples or associated equipment by operating it electrically, physically or mechanically to obtain data.

Tolerance

Differences between specified and minimum and maximum values.

(For example: When the specification is 10.0 ± 0.1, the tolerance is +0.1 - (-0.1) = 0.2.)

Why-Why analysis

This technique searches for noncompliance factors without omission in a methodical and orderly manner. This technique is characterized by not requiring special training. First, identify possible causes for the occurrence of the relevant noncompliance by speculating about the reason why. Second, track down each of the causes by speculating about the reason why repeatedly, looking for about five different alternatives, until the root cause is identified.

Variation tree analysis

A technique devised to analyze the human factors for noncompliance. The analysis technique, based on the FTA, incorporates the concept of the flow of time enabling us to easily understand the noncompliance occurrence processes. It is very effective, particularly in interface adjustment or communication where a relatively large amount of information flows, because of its peculiar description method. The study of variable factors (exclusion nodes) that must be eliminated to prevent noncompliance and points (breaks) that cut off a chain of variable factors, etc. from the schematic tree will provide clues for taking measures against noncompliance.

Quality Hiyari-Hatto

An event related to quality that may lead to the occurrence of noncompliance in rockets, satellites, etc. if one or more factors are added.

Appendix-2

QUALITY ASSURANCE PROGRAM DOCUMENTS

DOCUMENTS	APPLICABLE PARAGRAPH
Quality Assurance Program Plan	4.3.2
Quality Assurance Program Document and Quality Record Storage	4.3.3.1
Quality Assurance Program Audit Instructions	4.3.6
Various Technical Documents	4.4.1.1
Document Review Instruction	4.4.1.3
Change Control System Rules	4.4.2.1
Identification and Retrieval System Rules	4.5.1
Procurement Control Rules	4.6.1
Procurement Document	4.6.3
Acceptance Inspection Procedures	4.6.6.2
Supplier Rating System Rules	4.6.7
Fabrication Procedures	4.7.2
Special Process Control Procedures	4.7.5.2
Certification Instruction for Personnel on Special Process	4.7.5.4
Electrostatic Discharge Control Rule	4.7.7
Test Specification	4.8.3
Inspection and Test Specification	4.8.4
Noncompliance Processing System Rules	4.9.1
Metrology Control System Rules	4.11.1

Stamp Control System Standards	4.13
Procedures for Handling, Storage, Packaging and Shipment	4.14.1
Manuals	4.14.2
Sampling Inspection Rules	4.15.2
JAXA Properties Control Rules	4.16.1

Appendix-3

QUALITY RECORDS

DOCUMENTS	APPLICABLE PARAGRAPH
Quality Information Records	4.3.4
Quality Status Report	4.3.5
Quality Assurance Program Audit Plan and Report	4.3.6
Education and Training Plan and Implementation Results	4.3.7
Document Review Results	4.4.1.3
Identification List	4.5.5
Supplier Evaluation Records	4.6.2
Procurement Document Review Results	4.6.3
Receiving Inspection Records	4.6.6.4
Supplier Rating Data	4.6.7
Audit Records on Supplier	4.6.8
Report Concerning the Prevention of the Recurrence of Serious Quality Problems	4.6.11, 4.9.10
Fabrication Record (including polarity checklist, photographic records)	4.7.1
Operating Life Control Records	4.7.3.2
Cleanliness Control Records	4.7.4
Special Process Facility Certification Records	4.7.5.3
Certification Records for Personnel on Special Processes	4.7.5.4
Special Process Evaluation Records	4.7.5.7

Fabrication Process Change Proposition	4.7.9
Inspection and Test Records	4.8.8
Acceptance Test Report	4.8.8.2
Noncompliance Document	4.9.3
Waiver Application	4.9.7
Corrective Action Implementation Records	4.9.9
Quality Hiyari-Hatto Data	4.9.14
Article Records	4.10
Measurement Equipment Acceptance Records	4.11.2
Special Measuring Equipment Evaluation Results	4.11.3
Calibration Records	4.11.6.6
Accuracy Inspection Results of Jigs and Tools	4.11.10
Display of Status Record of Articles and Materials	4.12
Stamp Control Records	4.13
Data Package	4.14.8.2
Statistical Process Control Records	4.15.1
JAXA Property Control Records	4.16.1

Appendix-4

DOCUMENTS TO BE SUBMITTED

Document title	Applicable paragraph	Submission schedule	JAXA action
Quality Assurance Program Plan	4.3.2	A month after contract	Approval
Quality Status Report (1)	4.3.5	Specified month	Notification
Report on Preventive Measures for the Recurrence of Serious Quality Problems	4.6.11 4.9.10	Immediately after a serious quality problem is identified	Notification
Fabrication Process Change Proposition	4.7.9	Before starting to make changes	Notification
Acceptance Tests Specification and Procedures	4.8.7.2	Two weeks prior to test	Review
Acceptance Tests Report (2)	4.8.8.2	A month after completion of test	Review
Noncompliance Document	4.9.3	At MRB Review	Review
Report on Quality Hiyari-Hatto	4.9.14	As needed or regularly	Notification
Data Package	4.14.8.2	Delivery time	Review

Note: This list shall be regarded as a general reference. Document title, submission schedule or JAXA action shall comply with the requirements of each contract.