



CONFIGURATION MANAGEMENT STANDARD

April 1, 2004

Japan Aerospace Exploration Agency

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

This is an English translation of JMR-006 (Notice-3).

If there is anything ambiguous in this document, the original document (the Japanese version) shall be used to clarification.

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JMR-006

Configuration Management Standard

1. JAXA JMR-006 is hereby established.
2. For any questions concerning this standard, contact the Safety and Mission Assurance Department of the Japan Aerospace Exploration Agency (JAXA).

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Title	CONFIGURATION MANAGEMENT STANDARD
Keywords	configuration, configuration identification, configuration documents, configuration identification documents, engineering order documents, configuration items, change control, engineering change, deviation, waiver, recording and accounting, as-designed configuration, as-built configuration, as-delivered configuration, and Configuration Control Board (CCB)
<p>Summary</p> <p>This standards sets the requirements for configuration management to be planned and implemented by the contractor under contracts awarded by the Japan Aerospace Exploration Agency (JAXA), regarding the design, fabrication, test and/or operation of a system and/or its constituent items.</p> <p>Configuration management is a technical and administrative process to identify functional and physical characteristics of the system and/or its constituent items, and maintain, record and provide them in the most updated state all the time throughout the entire lifecycle from design to fabrication, test and operation.</p> <p>Major elements of requirements in this standard are configuration management and its planning, configuration identification, change control, and recording and accounting.</p>	

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1. General Provisions

1.1 Purpose

This Configuration Management Standard (called the “Standard” hereinafter) specifies, in a contract that includes a system or component item design, fabrication, tests and operation done by the Japan Aerospace Exploration Agency (called the “Agency” hereinafter), the requirements for configuration management planned and implemented by the other party to the contract.

1.2 Scope

1.2.1 Application

This Standard applies to the following cases.

- (1) If this Standard is invoked in a procurement specification document or such like (called a “Specification” hereinafter).
- (2) If the other party to the contract presents its wish to do management based on this Standard and the Agency approves that.
- (3) If cited in a proposal or requirement document of the Agency.

1.2.2 Relationship with other contractual requirements

The relationship of this Standard with other contractual requirements is as follows:

- (1) If a requirement in this Standard differs from a requirement in a Specification, the Specification has priority.
- (2) This Standard is not to require activities that overlap with the requirements of other contractual standards regarding reliability, quality assurance, safety, maintainability, and such like; they are to supplement each other.
Appendix I lists the scope over which this Standard interfaces with requirements of other contractual guarantee programs of the Agency.

1.2.3 Tailoring

- (1) The Agency may tailor requirements of this Standard for each contract according to aspects such as the purpose, function, importance, and scale of the subject in question.
- (2) The other party to the contract can propose appropriate tailoring in the course of contractual negotiation. Before tailoring, examine the factors related to the purpose and such like of the subject in question shown in Clause (1) above.
- (3) The other party to the contract should prepare the configuration management plan required in Section 4.2.2 based on the results of the tailoring and maintain it.

2. Related documents

2.1 Applicable documents

Not applicable.

2.2 Reference documents

The following are documents containing general information or information that aid in understanding.

- (1) Notice of the Director of the Safety and Reliability Management Department, No. 16-3 Configuration Management Procedure
- (2) Notice of the Directors of the Safety and Reliability Management Department and Contract Department, No. 16-1 Inspection Implementation Procedure
- (3) JMR-005 Quality Assurance Program Standard
- (4) JMR-004 Reliability Program Standard
- (5) JERG-3-001 Ground Facility and Equipment Quality Assurance Program Standard
- (6) ISO 10007 Quality management – Guidelines for configuration management

3. Definitions of Terms

The definitions of terms in this Standard are shown in Appendix II.

4. General Requirements

4.1 Basic Requirements

4.1.1 Configuration management

Configuration management is a technical and managerial process over the whole life cycle of design, fabrication, test and operation, and it involves identifying the functional and physical properties of a system or component item and always maintaining, recording and offering the latest condition.

4.1.2 Basic requirements for configuration management

The other party to the contract should do the following activities:

The other party to the contract should require its suppliers to implement configuration management.

- (1) Identify technical requirements and such like by using configuration documents and proceed with activities based on this. The definitions in configuration documents are shown in Appendix II.
- (2) Manage changes to configuration documents.
- (3) Appropriately manage the latest configuration condition and record and confirm the results and report them to the Agency.

4.1.3 Acts and Rights of the Agency

- (1) Examination and Confirmation by the Agency

The work and documents related to configuration management activities brought about for the contracted activities at the other party to the contract are subject to technical inspection and confirmation as done by the Agency's inspector or assistant inspector (called an "Inspector" hereinafter).

The suppliers are also subject to this technical inspection and confirmation.

- (2) Facilities for Inspectors

When the Inspector performs its activities, the other party to the contract should accommodate it by presenting the necessary documents and records and providing appropriate facilities.

4.2 Organization and Plan

4.2.1 Organizational Structure

The other party to the contract should set forth an organizational structure for efficient configuration management including the following and clearly define who has the authority and responsibility for configuration management activities.

- (1) Person in charge
Set forth a person in charge of configuration management.
- (2) Configuration Control Board (CCB) etc.
This is a committee of technical and managerial experts having authority and responsibility for configuration identification and change decision, and it should consist of representatives of the configuration management section, engineering section, reliability and quality assurance section, manufacturing section, procurement section, and such like. The selection results of members (including their deputies) of the Configuration Control Board (called "CCB" hereinafter) are subject to approval by the Agency's Inspector.
- (3) Related organizations
Define all the in-house sections directly related to implementation of the contract in question.
- (4) Audit team
This is set up when implementing a configuration management audit and should consist of personnel with expertise covering configuration management activities and not directly responsible for the audited activities.

4.2.2 Configuration management plan

4.2.2.1 Plan Preparation

The other party to the contract should prepare and maintain a configuration management plan document (called the “Plan” hereinafter) to implement the requirements for configuration management specified in the contract and perform configuration management based on this.

The other party to the contract can prepare a standard plan which is applied to contracts with the Agency in common. If a standard plan is prepared, however, prepare an individual configuration management plan for the individual contents of each plan as the need arises.

4.2.2.2 Contents of Plan

The other party to the contract should describe at least the following.

- (1) Describe all the sections related to conducting configuration management activities and their function, authority and responsibility using organization charts and tables.
Include in this the description of the configuration management activities shown in Paragraphs a to c below.
 - a. For the configuration management activities done by each section, their identification and relationship with other sections.
 - b. The authority and organizational and working relationship which the CCB and the like have with the configuration management activity implementation section.
 - c. Guidelines for work allocation and cooperation between the development activity implementation management and reliability and quality control organizations and the configuration control section.
- (2) The matters in configuration management planned by the other party to the contract for the performance and management of each activity in Section 4.3 and documents detailing them and their milestones and related documents.
The other party to the contract should document the guidelines, methods and procedures to exercise control over the various activities and cite or use them on the Plan. For this, exploit the procedures already enforced at the other party to the contract to the maximum.
- (3) A list of those documents of the other party to the contract which are newly prepared or are existing and need modifications to satisfy the requirements of this Standard.
Include in it a completion or modification schedule and descriptions of these documents.
- (4) Division of configuration identification and changes between a scope subject to approval by the Agency and a scope to be processed on the responsibility of the other party to the contract (documents subject to this, system or component level, etc.).
- (5) Application guidelines of this Standard for suppliers
- (6) Application guidelines of this Standard for goods developed by organizations other than the Agency.

4.2.2.3 Approval of Plan

The other party to the contract should obtain approval from the Agency at the start of performing the activities according to the contract. If there are changes to the contents of the plan, report them to the Agency and obtain re-approval for them. However, only for a simple change to an organization name or other slight changes which do not directly affect configuration management, re-approval may be omitted and changes or revisions are allowed by submitting a written notification to the Agency.

4.3 Configuration management

4.3.1 Configuration Identification

4.3.1.1 Configuration Identification Procedure

The other party to the contract should use the configuration identification document consisting of the technical specifications, contractual approval drawings and approved technical instructions presented by the Agency as a baseline to do the following identification work.

- (1) Allocate the functional and physical properties for achieving the requirements concretely to

lower-level component elements to the part level according to the state of progress and identify and list them as configuration items. Document each configuration item into a technical instruction.

- (2) Document the interface between configuration items or between the other party to the contract and its supplier into a technical instruction.
- (3) Establish the technical instructions prepared in Clauses (1) and (2) after review by the CCB, etc.
- (4) Include in the technical instructions the information about their changes and traceability (applied higher-level documents, etc.).
- (5) Technical instructions that require approval as stated in the contract should be approved by the Agency as approved technical instructions

4.3.1.2 Configuration clarification

The other party to the contract should confirm at each major milestone of development that the configuration document is kept in the latest state and clarify the configuration.

4.3.1.3 Identification number

The configuration items and configuration documents should all be identified by a unique identification number.

Using an identification number, it should be possible to control the following.

- (1) Hierarchical or subordinate relationship between configuration items.
- (2) Hierarchical or subordinate relationship between a part and component of a configuration item.
- (3) Relationship between goods item and document
- (4) Relationship with a change involving goods and documents
- (5) Relationship with a supplier's goods item

4.3.2 Change control

Change control consists of activities to review and approve a configuration change and precisely reflect the results in the goods and related documents.

Configuration change control is divided into the three categories of engineering change, deviation and waiver and the first is further divided into cases subject to approval of the Agency and cases to be processed at the responsibility of the other party to the contract.

A change subject to approval of the Agency is a case that involves changes to the contents specified in the configuration identification document and the details of the change should be proposed and requested to the Agency. In this case, a proposal and request should be made for each configuration identification document subject to the change. A change to be processed at the responsibility of the other party to the contract involves changing the contents specified in the technical instructions and it should be controlled by the CCB or other change control system of the other party to the contract.

Take the start time of change control to be the time when each configuration document is established.

The other party to the contract should establish a change control system which contains the following.

- (1) Decision criteria and decision organization for division into an engineering change, deviation or waiver.
- (2) Configuration document change procedure (including the activities of the CCB and document forms).
- (3) Procedure to reflect an engineering change in the goods.
- (4) Interface with a supplier

4.3.2.1 Engineering change

The other party to the contract should do the following when processing an engineering change.

- (1) The drafting, review, approval, implementation and confirmation of an engineering change should be processed according to the change control system of the other party to the contract. For an engineering change subject to approval of the Agency, however, proceed with the procedures of Clauses (3) and (4) in pace with approval by the other party to the contract.

- (2) When reviewing an engineering change, consider the following points.
 - a. Technical adequacy of the proposed change (performance, safety, reliability, maintainability, etc.)
 - b. Interchangeability and influence of an interface, etc.
 - c. Effect on configuration documents
 - d. Necessity for re-identification
 - e. Influence on lead time, cost, and other contractual matters
 - f. Influence on the fabrication, test and inspection methods
 - g. Influence on already delivered articles
- (3) When proposing an engineering change to the Agency, the other party to the contract should confer with the Inspector beforehand.
- (4) The other party to the contract who proposes an engineering change to the Agency should submit the following documents to the Agency for approval. The form should be in accordance with Appendix III.
 - a. Engineering Change Proposal (ECP)

4.3.2.2 Deviation

Deviations should be processed by following the same procedure as the engineering change in Section 4.3.2.1. The form of a request to the Agency should be in accordance with Appendix III. A request for approval of a deviation should be made prior to the start of fabrication of the item.

The Agency may change a requested deviation request into an engineering change proposal or conversely a proposed engineering change proposal into a deviation request.

4.3.2.3 Waiver

Waivers should be processed by following the same procedure as the engineering change in Section 4.3.2.1. The form of a request to the Agency should be in accordance with Appendix III.

4.3.2.4 Change to an already delivered item

If the necessity arises for an engineering change to a system or component item already delivered to the Agency (such as cases where it turns out after delivery that the required performance cannot be satisfied), confer with the Agency and, if approved, submit an engineering change proposal to the Agency according to Section 4.3.2.1.

If work on an already delivered item was done based on the engineering change proposal approved by the Agency, make a work completion report after completion of the work.

4.3.3 Recording and reporting

Recording and reporting are activities for clearly keeping track of the configuration at major milestones of development and ensuring the traceability to allow efficient control.

The other party to the contract should do the following.

- (1) Prepare and keep the status record of configuration documents (see Figure 1 of Appendix II).
- (2) Set forth the time of reporting beforehand and report the record of Clause (1) to the Agency.

4.4 Configuration control audit

The other party to the contract should make a plan of auditing the state of implementation of configuration control and implement it. The audit team of the other party to the contract should audit the following and document the audit results and, at the same time, report the audit results to the person in charge of configuration control.

- (1) An audit to see whether configuration control is performed surely as specified in the configuration control plan approved by the Agency.
- (2) An audit to see whether configuration control is working effectively.

5. Detail requirements

Not applicable.

6. Note

Not applicable.

Appendix I: Scope over which this Standard interfaces with requirements of other contractual guarantee programs of the Agency.

Many of the provisions in this Standard overlap, or need to be supplemented or interfaced with, provisions of the various standards shown below. When the other party to the contract prepares a plan for each of the various programs, those plans must be prepared to avoid overlapping activities and be able to satisfy all the requirements. Their mutual relationship for this purpose is shown below.

JMR-006 Configuration Control Standard	JMR-005 Quality Assurance Program Standard	JMR-004 Reliability Program Standard	JERG-3-001 Ground Facility and Equipment Quality Assurance Program Standard
4.2.1 Organization	4.3.1 Organization	4.2.1 Organization	4.3.1 Organization
4.2.2 Configuration management plan	4.3.2 Quality assurance program plan	4.2.2 Reliability program plan	4.3.2 Quality assurance program plan
4.3.1.1 Configuration identification procedure	4.4.1 Technical document management 4.6.3 Purchase document 4.7.2 Fabrication instruction 4.8.3 Test specification	4.3.2 Design specification 4.3.16.4 Specification 4.4.3.3 Test Specification, procedure and report	4.4.1 Technical document management 4.5.1 Design specification 4.7.2 Purchase document
4.3.1.2 Configuration clarification	4.4.3 Matters to be confirmed of the quality assurance section at various review meetings	4.3.13 Design review 4.3.16.12 Packaging review of EEE items 4.4.5.1 Pre-shipment review and pre-delivery review	4.5.5 Design review
4.3.1.3 Identification number	4.5 Identification and search		
4.3.2 Change control	4.4.2 Change control	4.3.13.3 Engineering change	4.4.2 Change control
4.3.2.1 Engineering change			
4.3.2.4 Waiver	4.9.7 Request to the Agency		4.11.7 Request to the Agency
4.3.3 Recording and reporting	4.10 Goods record		
4.4 Configuration control audit	4.3.6 Quality assurance program audit	4.2.3 Reliability program management and audit	4.3.4 Quality assurance program audit

Appendix II: Definitions of Terms

Configuration

Refers to the functional and physical properties of a system or component item.

Functional properties:

Refers to the performance to be given by the system or component item and the restrictions to be observed. Examples include thrust, velocity, transmission power, orbit accuracy, reliability, maintainability, and safety.

Technical inspection:

Refers to an inspection of technical matters including design verification, design validity confirmation and the like in the development and test processes and reliability management and other continuous inspections.

Physical properties:

Refers to the equipment or part configuration, shape, weight, dimensions and other specifications of a system or component item to realize the functional properties.

Overall system:

Refers to, for an artificial satellite, space station, or the like, a set of hardware and software which serves for its development and operation to accomplish its launch, operation and other missions, and is classified under "major system."

Major system

Refers to an artificial satellite, space station, rocket, and the like.

Goods item:

Refers to a set of hardware and software, or a part of it, making up a major system regardless of whether it is a component, part, or other entity. A configuration item refers to an item specified in the configuration document.

Configuration identification:

Refers to specifying a configuration in documents and drawings.

Configuration document:

Refers to a technical document which specifies the functional and physical properties of a system or component item. A configuration document is shown in Figure 1 of Appendix II.

Configuration identification document:

Refers to a technical specification document used for configuration identification, together with the drawings for approval and technical instruction documents for approval which supplement it.

Technical instruction document:

Refers to, of the configuration documents, a technical document which states the technical requirements for the other party to the contract to realize the requirements of the configuration identification document as a product (design standard, design specification, drawing, etc.).

Engineering change:

Refers to the case of changing the configuration identification document and technical instruction document. Engineering changes are divided into those subject to approval of the Agency (engineering change which needs the configuration identification document to be revised) and those processed at the responsibility of the other party to the contract. Engineering changes which have an influence on the performance, development cost, development schedule, safety, reliability, maintainability, interchangeability, replenishment support, interfaces or other important matters of the intended system or component item are especially important.

Deviation:

Refers to fabricating a system or component item which is nonconforming to the requirements of the configuration identification document, in a limited quantity and for a limited period before fabrication. An example is the case where a technical specification document specifies a type number for a component item but a substitute item is used for limited specific serial numbers of that item because of the lead time or for other reasons.

Waiver:

Refers to the case of accepting a system or component item as is despite a nonconformance to a requirement of the configuration identification document which occurred after the start of its fabrication or accepting it after repaired by an approved method. An example is the case where a hole was made at a place different from the instruction on the drawing due to a mistake in machining, but it is judged not to have an adverse effect on the functional and physical properties and the machined piece is accepted as is.

As-designed configuration

Refers to, for a system or component item after the decision phase, the configuration of the hardware and software related to it at the completion (review meeting, etc.) of their respective design phases.

As-built configuration

Refers to the configuration of the hardware and software related to a system or component item after the completion of its fabrication and tests.

As-delivered configuration

Refers to the configuration of the hardware and software related to a system or component item at its shipment.

Supplier:

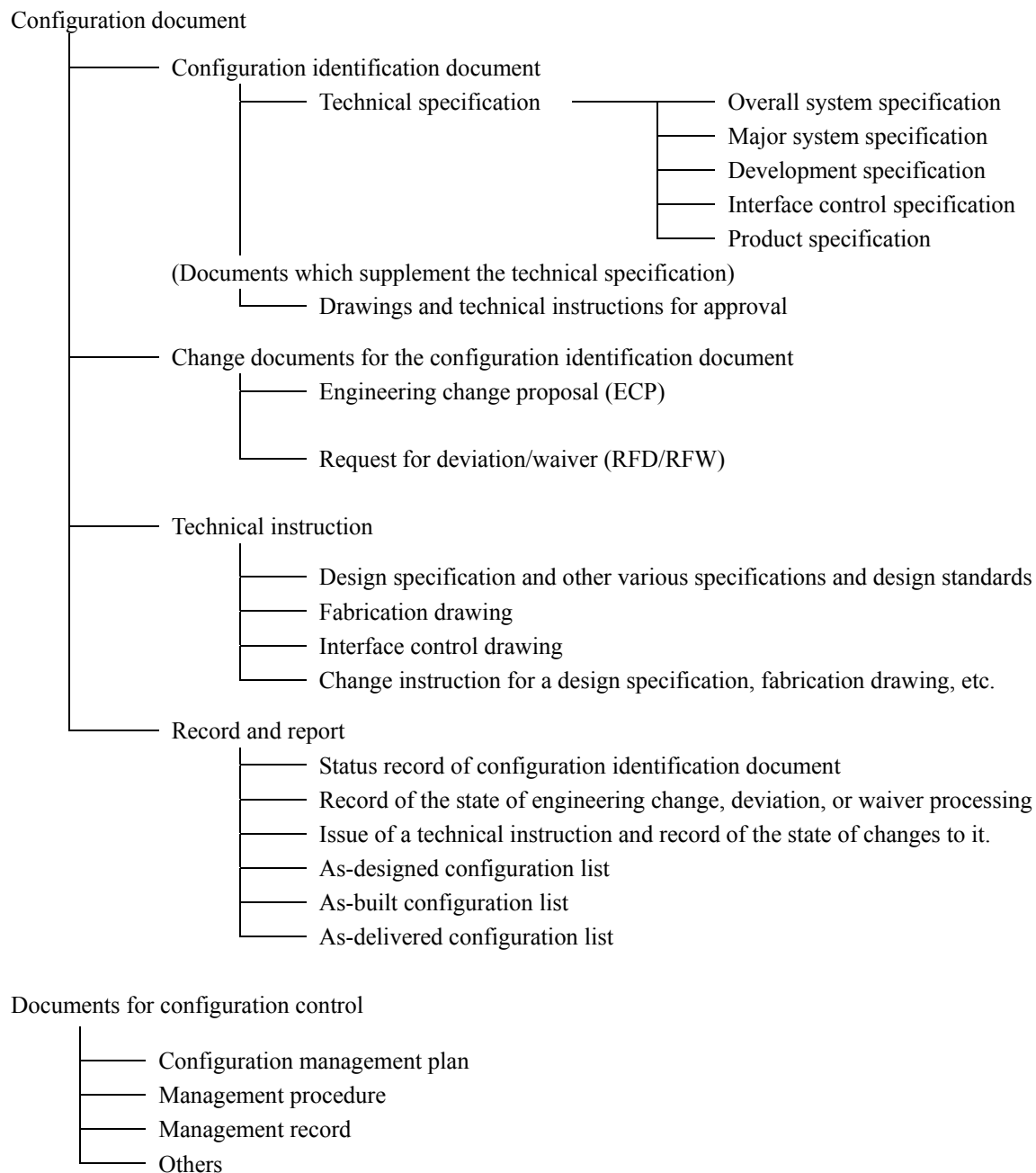
Refers to an individual, company, or business establishment that, under a contract with the Agency, carries out direct transactions with the other party to the contract and supplies goods and such like to the other party to the contract. This includes other business sections in the same company and affiliated companies.

Tailoring:

Refers to the acts of selecting or rewriting requirements considering various conditions of the subject of application to bring about a change into a requirement document that fits the subject of application.

Material review board (MRB):

Refers to a board consisting of the Inspectors and designated representatives of the other party to the contract, to confer about the materials, parts, semi-finished products, or the rocket, artificial satellite or the like which, in an inspection, turned out not to conform to the requirements set forth in a contract clause, specification document or the like and make an investigation into the cause of the nonconformance, dispose of the nonconforming articles, decide corrective actions, and verify the results pursuant to the provisions of the applicable quality control requirements.



Appendix II, Figure 1: Relationship between configuration documents

Appendix III: Form of a proposal or request to the Agency

For configuration control, document forms which need an interface between the Agency and the other party to the control are set forth as shown below.

1. Engineering change proposal (ECP)
2. Request for deviation or waiver (RFD/RFW)

Engineering change proposal (ECP)		Proposal origin control number	
		Date of preparation	
Proposer (proposal origin name, the section, office, signature or seal impression of the person responsible for the proposal)		Contract subject and procurement specification number	
Title of change		Urgent matter? Yes (until [Month Day, Year]) No	
Name, type or part number, and applicable fabrication number of the intended system or component		Applicable serial number	
Intended technical specification numbers, drawings, etc.		Related technical documents	
Motivation of proposal (1) Initiative by proposer (2) Nonconformance measures (3) Others			
Necessity and reason for proposal			
Details of change			
Related matters (detail each individual influence on a separate sheet) <input type="checkbox"/> Performance <input type="checkbox"/> Maintainability <input type="checkbox"/> Replenishment support <input type="checkbox"/> Other (describe in concrete terms.) <input type="checkbox"/> Safety <input type="checkbox"/> Interchangeability <input type="checkbox"/> Lead time <input type="checkbox"/> Reliability <input type="checkbox"/> Interface <input type="checkbox"/> Contract price			
Attached documents		* Field for approval of the Japan Aerospace Exploration Agency	
		This case is [Approved] / [Disapproved].	
		CCB	
		Head of project team in charge	
Reception stamp of department in change		* Field for signature	
		Members	
		Date	
		* Approval number	

Fields marked with an asterisk (*) will be filled out by JAXA when approved

Request for deviation or waiver (RFD/RFW)		Request origin control number	
		Date of preparation	
Requester (request origin name, the section, office, signature or seal impression of the person responsible for the request)		Contract subject and procurement specification number	
Title of deviation or waiver		Urgent matter? Yes (until [Month Day, Year]) No	
Name, type or part number, and applicable fabrication number of the intended system or component		Applicable serial number	
Intended technical specification numbers, drawings, etc.		Related technical documents	
Necessity and reason for deviation or waiver request			
Details of deviation or waiver request			
Influence on lead time		Related important matters <input type="checkbox"/> Performance <input type="checkbox"/> Maintainability <input type="checkbox"/> Replenishment support <input type="checkbox"/> Safety <input type="checkbox"/> Interchangeability <input type="checkbox"/> Other <input type="checkbox"/> Reliability <input type="checkbox"/> Interface (describe in concrete terms)	
Influence on contract price			
MRB recommendation and nonconformance report number (in case of a waiver)			
Attached documents		* Field for approval of the Japan Aerospace Exploration Agency	
		This case is [Approved] / [Disapproved].	
		CCB	
		Head of project team in charge Members	
Reception stamp of department in charge		* Field for signature	
		Date * Approval number	

Fields marked with an asterisk (*) will be filled out by the JAXA when approved