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SSP 50108
Revision C

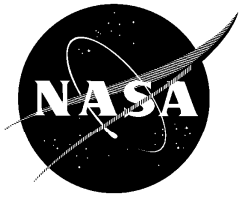
Certification of Flight Readiness Process Document

International Space Station Program

Revision C

November 2006

National Aeronautics and Space Administration
International Space Station Program
Johnson Space Center
Houston, Texas
Contract Number: NNJ04AA02C



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REVISION AND HISTORY PAGE

REV.	DESCRIPTION	PUB. DATE
-	Initial Release (per SSCBD 000197, EFF. 03-25-96)	09-23-96
A	Revision A (per SSCBD 000853, EFF. 01-08-98)	03-25-99
B	Revision B (Reference per SSCN 002507R1, EFF. 01-30-02)	02-13-02
	(SSP 50108 was updated from Microsoft Office 97 to the existing working version of Microsoft Office. All pages that have been affected by the implementation of this update have been included in this package. Although no technical content has been impacted, some text and line flow may have occurred.)	
	DCN 001 (Reference per SSCD 006530, EFF. 05-10-02)	
	Early Release	06-18-02
	Program Release	03-24-03
	DCN 002 (Reference per SSCD 007417, EFF. 01-08-03)	
	Early Release	02-27-03
	Program Release	03-24-03
	DCN 003 (Reference per SSCD 007795, EFF. 04-29-03)	06-23-03
	DCN 004 (Reference per SSCD 008102, EFF. 09-25-03)	11-11-03
	DCN 005 (Reference per SSCD 008392, EFF. 01-13-04)	02-17-04
C	Revision C (Reference per SSCD 008994, EFF. 01-17-07)	
	Early Release	01-29-07
	Program Release	05-01-09

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CERTIFICATION OF FLIGHT READINESS PROCESS DOCUMENT

CHANGE SHEET

January 23, 2007

Revision C

Space Station Control Board Directive 008994/(1-1), dated 01-17-07. (1)

CHANGE INSTRUCTIONS

SSP 50108, Certification of Flight Readiness Process Document, has been approved by the authority of SSCD 008994. All future updates to this document will be identified on this change sheet.

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Revision C (Reference SSCD 008994, dated 01-17-07)

LIST OF EFFECTIVE PAGES

January 23, 2007

The current status of all pages in this document is as shown below:

Page	Change No.	SSCD No.	Date
i - xiii	Revision C	008994	January 17, 2007
1-1 - 1-10	Revision C	008994	January 17, 2007
2-1 - 2-6	Revision C	008994	January 17, 2007
3-1 - 3-2	Revision C	008994	January 17, 2007
4-1 - 4-5	Revision C	008994	January 17, 2007
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C-1 - C-14	Revision C	008994	January 17, 2007
D-1 - D-11	Revision C	008994	January 17, 2007
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F-1 - F-12	Revision C	008994	January 17, 2007
G-1 - G-14	Revision C	008994	January 17, 2007
H-1 - H-21	Revision C	008994	January 17, 2007
I-1 - I-3	Revision C	008994	January 17, 2007
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SSP 50108
Revision C

INTERNATIONAL SPACE STATION PROGRAM

CERTIFICATION OF FLIGHT READINESS PROCESS DOCUMENT

NOVEMBER 2006

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PREFACE

CERTIFICATION OF FLIGHT READINESS PROCESS DOCUMENT

This document establishes the standard approach to be used by the International Space Station (ISS) Program for endorsing safety, flight readiness, and operational readiness for pre-launch activities, launch and return/disposal, and on-orbit assembly, operations, and maintenance. The approach defined within this document is to be used by the ISS Program Manager, Office Managers, ISS Program Contractors, International Partners/Participants (IP/Ps), NASA Launch Package Managers (LPMs), NASA Increment Managers (IMs), and other National Aeronautics and Space Administration (NASA) institutional managers and their associated contractors.

The ISS Program Certification of Flight Readiness (CoFR) process defines the endorsements, method of handling exceptions to endorsements, roles and responsibilities of each participant, and schedules for CoFR implementation. The process defined herein is independent of the launch vehicle (LV), although it does support and interface with the LV Certification of Flight Readiness process.

The contents of this document are consistent with agreements defined in Joint Management Plans (JMPs) and Memorandum of Understandings (MOUs) between NASA and the IP/Ps, and tasks and products to be prepared by ISS Program organizations and IP/Ps in accordance with all applicable ISS Program requirements. The ISS Program CoFR process shall be implemented on all new ISS Program contractual and other Program activities, and shall be included in any existing contracts through contract changes. This document is under the control of the Space Station Control Board (SSCB), and any changes or revisions shall be approved by the SSCB.

NASA ISS Program Manager

1/17/07
Date

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NASA/ASI

INTERNATIONAL SPACE STATION PROGRAM

CERTIFICATION OF FLIGHT READINESS PROCESS DOCUMENT

NOVEMBER 2006

JOINT REQUIREMENTS

APPROVAL

Agenzia Spaziale Italiana (ASI) concurs with the general concepts contained in this document. Appendix C of SSP 50108, Certification of Flight Readiness Process Document, contains specific joint agreements and requirements between NASA and ASI for the ISS Program. Any changes to Appendix C must be implemented via bilateral directives.

NASA ISS Program Manager

Date 1/17/07

ASI Program Director

Date

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NASA/CSA

INTERNATIONAL SPACE STATION PROGRAM

CERTIFICATION OF FLIGHT READINESS PROCESS DOCUMENT

NOVEMBER 2006

JOINT REQUIREMENTS

APPROVAL

Canadian Space Agency (CSA) concurs with the general concepts contained in this document. Appendix D of SSP 50108, Certification of Flight Readiness Process Document, contains specific joint agreements and requirements between NASA and CSA for the ISS Program. Any changes to Appendix D must be implemented via bilateral directives.

NASA ISS Program Manager

Date 1/17/07

Program Manager, Canadian Space Station (CSA) Program

Date

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NASA/ESA

INTERNATIONAL SPACE STATION PROGRAM

CERTIFICATION OF FLIGHT READINESS PROCESS DOCUMENT

NOVEMBER 2006

JOINT REQUIREMENTS

APPROVAL

European Space Agency (ESA) concurs with the general concepts contained in this document. Appendix E of SSP 50108, Certification of Flight Readiness Process Document, contains specific joint agreements and requirements between NASA and ESA ISS and Automated Transfer Vehicle Programs **<TBR>**for the ISS Program. Any changes to Appendix E must be implemented via bilateral directives.

NASA ISS Program Manager

1/07/07
Date

ESA ISS Program Director

13 SEPT 2007.
Date

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NASA/JAXA

INTERNATIONAL SPACE STATION PROGRAM

CERTIFICATION OF FLIGHT READINESS PROCESS DOCUMENT

NOVEMBER 2006

JOINT REQUIREMENTS

APPROVAL

Japan Aerospace Exploration Agency (JAXA) concurs with the general concepts contained in this document. Appendix F of SSP 50108, Certification of Flight Readiness Process Document, contains specific joint agreements and requirements between NASA and JAXA for the ISS Program. Any changes to Appendix F must be implemented via bilateral directives.

NASA ISS Program Manager

1/17/07
Date

JAXA ISS Program Manager

Date

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NASA/ROSCOSMOS

INTERNATIONAL SPACE STATION PROGRAM

CERTIFICATION OF FLIGHT READINESS PROCESS DOCUMENT

NOVEMBER 2006

JOINT REQUIREMENTS

APPROVAL

Roscosmos agrees to the flight readiness certification procedure applied to the Roscosmos elements, as per Appendix G, with respect to their integration into the ISS which will be launched by the Russian LVs or by LVs of other Partners under separate agreements. Roscosmos agrees to the general principles and definitions for the ISS elements certification provided in the attached document, limited to the Russian obligations for the certification of the Russian elements contained in Appendix G.

NASA ISS Program Manager

Date 11/17/06

Roscosmos Program Director

Date

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INTERNATIONAL SPACE STATION PROGRAM

CERTIFICATION OF FLIGHT READINESS PROCESS DOCUMENT

CONCURRENCE

NOVEMBER 2006

Concurred by:		RSC-E
	ROCKET SPACE CORPORATION - ENERGIA	ORG
	SIGNATURE	DATE
Developer Concurrence:		KhSC
	KHRUNICHEV STATE RESEARCH AND PRODUCTION SPACE CENTER	ORG
	SIGNATURE	DATE

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CERTIFICATION OF FLIGHT READINESS PROCESS DOCUMENT

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NOVEMBER 2006

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	Charlene E Gilbert SIGNATURE	12-08-06 DATE
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INTERNATIONAL SPACE STATION PROGRAM

CERTIFICATION OF FLIGHT READINESS PROCESS DOCUMENT

LIST OF CHANGES

NOVEMBER 2006

All changes to paragraphs, tables, and figures in this document are shown below:

SSCB	Entry Date	Change	Paragraph(s)
	February 2002	Revision B	All
	June 2002	DCN 001	
	February 2003	DCN 002	
	June 2003	DCN 003	
	November 2003	DCN 004	
	February 2004	DCN 005	
	January 2007	Revision C	All

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1.0 INTRODUCTION

1.1 PURPOSE

The International Space Station (ISS) Program Certification of Flight Readiness (CoFR) Process Document defines the ISS Program CoFR process and describes participant responsibilities. This process enables assessment and certification of the successful completion of Program activities that are required to ensure mission success. Additionally, it enables certification of the operational readiness and safety of the ISS Program Hardware/Software (HW/SW), facilities, and personnel that support prelaunch activity, launch/return, on-orbit assembly, operations, and utilization.

1.2 SCOPE

All organizations contributing to the ISS Program will certify that the necessary tasks, activities, and data products associated with their endorsement statements have been accomplished. The requirements defined herein are applicable to all participating organizations, including International Partner/Participant (IP/P), as they relate to ISS Cargo Elements, Cargo Items, Racks, Transportation Vehicles, ground facilities, personnel, and any other HW/SW that supports ISS assembly and operations. The certification of flight readiness for Launch Vehicles (LV) that deliver Transportation Vehicles to the ISS is outside the scope of this document. The NASA Space Shuttle is an integrated Launch Vehicle and Transportation Vehicle system. The requirements and procedures for the Space Shuttle certification of flight readiness are documented in NSTS-08117.

1.3 PRECEDENCE

In the event of a conflict between this document and any of the documents cited in paragraph 2.1, the information contained in the IP/P Joint Management Plan (JMP), will take precedence.

1.4 DOCUMENT STRUCTURE

The body of this multilateral document defines the generic requirements for implementation of the ISS Program CoFR process including specification of the required endorsements, description of the review process, and the process for addressing exceptions to the Endorsement Statements. It also establishes signature authority for the endorsements and the generic Certification of Flight Readiness process schedules for their implementation. Appendices A and B define the abbreviations/acronyms and glossary of terms. Appendices C through G are the detailed ISS Program CoFR process requirements that have been bilaterally negotiated with Agenzia Spaziale Italiana (ASI), Canadian Space Agency (CSA), European Space Agency (ESA), Japan Aerospace Exploration Agency (JAXA), and the Federal Space Agency (Roscosmos). Appendix H defines the National Aeronautics and Space Administration (NASA) ISS Program CoFR requirements. Appendix I identifies Open Work associated with the document. Appendix J contains examples of CoFR-related products.

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1.5 SUMMARY OF KEY CERTIFICATION OF FLIGHT READINESS TENETS

The following tenets form the basis of the ISS Program CoFR process definition, development, and implementation. These tenets apply to all members of the ISS Program, except where noted.

A. ISS Program policy calls for conducting a Stage Operations Readiness Review (SORR) for each flight and on-orbit Stage, including United States (U.S.) assembly, logistics, and utilization flights and their associated Stages, and all IP/P flights and on-orbit Stages. This review will provide certification of ISS Program readiness or certification as applicable, for launch, flight, on-orbit operations and return/disposal. The NASA ISS Program CoFR certificate shown in Appendix H will be executed for all flights. For IP/P flights, which include IP/P Cargo Elements and Cargo Items launched aboard the Shuttle or an IP/P Transportation Vehicle and when IP elements are active on-orbit the IP/P will execute the certificates shown in their respective appendix (Appendices C through G).

B. The SORR certifies the readiness of the ISS Program for the upcoming events as defined in the ISS Program SORR Announcement letter. This includes the launch and flight of a Transportation Vehicle and its accompanying cargo; on-orbit operations; and the return, whether destructive or otherwise, of a Transportation Vehicle and its accompanying cargo from the ISS. The Transportation Vehicle's cargo consists of but is not limited to the Launch Package/Cargo Element (LP/CE). The SORR also certifies the readiness of the on-orbit Stage to accept the Transportation Vehicle and its accompanying cargo, and perform the planned operations. Furthermore, the SORR certifies the ground facilities, flight controllers and other ground support personnel required to execute all of the above mentioned activities.

   Shuttle flights - An ISS Program SORR is conducted prior to the NASA Flight Readiness Review (FRR), which is a joint Station/Shuttle FRR. The NASA FRR provides the final NASA certification for flight.

   Non-Shuttle flights - An ISS Program SORR is conducted prior to the IP/P FRR-equivalent meeting. A NASA FRR is required for IP/P flights used for transportation of ISS crews and for the first flight of Transportation Vehicles to ISS. For subsequent flights of the Transportation Vehicle or for other significant events, a NASA FRR may be required for the final NASA flight certification. It is held at the discretion of the ISS Program Manager. The SORR for IP/P flights provides the final NASA certification for flight when a NASA FRR is not required. Further details, including scheduling of meetings, are contained in Sections 5.4 and 5.5.

C. Each IP/P is responsible for certifying their own ISS programmatic activities and responsibilities in accordance with the process defined by this document, and shall provide a CoFR Endorsement Letter to the ISS Program Manager prior to or at the SORR, declaring their certification of flight readiness. The CoFR Endorsement Letter shall be prepared according to the processes and endorsement codes defined in each IP/P's respective appendix (Appendices C through G).

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The IP/P is required to participate in the ISS Program CoFR process when any of the following conditions exists in the specified Stage that is to be addressed at the SORR.

1. The launch and operations of the IP's space Transportation Vehicle which will dock with the ISS and/or the departure from ISS of the IP's space Transportation Vehicle.
2. The launch and assembly of the IP/P's ISS element.
3. The integrated operations (i.e. systems + payloads) of an IP/P's ISS element (e.g. Columbus, Space Station Remote Manipulator System).
4. The operations of any part of an IP's program that is "standalone", and which is required for the specified Stage (e.g., ESA Ground Segment). (Standalone is defined as an asset or function which is the sole responsibility of the IP/P).
5. The IP/P astronaut is planned to be on board **<TBR 1-1>**.

D. The NASA ISS Program Manager will participate in the FRR or equivalent reviews for all flights to and from the ISS, including IP/P launches, and will provide an ISS Program readiness statement for the mission.

E. Final CoFR documentation approval is a requirement for launch to the ISS on-orbit stage configuration, increment operations, and return. Certification of Transportation Vehicles (e.g., Shuttle, Soyuz, Progress, ATV, HTV etc.) arriving at the ISS and departing from the ISS is accomplished prior to each mission, regardless of the duration the vehicle is docked to the ISS. Endorsements for cargo items manifested for return/disposal during this Stage are required at the SORR.

Shuttle flights - All open items and CoFR Exceptions from the NASA FRR, and any changes occurring after the NASA FRR will be presented with acceptance rationale at the Prelaunch Mission Management Team (MMT). Issues arising after the Prelaunch MMT meeting will be handled through the ISS Mission Management Team (IMMT), according to IMMT guidelines. The IMMT is discussed further in SSP 50200-01, Station Program Implementation Plan, Volume 1: Station Program Management Plan.

Non-Shuttle flights - All open items and CoFR Exceptions from the SORR or NASA FRR will be closed as directed by the review chair. Any changes occurring between International Partner (IP) CoFR review and launch that affect the Launch Package (LP) or the event will be handled through the IMMT according to IMMT guidelines.

F. This tenet is applicable only to NASA. Processes used by an internal organization for substantiating CoFR endorsement statements are defined in the endorsing organization's CoFR implementation plans. Responsibility for certification is based on sub-endorsements stated in the endorsing organizations' CoFR implementation plans and shall be consistent with the responsibility matrix in Appendix H (Figure H.2.2-1, Certification of Flight Readiness Responsibility Matrix).

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G. Software Transitions not associated with a specific flight are treated as open work at the SORR for the Stage/Increment in which the transition is to occur. The certification of Software Transitions occurs at the Software Transition Readiness Review convened by the Multilateral Avionics and Software Control Board (MASCB). The recommendations of the MASCB are presented to the Space Station Program Control Board (SSPCB) for authorization to proceed with the Software Transition.

H. Readiness to perform a Stage-based Extravehicular Activity (EVA) is treated as open work at the SORR for the Stage/Increment in which the EVA is to occur. The certification of EVA occurs at the Readiness Review convened by the IMMT. The recommendations of the IMMT are presented to the SSPCB for authorization to proceed with the EVA.

1.6 RESPONSIBILITIES

The following sections describe the CoFR roles and responsibilities, and method for delegation of authority for ISS Program management and organizations, independent assessment organizations, Launch Package Managers (LPMs), Increment Managers (IMs), ISS Program Office Contracts, IP/Ps, Transportation Vehicle organizations, and applicable NASA Directorates and their associated contractors.

1.6.1 NASA ISS PROGRAM

In its role as the ISS Program integrator, NASA has a lead role in program management and integration as outlined in the ISS Program IGA and MOUs. The following sections address NASA ISS Program organization roles and responsibilities for the certification of flight readiness process.

1.6.1.1 NASA ISS PROGRAM MANAGER

The NASA ISS Program Manager is responsible for establishing the ISS Program CoFR process; ensuring the successful completion of ISS Program requirements, tasks, and activities; and providing ISS Program approval of flight and on-orbit operational and safety readiness. The NASA ISS Program Manager chairs the Space Station Control Board (SSCB), the top-level executive board with IP consultation, which controls the ISS Program CoFR process. Additionally, the NASA ISS Program Manager chairs the SORR and represents the ISS Program at the applicable Launch Vehicle reviews if required.

1.6.1.2 NASA ISS PROGRAM ORGANIZATIONS

The following NASA ISS Program organizations are signatories on the Endorsement Certificate.

A. Mission Integration and Operations

B. Program Integration Office

C. Vehicle Office

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D. Avionics and Software Office

E. Payloads Office

F. Safety and Mission Assurance (S&MA)/Program Risk Office

G. Program Planning and Control Office

The NASA ISS Program organizations signing the Endorsement Certificate shall include in their presentation as defined in Section H.2.2 a signed CoFR Statement of Readiness that contains all required signatories. Endorsement statements belong to those ISS Program organizations that have responsibility for the tasks, activities, and/or products used to validate the endorsement. Figure H.2.3-1, Endorsement Statement Signature Criteria, provides the NASA criteria used to establish accountability for certification of endorsement statements. In preparation for the sign-off of an endorsement statement, each applicable organization reviews their roles, responsibilities, and accomplishments (products developed or overseen) in support of a flight, or Stage and confirms the successful completion of their checklist of requirements.

At the SORR, the NASA ISS Program organization managers will certify the completion of tasks and activities for which they are responsible, including the completion of on orbit tasks required to support launch, return, flight, operations, and on-orbit readiness, and any associated risks with documented acceptance rationale.

Each NASA ISS Program organization Manager, through internal processes defined in their organization's CoFR implementation plan, is responsible for implementing and validating the applicable CoFR endorsement statements indicated for their organization in the Appendix H responsibility matrix. Each CoFR Implementation plan shall be under configuration control, maintained by the endorsing organization, and available for review.

At a minimum, the contents of a CoFR implementation plan shall:

A. Identify data products, tasks, and activities used to arrive at an endorsement decision, and the process including organizational readiness reviews and archiving of data.

B. Identify sub-endorsements (checklists) and approval/concurrence signatures from other organizations providing data used in the decision-making process.

By signing the designated CoFR endorsement statement, each signatory certifies that all associated activities for which the signatory has responsibility have been satisfactorily completed, or have been identified as Standard Open Work or documented as a CoFR Exception.

The NASA Mission Integration and Operations Office will coordinate among the organizations sharing responsibilities for a particular endorsement statement to ensure no shortfall of coverage and that overlaps are minimized. Each endorsement statement will be supported by an underlying process to be shown in the implementation plan.

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The ISS Program CoFR process is based upon successful completion of a number of activities required in the normal development of the operational ISS. Thus, other than CoFR implementation plans, the CoFR process is not intended to require the generation of any new products.

The designated LPM and IM for the flight/increment will provide in-depth coordination with all participating organizations to ensure a thorough review at the SORR in order to certify readiness for launch and on-orbit operations.

NASA uses a similar process to address, from the ISS Program perspective, all activities to be certified by the IP/Ps. The IP/P CoFR certificates, as shown in their respective appendices (C through G), are maintained in the official meeting records by the ISS Program Planning and Control, Configuration Management Office.

1.6.1.3 ISS PROGRAM LAUNCH PACKAGE AND INCREMENT MANAGEMENT

The flight-specific Launch Package Management Team (LPMT) is responsible for the management of the LP integration, assembly, transfer, checkout, and return activities for a flight. The LPM chairs the LPMT. The increment-specific Increment Management Team (IMT) is responsible for the management of the on-orbit requirements, operations and activities during their increment. The IM chairs the IMT. The LPMT and IMT membership, roles, and responsibilities are defined in SSP 50200-01.

At approximately Launch minus (L-24 months), the LPM will meet with each NASA and IP/P organization to ensure that the organizational responsibilities for the flight are clearly understood. After the flight manifest (Increment Definition and Requirement Document (IDRD), Annex 1) is baselined, or in the event that significant changes are made to the flight requirements, the LPM/IM may meet with the affected organizations to ensure that the responsibilities are still properly understood.

Prior to the SORR, the LPM and IM will conduct a coordination meeting to ensure that the appropriate technical issues and special topics are scheduled for presentation. The IM will coordinate on-orbit issues and special topics with the appropriate IP/P. For specific issues that cross organizational lines, the LPM or IM may assign a special topic coordinator to integrate that section of the presentation. The IM will coordinate with each appropriate IP/P team to ensure that the IP/Ps with Stage-specific responsibilities are prepared to support the SORR or other CoFR related meetings as necessary, and that their CoFR Certificates have been executed and signed off as documented in Appendices C through G.

1.6.1.4 ISS PROGRAM CONTRACTORS

The ISS Program Contractors will sign CoFR certificates for each flight, including IP/P flights and increment, for the contractor's areas of contractual responsibility.

ISS Program Contractors CoFR implementation plans will define the activities leading to the signing of CoFR endorsement statements. All ISS Program Contractors are to

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develop a Contractor CoFR implementation plan addressing contractor CoFR accountable tasks and products. The products that form the basis of each ISS Program Contractor's signature on the CoFR certificates and the process including readiness reviews and archiving of data will be defined in the plans.

ISS Program Contractors signature of endorsement statements on NASA certificates for international flights, if required, will be based on IP/P/Government Furnished Equipment (GFE)/Payload (PL) data provided by NASA, participation in design reviews and Technical Interchange Meetings (TIMs), and joint verification activities defined in the IP Bilateral Integration and Verification Plan (BIVP). The depth of penetration into IP/P/GFE/PL HW/SW design, development, verification processes, and fabrication will be to the extent required to ensure physical, functional, safety, and operational compatibility at the system level and element-to-element interface within constraints of the Memoranda of Understanding (MOUs), Intergovernmental Agreements (IGAs) and JMPs to support certification of endorsement statements on NASA certificates. ISS Program Contractors will coordinate with NASA to identify IP/P/GFE/PL data necessary to perform integration tasks required for their CoFR endorsement responsibilities. NASA is responsible for providing IP/P/GFE/PL data to the ISS Program Contractors. NASA will obtain the data via the Government Furnished Data (GFD) and the Bilateral Data Exchange Agreement, Lists and Schedules (BDEALS) processes. When data is inadequate or not delivered in a timely manner, the ISS Program Contractors will notify the NASA ISS Program Manager of anticipated impacts.

1.6.2 INTERNATIONAL PARTNER/PARTICIPANT PARTICIPATION

All IP/Ps providing or returning flight HW/SW (including Transportation Vehicles, CEs, cargo items, racks, payloads, etc.), providing GSE and/or ground support personnel and services, or providing support to on-orbit operations (and its preparation) with ground facilities and personnel will certify that the necessary tasks, activities, and products associated with the endorsement statements defined for each IP/P as documented in Appendices C through G, have been accomplished. All IP/Ps will also provide substantiation for each endorsement signature through the identification of internal processes and procedures defined in the appropriate internal implementation plans.

For IP/P Cargo Elements and Cargo items launched or returned on their respective Transportation Vehicles, the requirements for the ISS Program CoFR process and endorsements defined herein are applicable. The IP/P is responsible for certifying overall readiness of the Transportation Vehicle, including its integrated cargo, to the ISS Program. The IP/P will provide certification through designated endorsement statements and certificates as defined in Appendices C through G.

In preparation for the ISS Program SORR, each IP/P with hardware or with planned operations already on the ISS, will provide a letter to the NASA ISS Program Manager and a copy to the NASA ISS Program Planning and Control Configuration Management (CM) Office consistent with the requirements in their respective appendix (Appendices C through G).

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1.6.3 PAYLOAD/EXPERIMENT DEVELOPMENT AND UTILIZATION ORGANIZATIONS

This section defines the high-level certification of readiness responsibilities for NASA and each IP/P with respect to ISS payloads being flown and/or operated aboard the Space Shuttle, IP/P Transportation Vehicles, and the ISS. The need for the ISS Payloads Office and each IP/P to certify readiness to each other or to exchange specific products to support their respective certifications of readiness shall be managed via the appropriate bilateral/multilateral ISS Payload Control Boards (PCBs).

The responsibilities defined herein, as well as the need for the ISS Payloads Office to interface with the various IP/Ps to support their respective certification of readiness activities, shall be further defined within the respective CoFR Implementation Plans established by the ISS Payloads Office and IP/Ps.

A. ISS Module-Level Certification. NASA and each of the IP/Ps are responsible for certifying the overall readiness of their respective on-orbit modules to support the entire complement of payloads and payload activities planned within those modules for the Flight and Stage. This certification includes verification that the module design and configuration satisfies the interface requirements for the various payload racks and non-rack payloads within the modules. In addition, the certification confirms module readiness and availability of sufficient resources during the Flight and Stage to support the planned payload operations.

B. ISS Payload Rack, Sub-Rack, Non-Rack, and External Payload Certification. NASA and each of the IP/Ps are responsible for certifying the overall readiness of their manifested and on-orbit payload racks, sub-rack payloads, non-rack payloads, and external payloads for the Flight and Stage. This certification is independent of whether those payloads are or will be installed in their own or a different IP/P's module. For payload racks, this certification includes verification that the payload rack meets both the module and sub-rack payload interfaces. For non-rack and external payloads, this certification includes verification that the module interface requirements have been satisfied. For sub-rack payloads, this certification includes verification that the payload meets the rack interface requirements. These certifications must also include verification, at the rack and sub-rack levels, that sufficient resources will be available to support planned activities during the Flight and Stage.

C. Space Shuttle Certification. For NASA and IP/P payloads manifested for launch and/or return aboard the Space Shuttle, the ISS Payloads Office is responsible for certifying the readiness of those payloads to be installed, flown, operated (if planned), and returned aboard the Space Shuttle. Certification by the ISS Payloads Office for IP/P payloads shall be based on demonstration by the IP/P that the appropriate Space Shuttle interfaces and CoFR requirements, as conveyed by the ISS Payloads Office, have been satisfied.

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D. IP/P Transportation Vehicle Certification. For NASA payloads manifested for launch and/or return aboard an IP/P Transportation Vehicle, the ISS Payloads office is responsible for certifying that those payloads satisfy all applicable interface and integration requirements for the Transportation Vehicle as defined by the IP/P.

E. Ground, Crew, **<TBR 1-2>** and Operations Readiness. NASA and each of the IP/Ps are also responsible for certifying to the ISS Program the overall readiness of their ground support facilities, on-orbit and ground procedures, ground personnel, and the crew to support payload activities throughout the Flight and Stage. As appropriate, crew training, ground training, and operations planning shall also be certified as ready for the Increment.

1.6.4 LAUNCH AND TRANSPORTATION VEHICLE ORGANIZATION

The ISS Program will support the LV/Transportation Vehicle organization (Space Shuttle, Roscosmos, ESA, JAXA, etc.) flight readiness and certification process for each flight by providing the required documentation and participating, as applicable, in joint reviews that certify launch readiness. For Shuttle-related flights, reference requirements are specified in NSTS 08117, Space Shuttle Requirements and Procedures for Certification of Flight Readiness. Similarly, each Transportation Vehicle organization will participate in the ISS Program CoFR process by providing the appropriate documentation and participating as applicable in joint reviews. These reviews will culminate in certification of the readiness of Transportation Vehicle to perform proximity operations, berthing and docking, mated operations, and departure with the ISS.

1.6.5 NASA ENGINEERING SAFETY CENTER

The NASA Engineering Safety Center (NESC) is a NASA Headquarters S&MA organization which participates in the ISS CoFR process. The NESC performs engineering analysis, testing and assessments either at the request of NASA Programs, on their own initiative or on request from other external organizations. The NESC participation in CoFR is referenced in the NESC Management Plan: “The Director, or designee, will be a non-voting member of the highest-level review board (such as Flight or Launch Readiness Reviews) for selected programs, with authority to request action from the program/board.”

1.6.6 NASA DIRECTORATES AND ASSOCIATED CONTRACTORS

NASA organizations other than those in the ISS Program also participate in the ISS Program CoFR process. Johnson Space Center (JSC) organizations include the following: Mission Operations Directorate (MOD), Engineering Directorate, Space Life Sciences Directorate, EVA Office, and the Flight Crew Operations Directorate (FCOD). Kennedy Space Center (KSC) organizations providing certifications include those responsible for Launch Site Processing, within the KSC ISS/Payload Processing Directorate. The Space Program Operations Contract (SPOC) contractor, United Space Alliance (USA) will certify a portion of the ISS Program mission operations activity. The

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applicable NASA directorates and their associated contractors will develop CoFR implementation plans, sign CoFR certificates as appropriate, and provide status and briefings at the ISS Program CoFR reviews as required. The Astromaterials Research and Exploration Science Directorate provides their endorsement to the ISS Program through the NASA ISS Program Vehicle Office and the Program Integration Office, and therefore it does not provide a separate status and briefing at the SORR.

1.6.7 INDEPENDENT TECHNICAL AUTHORITY

The NASA JSC Center Director is responsible for independent technical authority for NASA programs and projects located at JSC. The NASA JSC Center Director is authorized to further delegate this authority and has delegated responsibility for the NASA ISS Program to the NASA JSC Engineering Director and the NASA ISS Chief Engineer. The ISS Chief Engineer will approve waivers, deviations, requirements changes and CoFR Exceptions which affect ISS Program safe and reliable operations. The NASA JSC Center Director or designee will be a voting member of the NASA FRR Board and the NASA JSC Engineering Director or designee will be a voting member of the SORR Board.

1.6.8 INDEPENDENT HEALTH AND MEDICAL AUTHORITY

The NASA Chief Health and Medical Officer has the authority, responsibility, and accountability to establish, approve, maintain, assure compliance with, and approve waivers, deviations and changes to technical health and medical requirements (including standards), processes, and policy. The NASA Chief Health and Medical Officer is authorized to further delegate this authority and has delegated responsibility for NASA programs and projects located at JSC to the JSC Chief Medical Officer. The JSC Chief Medical Officer will approve waivers, deviations, requirements changes and CoFR Exceptions that are within his authority. The NASA Chief Health and Medical Officer will be a voting member of the NASA FRR Board and the JSC Chief Medical Officer will be a voting member of the SORR Board.

1.7 DELEGATION OF AUTHORITY

Any member of the SORR Board may delegate signature authority by submitting a delegation of authority letter to the NASA ISS Program Manager. The letter is to be sent to the NASA ISS Program Planning and Control Office, nominally seven calendar days prior to the SORR, but no later than the start of the SORR itself. Delegation to formal deputies does not require a delegation of authority letter. Only a member of the SORR Board or their formal deputies may delegate authority.

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2.0 DOCUMENTATION

2.1 APPLICABLE DOCUMENTS

The following documents include specifications, models, standards, guidelines, handbooks, and other special publications. The current issue of the following ISS documents is identified in Electronic Document Management System, (EDMS) and in the Space Shuttle/Payload Interface Control Document (ICD) website. The documents listed in this paragraph are applicable to the extent specified herein. Inclusion of applicable documents herein does not in any way supersede the order of precedence identified in Paragraph 1.3 of this document.

SSP 30695	Acceptance Data Package Requirements Specification
SSP 41160	European Space Agency Segment Specification for Columbus
SSP 41163	Russian Segment Specification
SSP 41164	Italian Mini-Pressurized Logistics Segment
SSP 41165	Segment Specification for the Japanese Experiment Module
SSP 41167	Mobile Servicing System Segment Specification for the International Space Station Program
SSP 50062	NASA/CSA Bilateral Safety and Mission Assurance Requirements
SSP 50101	NASA-RSA Phase 2-3 Bilateral Integration and Verification Plan
SSP 50145	NASA/NASDA Bilateral Safety and Product Assurance Requirements
SSP 50146	NASA/RSA Bilateral S&MA Process Requirements for International Space Station
SSP 50182	NASA/ASI Bilateral Safety and Product Assurance Requirements
SSP 50200-01	Station Program Implementation Plan, Volume 1: Station Program Management Plan
JSC 62586	International Space Station / Space Shuttle Program Implementation Plan to Interface with the Payload Research Communities
NSTS 08117	Space Shuttle Requirements and Procedures for Certification of Flight Readiness

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П32928-103	Requirements For International Partner Cargoes Transported On Russian Progress and Soyuz Vehicles
CRS-94021	NASDA Acceptance Data Package Requirements

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2.2 REFERENCE DOCUMENTS

The following documents contain supplemental information to guide the user in the application of this document. These reference documents may or may not be specifically cited within the text of this document.

SSP 30473	Space Station Customer/Experiments Verification Process Requirements
SSP 30599	Safety Review Process
SSP 41000	System Specification for the International Space Station
SSP 54500	Segment Specification for the United States Ground Segment
SSP 41162	Segment Specification for the United States On-Orbit
SSP 41170	Configuration Management Requirements
SSP 41173	Space Station Quality Assurance Requirements
SSP 50019	NASA/ESA Joint Management Plan
SSP 50022	NASA/CSA Joint Management Plan
SSP 50030	NASA/NASDA Joint Management Plan
SSP 50033	NASA/CSA Bilateral Integration and Verification Plan
SSP 50034	NASA/ESA Bilateral Integration & Verification Plan
SSP 50035	NASA-NASDA JEM Bilateral Integration and Verification Plan
SSP 50076	NASA/ASI Joint Management Plan
SSP 50094	NASA/RSA Joint Specifications Standards Document for the ISS Russian Segment
SSP 50102	NASA/ASI Bilateral Integration & Verification Plan
SSP 50107	NASA/RSA Joint Management Plan

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SSP 50123	Configuration Management Handbook
SSP 50124	NASA/CSA Bilateral Data Exchange Agreements, Lists and Schedules
SSP 50125	NASA/ASI Bilateral Data Exchange Agreements, Lists, and Schedules
SSP 50126	NASA/JAXA Bilateral Data Exchange Agreements, Lists and Schedules
SSP 50127	NASA/ESA Bilateral Data Exchange Agreements, Lists, and Schedules for Columbus
SSP 50128	Specification of Technical Requirements for the FGB, Functional Cargo Block
SSP 50136	NASA/RSA Bilateral Hardware And Software Exchange Agreements, Lists, And Schedules
SSP 50137	NASA/RSA Bilateral Data Exchange Agreement, List, and Schedule
SSP 50175	International Space Station Program Risk Management Plan
SSP 50177, Part II	Government Furnished Data (GFD) Description Document Part II International Partners Data
SSP 50191	NASA/ESA Bilateral Safety and Product Assurance Requirements
SSP 50219	NASA/ASI Bilateral Hardware and Software Exchange Agreements, Lists and Schedules
SSP 50220	NASA/CSA Bilateral Hardware and Software Exchange Agreements, Lists, and Schedules
SSP 50230	Mission Integration and Operations Office Certification of Flight Readiness Implementation Plan
SSP 50231	Safety and Mission Assurance/Program Risk Certification of Flight Readiness Implementation Plan
SSP 50245	Government Furnished Equipment Illustrated Parts Breakdown (IPB) Flight 5A, On-Orbit Maintenance

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SSP 50264	NASA/NASDA Bilateral Hardware and Software Exchange Agreements, Lists, and Schedules
SSP 50280	Node 2 Bilateral Hardware and Software Exchange Agreements, Lists and Schedules
SSP 50287	Hardware/Software Acceptance Process
SSP 50289	NASA/ESA Bilateral Hardware and Software Exchange Agreements, Lists, and Schedules for Columbus
SSP 50322	ISS Vehicle Office CoFR Implementation Plan
SSP 50334	RSA/ESA Bilateral Integration & Verification Plan for the Automated Transfer Vehicle (ATV)
SSP 50344	Program Integration Office Certification of Flight Readiness Implementation Plan
SSP 50421	Program Planning and Control Office Certification of Flight Readiness (CoFR) Implementation Plan
SSP 50439	ESA Segment Specification for the Automated Transfer Vehicle (ATV)
SSP 50484	ISS Avionics & Software CoFR Implementation Plan
SSP 50611	NASA/ESA Bilateral Data Exchange Agreements, Lists, and Schedules for the Automated Transfer Vehicle
SSP 50614	NASA/JAXA Bilateral Data Exchange Agreements, Lists, and Schedules for H-II Transfer Vehicle (HTV)
SSP 52054	ISS Program Payloads Certification of Flight Readiness Implementation Plan
SSP 540XX	Increment Definition and Requirements Document for Increment XX
SSP 54500	International Ground System Specification Document
SSP 540XX-FFF	Increment Definition and Requirements Document for Planning Period X, Annex 1: Station Manifest, Flight FFF
JSC 27771	Independent Assessment Certification of Flight Readiness

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	Implementation Process Plan
JSC 28140	Mission Operations Directorate International Space Station Certification of Flight Readiness Implementation Plan
JSC 28222	EVA Certification of Flight Readiness Requirements and Implementation Plan
JSC 28225	Certification of Flight Readiness Implementation Plan
CA-QMS-001	Flight Crew Operations Space Flight Preparation Plan (Implementation Plan)
KPL-PLN-50001	Kennedy Space Center Payload Processing Certification of Flight Readiness Implementation Plan
ARES-PM-03-002	Program Integration & Control Certification of Flight Readiness Plan
CMC-DRD-000003	Cargo Mission Contract Certification of Flight Readiness Plan
DRD-B-PM-06	Certificate of Flight Readiness (CoFR) Implementation Plan Mission Integration Contract
D684-10294	Boeing Certification of Flight Readiness Implementation Plan
D684-10020-1	Program Master Integration and Verification Plan
D684-10044-1	Program Execution Plan
D684-10074-01	Integrated Program Schedule
D684-11715-01	Boeing IPI CoFR Implementation Plan
MIL-STD-1521	Technical Reviews and Audits for System, Equipment, Munitions, and Computer Programs
NAS15-10110 (005B4)	Russian Segment Configuration Management Plan
NSTS/ISS 13830	Payload Safety Review and Data Submittal Requirements for Payloads Using the: - Space Shuttle - International Space Station
NSTS 1700.7 ISS Addendum	Safety Policy and Requirements for Payloads using the Space Transportation System (STS)

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USA008977	Flight Operations Flight Preparation and Readiness Process Plan
FPP-01-02	USA Launch Minus Five Week Flight Readiness Review (FRR)
EA-WI-029	Engineering Directorate Flight Readiness Assessment

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3.0 ISS PROGRAM CERTIFICATION OF FLIGHT READINESS PROCESS OVERVIEW

This section provides an overview of the ISS Program CoFR process. Included is a discussion of documentation required to confirm certification, an overview of the CoFR activities and timetable, the NASA CoFR process guidelines, and the IP/P CoFR process guidelines. There may be minor differences from these guidelines for each IP/P resulting from the five independently negotiated bilateral CoFR process agreements specified in their respective appendix (Appendices C through G). The process definition in the appendix always takes precedence.

3.1 CERTIFICATION OF FLIGHT READINESS OVERVIEW

The ISS Program's Certification of Flight Readiness process consists of a series of detailed reviews by NASA, IP/Ps, and contractors that demonstrate the ISS Program's readiness for all planned activities and events involving the ISS during a specified timeframe. These reviews culminate in the ISS Program's SORR, where the ISS Program establishes its readiness. The outcome from the SORR is used to support other downstream agency-level and launch-organization readiness reviews, such as FRRs. The programmatic content under assessment during any CoFR cycle includes integration with a Transportation Vehicle for launch, transport, and returns, as well as the ISS's readiness to accept the Transportation Vehicle, perform all planned on-orbit operations, including the readiness of all ground capabilities necessary to support those operations.

Figure 3.1-1, Certification of Flight Readiness Process (Shuttle Launch), and Figure 3.1-2, Certification of Flight Readiness Process (IP Transportation Vehicle) illustrate in general, the flow of activities and reviews that lead to the ISS Program's integrated and consolidated certification of flight readiness.

Assessment reviews may be conducted prior to the SORR for some flights. For Shuttle flights, a Launch Package Assessment (LPA) is conducted prior to shipment of the CE to the launch pad to ensure the CE is ready for Shuttle processing. Similarly, the ISS Program may conduct an assessment of the Transportation Vehicle processes for the first launch of an IP/P Transportation Vehicle, or if major modifications have been incorporated. These assessment reviews are described in Section 5.3.

The ISS Program performs its final program-level readiness assessment at the SORR, which nominally occurs between L-3.5 weeks and L-2 weeks. In preparation for the SORR, the ISS Program certifying organizations will complete internal formal reviews to determine their readiness for the specified Flight/Stage. The SORR addresses both HW/SW readiness and operations readiness, in addition to certifying the readiness for launch and on-orbit operations of the cargo and facilities provided on-orbit during the Stage. The specific content to be assessed by the ISS Program for any SORR will be defined in the associated SORR Announcement Letter. The SORR Announcement Letter, signed and distributed from the NASA ISS Program Office, addresses the scope, guidelines, deltas, and schedule to be covered by the SORR. The letter is distributed at approximately L-6 weeks as depicted in Figure 3.1-1 and Figure 3.1-2.

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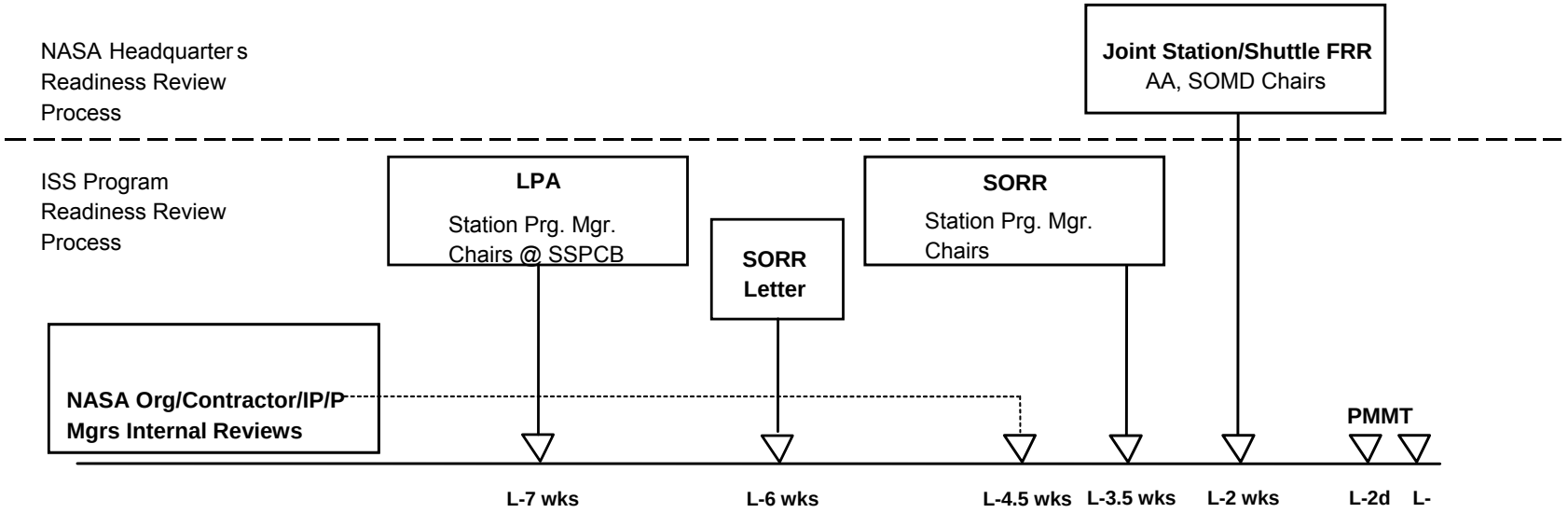

Note: Launch Minus (L -) dates are approximate for planning purposes only

FIGURE 3.1-1 CERTIFICATION OF FLIGHT READINESS PROCESS (SHUTTLE LAUNCH)

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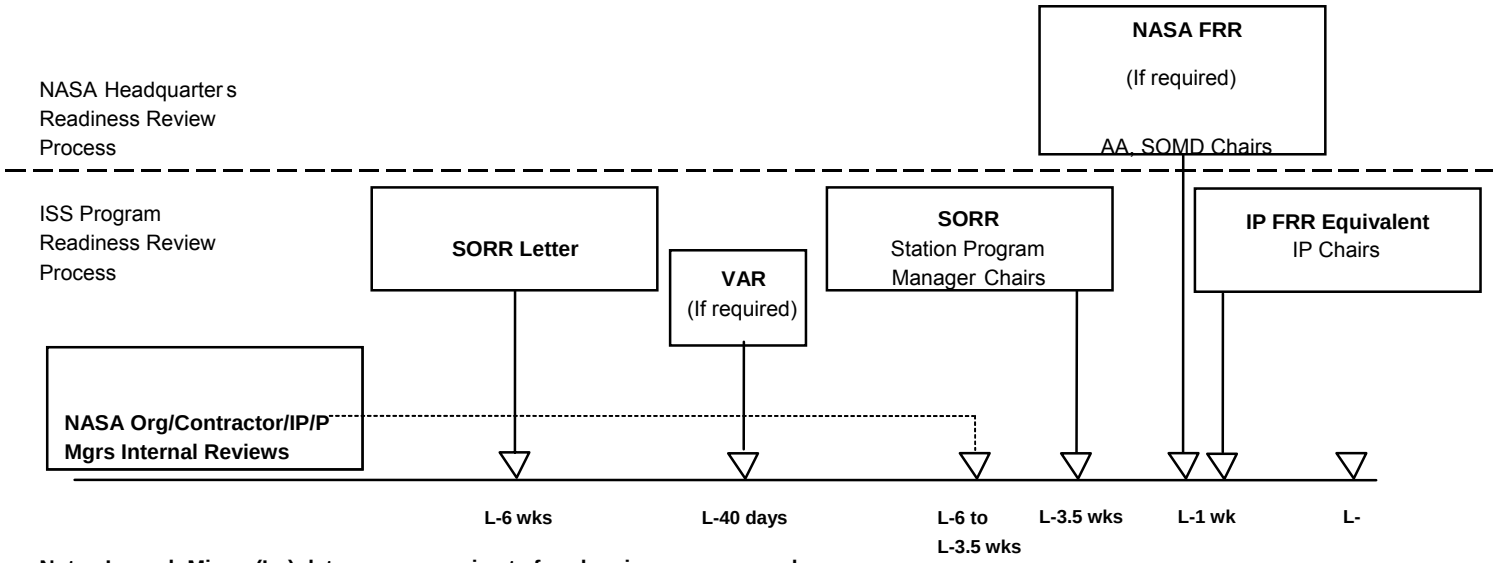

Note: Launch Minus (L -) dates are approximate for planning purposes only

FIGURE 3.1-2 CERTIFICATION OF FLIGHT READINESS PROCESS (IP TRANSPORTATION VEHICLE)

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Following the SORR NASA may conduct an agency-level FRR to assess the agency's readiness for a particular Flight/Stage. For Space Shuttle flights, NASA will conduct a Joint Station/Shuttle FRR. The NASA Joint Station/Shuttle FRR is an expansion of the Space Shuttle FRR to include the ISS Program as a presenter.

For an IP launch which includes crew transportation, or for the first flight of a Transportation Vehicle, NASA will conduct a FRR. For subsequent flights of the Transportation Vehicle, NASA may conduct a FRR at the direction of the NASA ISS Program Manager. When a NASA FRR is not required, the SORR provides the final NASA certification of flight.

At the Joint NASA Station/Shuttle FRR and NASA FRR for non-Space Shuttle flights, the ISS Program manager or his designee will address HW/SW readiness, on-orbit readiness, ground facilities readiness and the launch and return readiness of the CE. An equivalent meeting, or series of meetings, may be held by the IP for IP launches.

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4.0 CERTIFICATION OF FLIGHT READINESS PROCESS EXCEPTIONS

In preparation for the SORR, each organization assesses its readiness and evaluates whether or not it has met all the criteria for their associated ISS Program Endorsement Statements as documented in their respective appendix (Appendices C through H). When the criteria for an Endorsement Statement cannot be completely met, it is documented as a CoFR Exception. At the SORR, each certifying organization will present the results of their readiness assessment, including any CoFR Exceptions that have been identified.

A CoFR Exception is not required if an approved waiver or deviation exists for mandatory requirements that must be met to satisfy the completion of the ISS Program CoFR Endorsement statement.

A CoFR Exception is not required if the completion of criteria for a specific endorsement statement is dependent upon the nominal completion of Standard Work that is scheduled to occur after the SORR. Standard Work that a certifying organization will, according to the organization's nominal processes, complete after the SORR is considered to be Standard Open Work. When Standard Work is late or delinquent it is no longer considered to be Standard Open Work; it then becomes non-Standard Open Work.

A CoFR Exception may be required if the completion of criteria for a specific Endorsement Statement is dependent upon the completion of Standard Work that is incomplete at the time of the SORR, but should have been complete, according to a certifying organization's nominal processes. Such late or delinquent work should be referred to as non-Standard Open Work.

In accordance with criteria documented in their respective appendix (Appendices C through H), each certifying organization will assess the non-Standard Open Work and determine whether a CoFR Exception is warranted.

The CoFR Exception will be submitted by the responsible organization prior to or along with the submittal of their SORR presentation charts to the NASA ISS PP&C Office.

Each CoFR Exception input will be submitted electronically by the responsible organization using the Configuration Status Management Operations Systems (COSMOS) database and will be dispositioned by the ISS Program Manager or designee. The NASA ISS PP&C, Configuration Management Office will track all CoFR Exceptions. Each organization is responsible for ensuring a satisfactory close-out of their respective CoFR Exceptions. The progress of the close-out activities will be statused at the IMMT regularly to ensure closure of the CoFR Exception before the event with which it is associated (e.g., launch, EVA, payload operations, etc.). International Partners that are required to bring forward a CoFR Exception will work through their JSC Liaison Office and the NASA ISS PP&C Configuration Management Office for submittal.

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5.0 ISS PROGRAM CERTIFICATION OF FLIGHT READINESS PROCESS

This section states the organizational participation, responsibilities, requirements, and procedures to ensure effective planning and conducting of the ISS Program CoFR reviews, which assess and certify readiness of ISS Program HW/SW and supporting ground facilities and personnel to execute the planned objectives and requirements of the specified Flight and Stage.

5.1 DESCRIPTION

The ISS CoFR Process is applicable to all planned ISS events and activities and the support thereof, as well as to the current configuration and capability of the ISS itself. The readiness review requirements, process, content, timing, and the SORR and NASA FRR board organization are defined in this section. The scope of the responsibilities for this process is described in the tenets of the ISS CoFR Process defined in section 1.5.

5.2 RISK MANAGEMENT

The ISS risk management process supports the CoFR process by enabling the identification of open risks and providing associated acceptance rationale for the specified ISS flight/Stage at the Stage Operations Readiness Review (SORR).

Risk management is a proactive and systematic approach to managing risks and is an integral part of effective decision making. Risk management provides the framework for identifying, analyzing, planning, tracking, controlling, communicating, and documenting risks to achieve mission success.

Risk management begins with identifying risks early to formulate and implement mitigation strategies. A risk should be identified as a potential ISS Program risk when:

A. Resources are needed to mitigate the risk, whether it be in the form of funding, management decision, additional time, personnel, or facilities

B. Communication and coordination with other organizations are needed to manage the risk

C. Level of awareness of the risk needs to be elevated.

The ISS Program organizations and IP/P's are responsible for reviewing and analyzing all open risks and selecting risks applicable to a given flight and /or Stage. The flight/Stage effectivity is chosen by the following criteria:

A. Resources (hardware, software, data, analysis, or items in the manifest) being delivered or completed during the flight and/or Stage that are required to mitigate the risk or continuing the Stage.

B. Launches that include the addition of a crewmember(s), select any risk or watch item that may potentially affect the crewmember(s) ability to complete the increment.

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C. Tasks or activities during the flight and/or Stage that are required to mitigate the risk or continuing the Stage.

D. Tasks or activities planned during the Flight and/or Stage that significantly change the likelihood or consequence of the risk.

E. Resources (hardware, software, data, analysis, or items in the down manifest) being returned during the flight and/or Stage that are required to mitigate a risk or continuing the Stage.

5.3 REVIEWS PRECEDING THE STAGE OPERATIONS READINESS REVIEW

5.3.1 LAUNCH PACKAGE MANAGER / INCREMENT MANAGER SORR COORDINATION MEETINGS

The LPM and IM will conduct SORR coordination meetings as necessary with the certifying organizations to provide presentation guidelines and clarifications relative to the scope of the upcoming SORR and to ensure that all relevant items requiring certification are addressed by the responsible organizations. These meetings will also ensure that appropriate technical issues and special topics are scheduled for presentation by the NASA and the IP/P certifying organizations.

5.3.2 INTERNAL ORGANIZATIONAL REVIEW

The SORR will be preceded by a formal internal review conducted by each certifying organization. A permanent record of the internal organizational reviews will be maintained by each organization.

5.3.3 NASA ISS PROGRAM LAUNCH PACKAGE ASSESSMENT

The LPA is a NASA ISS Program review for Space Shuttle flights to determine that there are no anticipated problems that would preclude a CE from being delivered to the pad on schedule to be integrated with the Shuttle. The LPA will cover constraints, open issues, and open work remaining prior to launch. It will also address programmatic issues or operational concerns that could be a constraint to launch and should be considered prior to CE installation. The LPA is conducted at the SSPCB. The LPA is scheduled at approximately L-7 weeks, in a time frame to support both Payload Readiness Review (PRR) and decision to transfer the Orbiter from the Orbiter Processing Facility (OPF) to the launch pad.

5.3.4 NASA SPACE SHUTTLE PROGRAM PAYLOAD READINESS REVIEW

The Payload Readiness Review (PRR) is a NASA Space Shuttle Program review that is held to certify the CE for Orbiter integration. The PRR occurs one week prior to delivery of the CE to the launch pad or installation into the Orbiter in the OPF, (reference NSTS 08117 for PRR requirements). At the PRR, the ISS Program provides a status of its readiness for CE integration with the Shuttle.

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5.3.5 NASA ISS PROGRAM VEHICLE ASSESSMENT REVIEW

Before launching a new Transportation Vehicle to the ISS, including IP/P vehicles, the NASA ISS Program may conduct a Vehicle Assessment Review (VAR) at the request of the NASA ISS Program Manager. Normally, a VAR will be conducted for the first launch of a type of Transportation Vehicle, or when major modifications have been incorporated into a Transportation Vehicle. The VAR is conducted prior to the SORR and includes representatives from the SORR board organizations. The results and summary of the VAR are presented to either the SSPCB or the SSCB, as deemed appropriate by the NASA ISS Program Manager.

5.4 ISS PROGRAM STAGE OPERATIONS READINESS REVIEW

The SORR certifies the ISS Program's comprehensive HW/SW, vehicle, infrastructure, personnel, and ground facility(s) readiness for launch, flight-to and return-from, on-orbit operations, and other planned events and activities related to ISS during the Stage or event, as appropriate.

The specific schedule, content, presentation, and assessment expectations for each SORR will be defined in the SORR Announcement Letter produced and distributed by the NASA ISS Program Office prior to the SORR. Each SORR begins with an introduction to the activities and objectives under review and the current state of the ISS. Then each certifying organization including IP/Ps, presents its readiness status, issues, and CoFR Exceptions to the Board according to the presentation format and expectation described in the SORR Announcement Letter. Following the readiness statements and certifications of each organization, each member of the Board is polled to declare their organization's state of readiness and their assessment of the overall ISS Program readiness for the Flight Launch, Return, Stage (or Event), and the NASA ISS Program Manager and the SORR Board members assess these declarations and the material presented to decide upon the ISS Program's readiness to proceed with the planned activities and objectives for the Stage. An example of a typical meeting agenda for the SORR is presented in Appendix J.

IP/Ps participate in the SORR as any other certifying organization according to the procedures describe in this section (5.0), except that the scope of their specific CoFR endorsements and the certifications they make to the ISS Program is described in their respective appendix (Appendices C through G).

For Shuttle flights, the ISS Program CoFR requirements will be addressed as discussed above, however, several joint Shuttle/Station items including the Joint Technical Working Groups (JTWGs), Safety Review Panel (SRP)/Payload Safety Review Panel (PSRP) status will be presented by Space Shuttle Program (SSP) Integration.

The SORR shall be conducted at JSC. Participation by teleconference is acceptable with prior approval from the NASA ISS Program Manager.

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For a Shuttle flight, the SORR is held approximately 10 days prior to the Joint NASA Station/Shuttle FRR. For non-Shuttle flights, an ISS Program SORR is conducted approximately one week prior to the IP/P FRR-equivalent meeting. For Russian flights, if timing allows, the SORR will be after the Roscosmos General Designer's Review (GDR). For Progress flights, if timing allows, the SORR will be within 18 days of launch. When time allows, and with the agreement of the NASA and Roscosmos Program Managers, the SORR for a Progress or Soyuz flight can be combined with the SORR for another flight. For IP/P flights, without crew transportation, typically the SORR provides the final NASA certification for flight readiness. If deemed necessary, the NASA ISS Program Manager can require a NASA FRR to be held.

5.4.1 BOARD MEMBERSHIP

The Board of the SORR is composed of individuals representing their organization and is chaired by the NASA ISS Program Manager. All Board members are required participants at the SORR. A delegation of authority memorandum is required for all delegated representatives, other than a deputy. The SORR Board will consist of the following members as listed below and additional members may be added to the SORR Board membership as required. The SORR Announcement Letter will contain the latest board membership.

CHAIR
Manager, ISS Program, NASA

SECRETARIAT
Manager, Configuration Management, Program Planning and Control Office, ISS Program, NASA

MEMBERS
Deputy Manager, ISS Program, NASA
Director, Space Life Sciences and JSC Chief Medical Officer, JSC, NASA
Manager, Operations Integration, ISS Program, NASA **<TBR 5-1>**
Launch Package Manager, Mission Integration and Operations Office, ISS Program, NASA*
Increment Manager, Mission Integration and Operations Office, ISS Program, NASA*
Launch Package Manager/Element Manager, ISS Program, NASA**
Manager, Mission Integration and Operations Office, ISS Program, NASA
Manager, Program Integration Office, ISS Program, NASA
Manager, Vehicle Office, ISS Program, NASA
Manager, Avionics and Software Office, ISS Program, NASA
Manager, Payloads Office, ISS Program, NASA
Manager, Safety and Mission Assurance/Program Risk Office, ISS Program, NASA
Manager, Configuration Management, Program Planning and Control, ISS Program, NASA******
ISS Program Lead, NASA Engineering Safety Center, NASA*****
Vice President and Program Manager, ISS, Boeing
Chief Engineer, Boeing
Director, ISS Vehicle, Boeing
Director, ISS Payload Integration, Boeing***
Director, ISS Program Integration, Boeing***

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Director, ISS Avionics and Software, Boeing
Director, ISS Safety and Mission Assurance, Boeing
Manager, ISS Launch Package, Boeing***
Director, Safety and Mission Assurance, JSC, NASA
Director, Mission Operations, JSC, NASA
Director, Engineering, JSC, NASA
Director, Flight Crew Operations, JSC, NASA
Manager, EVA Office, JSC, NASA
Director, ISS/Payload Processing, Kennedy Space Center, NASA***
Program Manager, Space Station, United Space Alliance
Program Manager, Program Integration and Control Contract, ARES Corporation
Program Manager, Mission Integration Contract, Barrios Technologies
Program Manager, Cargo Mission Contract, Lockheed Martin

INTERNATIONAL MEMBERS****
Chief, Manned Flight Directorate, Roscosmos
Program Manager, Canadian Space Agency
ISS Program Manager, European Space Agency
Manager, Space Station Program, Japan Aerospace Exploration Agency
ISS Program Manager, Agenzia Spaziale Italiana
Manager, Other Applicable LV (e.g., Soyuz, Proton, Ariane, H-II)

NOTES:
* The LPM and IM will be polled at the SORR, but will not sign the certificate because their CoFR responsibilities are certified by the Mission Integration and Operations Manager.
** The LPM/Element Manager will be polled at the SORR for an IP/P element/vehicle launch, but will not sign the certificate because their CoFR responsibilities are certified by either the Program Integration Manager for the first launch of a type of Transportation Vehicle or by the Mission Integration and Operations Manager for all other non-Shuttle flights.
*** These managers do not participate in Soyuz or Progress SORR.
**** The IP/P will be polled and sign certificates when an IP/P has a Transportation Vehicle being transported to/from the ISS during the Stage; or has cargo HW/SW being transported to/from the ISS during the Stage; or has operations on the ISS during the Stage.
***** Will be polled, but does not sign the certificate.
****** Also serves as Secretariat.

5.4.2 REVIEW REQUIREMENTS

A structured approach will be used for the conduct of the SORR. The scope of the review will be defined in the ISS Program SORR Announcement letter. At a minimum it will define flight (s), launches, returns, the increments, and Stage durations.

Presentations will include a status summary with supporting detail on items that are significant to the applicable LP or on-orbit configuration. All information needed to make a determination of readiness shall be presented. Emphasis will be placed on resolution of major programmatic issues, areas where risk has been accepted by the ISS Program, and areas where significant open issues remain. Open risk records

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applicable to the Flight/Stage will be presented at the SORR for formal acceptance. In addition, a high-level summary of completion of the major products and/or tasks contained in the organization's CoFR Implementation Plan will be presented, with a summary of open work and a plan for closure. A status summary of previous review action items and CoFR Exceptions will be presented. Dissenting opinions and minority reports should be presented to encourage open and thorough discussions at the SORR.

Each certifying organization will address the guidelines and requirements established in the ISS Program SORR Announcement letter. As a minimum, each of the following items shall be addressed in each certifying organization's SORR presentation.

A. Baseline for evaluation (e.g. CR number). Identify critical assumptions used which allow the organization to certify flight readiness for the entire Increment. Each SORR announcement letter will provide specific assumptions to use.

B. First flight items.

C. Changes in operations or functions since the last SORR.

D. First Operations items such as:

   1. First on-orbit operations of new hardware.

   2. New or modified operations of existing on-orbit hardware that has been repaired.

   3. EVA operations (including Russian EVAs).

   4. Software transitions.

   Details on which system and subsystems are affected should also be provided.

E. Critical process or operations changes.

F. Risks

   1. List open risk records applicable for the Flight/Stage.

   2. Document acceptance rationale with sufficient data to support recommendation.

   3. A request for formal acceptance.

G. Open Work Related to CoFR Endorsement Statements

   1. List open work with the estimated closure date. This includes Standard Open Work as well as non-Standard Open Work. Any work that poses a risk should be presented with closure plans.

   2. Any open work that poses a constraint to an event such as Launch, Docking. Undocking, EVA or specific operations shall be denoted as such.

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H. CoFR Exceptions

All CoFR Exceptions shall be presented with actions required for closure, and a planned closure date.

I. Applicable deviations and waivers.

J. Significant open issues accompanied with closure plans.

K. Dissenting opinions with accompanying rationale.

Additionally each presentation should contain a readiness statement for each of the organization's endorsement codes and any applicable organization-signed CoFR certificates.

5.5 FLIGHT READINESS REVIEWS AND THEIR EQUIVALENTS

Following the SORR, NASA may conduct an agency-level FRR to verify the agency's readiness for the launch and the specified Flight/Stage. Also following the SORR, additional reviews are conducted by the IP's to verify readiness for launch of their LV's. The ISS Program Readiness Certificate which is the result of the SORR is provided to the IP's in support of their final agency launch readiness reviews. The specific products required from the ISS Program by the IP to support the IP readiness reviews are documented in their respective appendix (C, D, E, F, and G).

5.5.1 NASA FLIGHT READINESS REVIEWS

In its role as the ISS Program Integrator, NASA may conduct an agency-level FRR to assess the overall readiness for a particular Flight/Stage. The requirements are documented herein. The NASA FRRs are chaired by the Associate Administrator (AA), Space Operations Mission Directorate.

5.5.1.1 NASA JOINT STATION/SHUTTLE FLIGHT READINESS REVIEW

For Shuttle flights, the ISS complement is considered to be a CE and the Shuttle FRR is expanded to include CE launch readiness and on-orbit Stage readiness. The Joint Station/Shuttle FRR is held to verify NASA readiness for both the specified Flight/Stage and the launch of the Space Shuttle itself. The Deputy Manager, Space Shuttle Program is responsible for the conduct of the Joint Station/Shuttle FRR. The FRR is held at KSC approximately two weeks before launch. Requirements and board membership for the Shuttle Program FRR are documented in NSTS 08117. ISS Program responsibilities are documented herein.

The integrated ISS Program presentation will address Station operations, on-orbit configuration, LP/CE readiness, and any open CoFR Exceptions and significant open work and issues. The NASA ISS Program Manager will represent the ISS Program at the FRR and will identify the required ISS Program organization prior to the FRR. The IP/P role, if applicable, will be coordinated in advance by the LPM or IM.

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5.5.1.2 NASA FRR FOR AN IP LAUNCH WITH CREW TRANSPORTATION

The NASA FRR for an IP launch with crew transportation certifies the NASA readiness for the launch of the U.S. crewmember (s) on an IP LV and for on-orbit Stage operations. The NASA FRR for an IP launch with crew transportation will be conducted prior to the IP FRR-equivalent. The NASA FRR will be conducted at JSC. Board members and presenters shall be present at the meeting. NASA Headquarters staff will have teleconference access to each FRR. The integrated ISS Program presentation will address Station operations, on-orbit Stage/increment readiness, LP/CE readiness, CoFR Exceptions and significant open work and issues. IP/Ps that have hardware already on-orbit, have hardware to be launched, or have operations during on-orbit timeframe covered will participate in the review.

5.5.1.2.1 BOARD MEMBERSHIP

The Board of the NASA FRR for an IP/P launch with crew transportation is composed of individuals representing their organization and is chaired by the NASA Associate Administrator, Space Operations Mission Directorate. All Board members or designated representatives are required to attend the review in person. A delegation of authority memorandum is required for all delegated representatives, other than a deputy. The NASA FRR Board will consist of the following members as listed below and additional members may be added to the NASA FRR Board membership as required. The NASA FRR Announcement Letter will contain the latest board membership.

CHAIR
Associate Administrator, Space Operations Mission Directorate, NASA

SECRETARIAT
Manager, Configuration Management, Program Planning and Control Office, ISS Program, NASA

MEMBERS
Manager, ISS Program, NASA
Chief Engineer, NASA
Director, Space Life Sciences and JSC Chief Medical Officer, JSC, NASA
Chief Safety and Mission Assurance Officer, NASA
Assistant Associate Administrator for ISS
Director, JSC, NASA
Director, Kennedy Space Center, NASA
Director, Marshall Space Flight Center, NASA
Director, Stennis Space Center, NASA
Program Manager, Program Integration and Control Contract, ARES Corporation
Program Manager, Mission Integration Contract, Barrios Technologies
Program Manager, ISS, Boeing
Program Manager, Cargo Mission Contract, Lockheed Martin
Manager for Shuttle and Station Programs, United Space Alliance

INTERNATIONAL MEMBERS****
Chief, Manned Flight Directorate, Roscosmos

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Program Manager, Canadian Space Agency
ISS Program Manager, European Space Agency
Manager, Space Station Program, Japan Aerospace Exploration Agency
ISS Program Manager, Agenzia Spaziale Italiana
Manager, Other Applicable LV (e.g., Soyuz, Proton, Ariane, H-II)

NOTES:
**** The IP/P will be polled and sign certificates when an IP/P has a Transportation Vehicle being transported to/from the ISS during the Stage; or has cargo HW/SW being transported to/from the ISS during the Stage; or has operations on the ISS during the Stage.

5.5.1.2.2 REVIEW REQUIREMENTS

Presentations will include a summary of the material presented at the SORR with supporting detail on items that are significant to the applicable LP or Increment configuration. Emphasis will be placed on resolution of major programmatic issues, areas where risk has been accepted by the ISS Program, and areas where significant open issues remain. A status summary of previous review action items and CoFR Exceptions will be presented. Major dissenting opinions and minority reports shall be presented to encourage open and thorough discussions.

5.5.1.3 NASA FRR FOR AN IP/P LAUNCH OF A FIRST FLOWN TRANSPORTATION VEHICLE

For an IP/P launch of a first flown Transportation Vehicle or if significant changes have been made to the vehicle, a NASA FRR will be held. The board membership and review requirements are the same as for an IP Launch with Crew Transportation (Section 5.5.1.2.1).

5.5.1.4 NASA FRR FOR AN IP/P LAUNCH

For an IP/P launch of an already flown Transportation Vehicle, typically a separate NASA FRR is not held, although at the direction of the NASA ISS Program Manager, a NASA FRR may be held for subsequent flights of the Transportation Vehicle. The board membership and review requirements are the same as for an IP Launch with Crew Transportation (Section 5.5.1.2.1).

5.5.2 RUSSIAN FRR-EQUIVALENT

The ISS Program Manager or an authorized representative will take part in the final launch readiness review conducted at Baikonur as required. The specific products required from the ISS Program by Roscosmos to support their readiness reviews are documented in appendix G.

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5.5.3 ARIANE FRR-EQUIVALENT

The ISS Program Manager or an authorized representative will take part in the final launch readiness review as required. The specific products required from the ISS Program by ESA to support their readiness reviews are documented in appendix E.

5.5.4 HTV FRR-EQUIVALENT

The ISS Program Manager or an authorized representative will take part in the final launch readiness review as required. The specific products required from the ISS Program by JAXA to support their readiness reviews are documented in appendix F.

5.6 READINESS POLL

A readiness poll of all Board members will be conducted at the conclusion of the SORR and the NASA FRR. Responses to the polls will be clear, concise, unambiguous statements concerning readiness for flight, Stage, and increment implementation. The readiness poll will be performed per a checklist, which will become part of the formal records of the SORR and the NASA FRR.

5.7 STAGE OPERATIONS READINESS REVIEW AND FLIGHT READINESS REVIEW DOCUMENTATION

The NASA ISS Program PP&C Office will maintain the following official documentation of each ISS Program SORR and FRR Review.

A. Action item log

B. Applicable ISS Program CoFR certificates - signed

C. Listing of ISS Program CoFR Exceptions

D. Listing of Open Work which is a constraint to an event

E. ISS Program CoFR Exception /Standard Open Work listing

F. Review briefing materials

G. Delegation of authority letters

H. Readiness poll list

I. Review minutes

J. Meeting audio recording (only SORR and FRR)

K. Statement of Readiness to NASA Administrator (when NASA FRR is required for IP launches)

The official documentation of the Joint Station/Shuttle FRR will be maintained by the Space Shuttle CM Office.

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APPENDIX A

ACRONYMS AND ABBREVIATIONS

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APPENDIX A - ACRONYMS AND ABBREVIATIONS

AA	Associate Administrator
ADP	Acceptance Data Package
AR	Acceptance Review
ARES	Applied Research & Engineering Sciences
ASC	Aisle Stowage Container
ASI	Agenzia Spaziale Italiana
ATV	Automated Transfer Vehicle
BDEALS	Bilateral Data Exchange Agreement, Lists and Schedules
BIVP	Bilateral Integration and Verification Plan
BOE	Boeing
CE	Cargo Element
CG	Center of Gravity
CI	Configuration Item
CIL	Critical Item List
CM	Configuration Management
CMC	Cargo Mission Contract
COA	Certificate of Acceptance
CoFR	Certification of Flight Readiness
CSA	Canadian Space Agency
DQA	Data Quality Assurance
EDMS	Electronic Document Management System
Equiv	Equivalent
ESA	European Space Agency
EVA	Extravehicular Activity
EXPRESS	EXpedite the PRocessing of Experiments to Space Station
FCA	Functional Configuration Audit
FCOD	Flight Crew Operations Directorate
FGB	Functional Cargo Block
FRR	Flight Readiness Review
FSE	Flight Support Equipment
GDR	General Designer’s Review
GFD	Government Furnished Data
GFE	Government Furnished Equipment
GSE	Ground Support Equipment
HTV	H-II Transfer Vehicle
HW/SW	Hardware/Software
ICD	Interface Control Document
IDD	Interface Definition Document

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IDRD	Increment Definition and Requirements Document
IGA	Intergovernmental Agreement
IM	Increment Manager
IMMT	ISS Mission Management Team
IMT	Increment Management Team
IP	International Partner
IPB	Illustrated Parts Breakdown
IP/P	International Partner/Participant
IPI	ISS Payload Integration
IRMA	ISS Risk Management Application
ISPR	International Standard Payload Rack
ISS	International Space Station
JARSWG	Joint American/Russian Safety Working Group
JAXA	Japan Aerospace Exploration Agency
JCCT	Joint Cargo Certification Team
JEM	Japanese Experiment Module
JMP	Joint Management Plan
JSC	Johnson Space Center
JTWG	Joint Technical Working Group
KSC	Kennedy Space Center
L	Launch
L-	Launch minus
LCC	Launch Commit Criteria
L/M	Logistics & Maintenance
LP	Launch Package
LPA	Launch Package Assessment
LP/CE	Launch Package/Cargo Element
LPM	Launch Package Manager
LPMT	Launch Package Management Team
LPRR	Launch Package Readiness Review
LV	Launch Vehicle
MASCB	Multilateral Avionics and Software Control Board
Mgr.	Manager
Mgrs	Managers
MIC	Mission Integration Contract
MIP	Mission Integration Plan
MOA	Memorandum of Agreement
MOD	Mission Operations Directorate
MOU	Memorandum of Understanding
MPLM	Multi-Purpose Logistics Module

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MSFC	Marshall Space Flight Center
MSS	Mobile Servicing System
N/A	Not Applicable
NASA	National Aeronautics and Space Administration
NESC	NASA Engineering Safety Center
NSTS	National Space Transportation System
O&U	Operations and Utilization
ODF	Operations Data File
OP	Operations Product
OPF	Orbiter Processing Facility
Org	Organization
ORU	Orbital Replacement Unit
OSF	Office of Space Flight
PCA	Physical Configuration Audit
PI&C	Program Integration and Control Contract
PIO	Program Integration Office
PL	Payload
P/L	Payload
PM	Program Manager
PMMT	Prelaunch Mission Management Team
POIC	Payload Operations Integration Center
POIF	Payload Operations Integration Facility
Prg.	Program
PRR	Payload Readiness Review
PSRP	Payload Safety Review Panel
RM&QA	Reliability, Maintainability, and Quality Assurance
Roscosmos	Federal Space Agency
RS	Russian
RSA	Russian Space Agency
RSC-E	Rocket Space Corporation - Energia
S&MA	Safety and Mission Assurance
S&PA	Safety and Product Assurance
SIF	Schedule Integration Form
SLSD	Space Life Sciences Directorate
SORR	Stage Operations Readiness Review
SPP	Science Power Platform
SRP	Safety Review Panel
SSC	Stennis Space Center
SSCB	Space Station Control Board
SSCBD	Space Station Control Board Directive
SSP	Space Shuttle Program
SSPCB	Space Station Program Control Board

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STS	Space Transportation System
STWH	System Technical Warrant Holder
SW	Software
S/W	Software
TBD	To Be Determined
TBR	To Be Resolved
TIM	Technical Interchange Meeting
TPS	Thermal Protection System
ULC	Unpressurized Logistics Carrier
U.S.	United States
USA	United Space Alliance
VAR	Vehicle Assessment Review

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APPENDIX B

GLOSSARY OF TERMS

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APPENDIX B - GLOSSARY OF TERMS

ACCEPTANCE

Act of receiving a delivery with verification that the design meets the specification requirements. Acceptance requires delivery paper and accumulation of support data in an acceptance data pack. Acceptance provides assurance that an item was manufactured as designed and is free of manufacturing and workmanship defects.

ACCEPTED

All responsible parties have agreed on a coordinated resolution to the issue of concern.

BOEING LAUNCH PACKAGE MANAGER

The Boeing LPM is responsible for the day-to-day Boeing ISS Program management of flight-specific activities, including definition of LP requirements and manifest, and management of integration activities of cargo into a Transportation Vehicle. Coordinates Contractor ISS Program support to Transportation Vehicle reviews and integration activities, manages Contractor integration schedules for the individual CEs that make up the LP, and manages the Contractor CoFR processes for the flight.

CARGO ELEMENT

A group of ISS Program flight hardware end items or flight elements configured within a Transportation Vehicle for launch to the ISS.

CARGO ITEM

Any item that is transferred to and from orbit via an ISS Program logistics carrier or other ISS Program stowage accommodations (i.e., middeck lockers). Categories of cargo items include: system elements, crew support items, ISS Program support items (major ORUs), pressurized payloads, payloads resupply items, and attached payloads.

CARRIER

An item that delivers to orbit and returns from orbit LP/cargo items in a pressurized MPLM, or in an unpressurized atmospheric environment on a ULC, Spacelab pallet, etc.

CERTIFICATION

The formal written act whereby a responsible official attests to the satisfactory accomplishment of specified activities and authorizes the specified HW/SW, procedures, facilities, and/or personnel for program usage.

CONFIGURATION ITEM

Hardware or software or an aggregation of both that is designated by contracting agency for CM.

FLIGHT

Activity supported by personnel, facilities, and equipment required to launch and/or return HW/SW to orbit or to the ground.

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FLIGHT SUPPORT EQUIPMENT

Equipment, both hardware and associated software, that is used to provide support to flight hardware from the time of flight hardware insertion into the on-orbit Transportation Vehicle (e.g., Space Shuttle Orbiter cargo bay) until removal for on-orbit installation or assembly.

GOVERNMENT FURNISHED EQUIPMENT

Equipment acquired by the Government and delivered or otherwise made available to a non-Government organization.

GROUND PROCESSING PERSONNEL

Individuals who perform launch and post landing processing for ISS Program elements, systems, and payloads in support of increment support operations.

GROUND SUPPORT EQUIPMENT

Deliverable equipment, both hardware and associated software, that is used on the ground to provide some means of support to flight systems or equipment. GSE includes test and checkout equipment, handling and transporting equipment, access equipment, and servicing equipment.

INCREMENT

A specific time period into which various assembly, research, testing, logistics, maintenance, and other ISS system Operations and Utilization (O&U) activities are grouped. Increment boundaries are established to coincide with, and are defined by, crew rotations.

INCREMENT MANAGER

Person that is responsible for the day-to-day ISS Program management for Increment specific activities, including definition of requirements, manifest and integration activities. Coordinates ISS Program support to ISS reviews and integrated activities, manages integration schedules for the increment and manages the CoFR process for the increment/Stages along with the applicable LPM(s).

INTEGRATION

The act of mating hardware and/or software components, subsystems, systems, or elements with their respective interfaces and verifying the compatibility and proper operation of the resulting entity, including the interface.

INTEGRATION HARDWARE

ISS Program flight hardware required to integrate a cargo item into an ISS Program carrier/subcarrier.

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LAUNCH PACKAGE

The total complement of ISS Program CEs, crew compartment items, cargo items and support equipment onboard a Transportation Vehicle on a single flight. The LP applies to both assembly and cargo service flights.

LAUNCH PACKAGE MANAGER

Person that is responsible for the day-to-day ISS Program management of flight-specific activities, including definition of LP requirements and manifest, and management of integration activities of cargo into a Transportation Vehicle. Coordinates ISS Program support to Transportation Vehicle reviews and integration activities, manages integration schedules for the individual CEs that make up the LP, and manages the CoFR processes for the flight along with the applicable IM.

LAUNCH VEHICLE

The vehicle that launches the Transportation Vehicle to orbit.

MISSION

The performance of a coherent set of investigations or operations in space to achieve ISS Program goals.

MISSION ASSURANCE

Those independent activities preformed that are necessary to provide increased confidence in achieving mission success. The mission assurance activities will typically include independent assessments, Non-Advocate Reviews, process verification, program or project reviews and audits, quality assurance, software verification, and other activities that validate approaches, plans, and products.

MISSION SUCCESS

Those activities performed in line and under the control of the program or project that are necessary to provide assurance that the program or project will achieve its objectives' requirements. The mission success activities will typically include risk assessments, system safety engineering, reliability analysis, quality assurance, electronic and mechanical parts control, software validation, failure reporting/resolution, and other activities that are normally part of a program or project work structure. The ISS mission requirements are documented in the IDRD.

NON-STANDARD OPEN WORK

Non-standard Work that is still to be complete. This includes Standard Work that has become late or delinquent.

NON-STANDARD WORK

Work that is not a part of the normal standard work process.

OBJECTIVE EVIDENCE

The tangible proof that endorsements have been met.

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ON-ORBIT CONFIGURATION

The HW/SW configuration that occurs during assembly operations, including Stage configuration.

QUALIFIED DESIGN

A design (hardware or software) that has been verified to be compliant to its design requirements resulting in a successful Functional Configuration Audit (FCA).

RACK (PAYLOAD/STOWAGE/SYSTEM)

The total complement of ISS Program flight HW/SW end items carried to and from the ISS in the International Standard Payload Rack (ISPR), Expedite the Processing of Experiments to Space Station (EXPRESS), Resupply Stowage Rack, Resupply Stowage Platform, System Rack, and/or Aisle Stowage Container (ASC).

RISK

A future event with a negative consequence that has some probability of occurring. It is a combination of the likelihood of occurrence and the severity of the consequence. An ISS Program risk poses a threat to the crew or vehicle safety, program cost, schedule, or major mission objective.

SOFTWARE TRANSITION

A Software Transition on orbit is a transition that involves deploying and activating a new compiled version or release of a Computer Software Configuration Item (CSCI), significant revisions of firmware, substantial patches, or substantial changes in Pre-Positioned Loads (PPLs).

STAGE

Per SSP 54004, IDRD Blank Book Template, Stage is defined as “Period of on-orbit configuration of the ISS after each flight which adds capability to the ISS. This can also be a designated period between launch vehicles defined by the ISS Program for requirement documentation and planning purposes.” For the purposes of SSP 50108, Stage is defined to be a designated period between Transportation Vehicles defined by the ISS Program for requirement documentation and planning purposes.

STANDARD OPEN WORK

Standard Work that is still to be completed. In the case of the SORR, this would be Standard Work that is to be completed after the SORR as part of the normal planned process.

STANDARD WORK

Work that occurs as part of the normal planned process.

TECHNICAL AUTHORITY

The responsibility, authority, and accountability to establish monitor, and approve technical requirements, products, and policy.

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TRANSPORATION VEHICLE

The vehicle that docks/undocks with ISS.

USER PAYLOAD

Equipment designed and developed for the purpose of performing research onboard the on-orbit ISS.

VEHICLE ASSESSMENT REVIEW (VAR)

Definition to be supplied by OB/Vehicle Office **<TBD B-1>**.

VERIFICATION

Ensures that facilities, system, and payload HW/SW products and operational procedures comply with the specification requirements imposed on them.

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APPENDIX C

ASI ISS CERTIFICATION OF FLIGHT READINESS PROCESS REQUIREMENTS

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APPENDIX C - ASI ISS COFR PROCESS REQUIREMENTS

C.1 CONTROL AUTHORITY

Appendix C is subject to Space Station Control Board (SSCB) Change Control. Requirements defined herein have been negotiated and agreed to by the ISS Program and the Agenzia Spaziale Italiana (ASI) and are supported by internal implementation plans.

C.2 ASI ISS CERTIFICATION OF FLIGHT READINESS PROCESS

Figure C.2-1, ASI ISS Certification of Flight Readiness Process, defines the agreed-to review process that culminates in the signing of the International Space Station (ISS) documentation for a particular flight, Stage, increment and/or major activity containing ASI payloads and/or ASI provided elements.

This process has been developed to support the standard ASI Certification Process for certifying their provided elements or payloads, and to provide the ISS Program with the data and insight for integration of all Hardware/Software (HW/SW) supporting the ISS.

The ASI process will follow the standard timeline and procedure for certifying their elements or payloads.

A. For the first flight of each Multipurpose-Pressurized Logistics Module (MPLM) and for ASI payloads flights, the following process applies;

The data from the ASI Acceptance Reviews (ARs), the joint ASI/NASA Safety Review Process, and other joint reviews will support the endorsement statements for Certification of Flight Readiness (CoFR).

ASI will carry out the operations support necessary to support CoFR contained in Figure C.2-2, ASI ISS Certification of Flight Readiness Launch Package and Increment/Stage Integration Readiness, and the ISS FRR.

A. For follow-on MPLM flights, ASI will submit the CoFR document contained in Figure C.2-3, ASI ISS COFR - Launch Package and Increment/Stage Integration Readiness for Follow-On MPLM Flights. If modifications are made to the MPLM, then the unit needs to be re-certified. CoFR requires a new Functional Configuration Audit (FCA)/Physical Configuration Audit (PCA) if the design is changed. However, modifications done after the delivery of MPLM units to NASA, will be managed according to SSP 50200-10 Appendix G.

ASI provided elements or ASI payloads may contain components or items provided by other ISS Partners, including NASA. The CoFR documents provided by ASI in this case will certify those other components or items as well, based on documentation provided by the other Partner. The type of documentation provided by the Partner depends on

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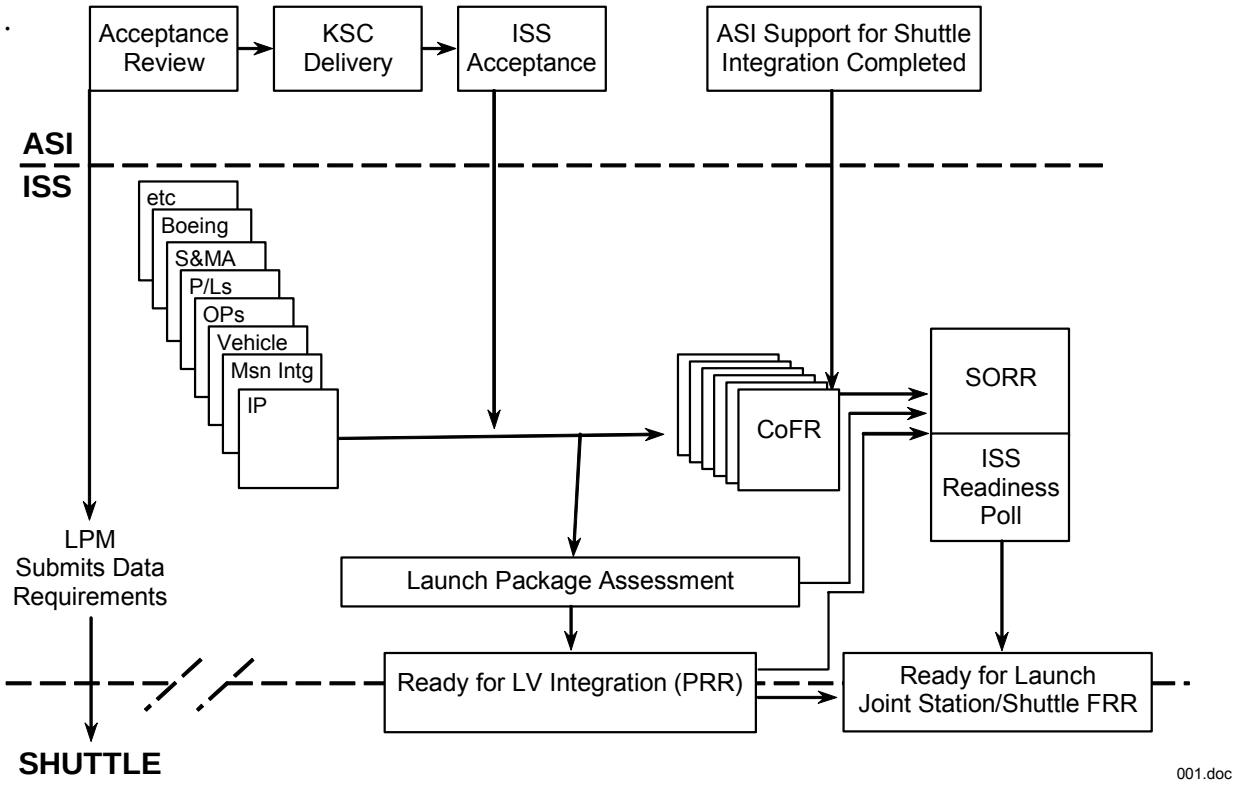

FIGURE C.2-1 ASI ISS CERTIFICATION OF FLIGHT READINESS PROCESS

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Flight Number_____ Launch Vehicle _____ Stage/Increment Description _____

ASI ISS CoFR 1 - Launch Package/Cargo Element Integration Readiness Description											
Cargo Elements (CEs)			Cargo Carriers			Racks (System/Payload)			GSE		
Description	Part #	Config	Description	Part #	Config	Description	Part #	Config	Description	Part #	Config

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ASI ISS Certification of Flight Readiness (CoFR)
Launch Package and Increment/Stage Integration Readiness (CoFR)

Flight Number_____ Launch Vehicle _____Stage/Increment Description _____

ASI ISS CoFR Launch Package and Increment/Stage Integration Readiness Description											
Cargo Elements (CEs)			Cargo Carriers			Racks (System/Payload)			GSE		
Description	Part #	Config	Description	Part #	Config	Description	Part #	Config	Description	Part #	Config

This endorsement certifies that: • the above listed ASI HW/SW ,other ASI support HW/SW, and support facilities and personnel are ready to support the flight, stage, and/or increment. • those HW/SW are ready for use by the ISS program. • all necessary ASI activities (action items, open work, and exceptions) have been completed and/or approved.	
Endorsement Codes	**Exceptions**
a. (for MPLM) "As-built" flight articles, Configurations Items (CIs), and HW/SW satisfy the functional, operational, and performance requirements in accordance with the International Partners (IPs) "design-to" specifications, Interface Control Documents (ICDs), and SSP 41164, Italian Mini-Pressurized Logistics Segment. Any departure from the requirements has been documented. Verification has been completed and documented. (for Payloads): "As-built" flight articles, Configurations Items (CIs), and HW/SW satisfy the functional, operational, and performance requirements in accordance with the International Partners (IPs) "design-to" specifications and Interface Control Documents (ICDs). Any departure from the requirements has been documented. Verification has been completed and documented.	
b. (for MPLM/ for Payload): "As-built" flight articles, CIs, and HW/SW satisfy the physical requirements (weight, Center of Gravity (CG), surface finish, cleanliness, etc.) in the design specifications, and are correctly documented in accordance with ASI applicable Acceptance Data Package Requirements. Any departure from design requirements has been documented, dispositioned, and approved. Verification has been completed and documented.	
c. (for MPLM): All ASI supported ground processing that allows the integration of MPLM HW/SW into the ISS LP has been completed (for Payload): All ASI-supported ground processing that allows the integration of the payload/experiment HW/SW into the ISS LP has been completed	
d.	
e. (for MPLM): All requirements necessary for integration of a rack and relevant cargo into the MPLM have been documented in applicable ISS configuration drawings Interface Definition Documents (IDDs), and ICDs	
f. (for MPLM/Payload): All certification requirements for ASI Ground Support Equipment (GSE) HW/SW have been satisfied.	

FIGURE C.2-2 ASI ISS CERTIFICATION OF FLIGHT READINESS LAUNCH PACKAGE AND INCREMENT/STAGE INTEGRATION READINESS (PAGE 1 OF 4)

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ASI ISS Certification of Flight Readiness (CoFR)
Launch Package and Increment/Stage Integration Readiness (CoFR)

Flight Number_____ Launch Vehicle _____Stage/Increment Description _____

ASI ISS CoFR Launch Package and Increment/Stage Integration Readiness Description	
g. (for MPLM): All MPLM requirements for LP integration into the transportation system have been provided.	
h. (for Payload): Test, checkout, and servicing of the ASI payload have been completed, and is prepared for integration into the transportation system.	
i. (for MPLM/Payload): Limited-life hardware (time, cycle) has been identified and the logistics and maintenance planning support has been accomplished that will support the on-orbit operations.	
l. *this repeats what in point e.*	
m. (for MPLM/Payload): Any open items, or actions identified from applicable design reviews and integration readiness reviews impacting ASI designed HW/SW that constrain installation into the transportation vehicle have been resolved and closed.	
n. (for MPLM/Payload): All open items identified from previous reviews that impact the ASI-developed HW/SW have been resolved and their resolution documented.	
o. (for MPLM/Payload): All ASI generated nonconformance items, discrepancies and problem reports associated with the ASI-developed flight HW/SW have been resolved, and design related corrective action have been implemented or documented as acceptable.	
2	
p. (for MPLM/Payload): All analyses and assessments to ensure MPLM/ASI payload safety have been performed in accordance with the SSP 50182, NASA/ASI Bilateral Safety and Product Assurance Requirements.	
q. (for MPLM/Payload): ASI is satisfied with the results of the ISS safety review process.	
r. (for Payload): The applicable CI configurations have not changed between the ASI ARs and acceptance by the ISS Program, and any changes to the configuration have been documented in accordance with ISS Configuration Management (CM) procedures.	
s. (for MPLM/Payload): All ASI personnel are certified and ready to support integration activities into the transportation system.	
t. (for MPLM/payload): All ASI Space Station sites, facilities, personnel, and procedures that support the MPLM/Payload mission have been properly trained and are certified and ready to support the flight and increment.	
u. (for MPLM/Payload) All ASI flight rule inputs have been defined, and all ISS related flight rules have been reviewed, concurred on/.	
v. (for MPLM/Payload): All ASI ISS Operations Data File (ODF) procedure inputs have been defined, and all related ODF procedures have been reviewed, concurred on.	

FIGURE C.2-2 ASI ISS CERTIFICATION OF FLIGHT READINESS LAUNCH PACKAGE AND INCREMENT/STAGE INTEGRATION READINESS (PAGE 2 OF 4)

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ASI ISS Certification of Flight Readiness (CoFR)
Launch Package and Increment/Stage Integration Readiness (CoFR)

Flight Number_____ Launch Vehicle _____Stage/Increment Description _____

ASI ISS CoFR Launch Package and Increment/Stage Integration Readiness Description	
this repeats what in point t. x. For MPLM: The final ASI software flight load delivered to MBF has been verified. y. For Payload The final ASI software flight load has been verified. Launch Commit Criteria (LCC) have been defined and approved.	

ISS-CoFR-ASI01

FIGURE C.2-2 ASI ISS CERTIFICATION OF FLIGHT READINESS LAUNCH PACKAGE AND INCREMENT/STAGE INTEGRATION READINESS (PAGE 3 OF 4)

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ASI ISS Certification of Flight Readiness (CoFR)
Launch Package and Increment/Stage Integration Readiness (CoFR)

Flight Number_____ Launch Vehicle _____Stage/Increment Description _____

ASI ISS CoFR Launch Package and Increment/Stage Integration Readiness Certificate

This statement certifies, based on the responsible manager's best knowledge, satisfactory completion of the portion of the listed requirement codes for which each manager is responsible, and readiness for the flight, contingent on closeout of any exceptions noted herein.

Responsibility	Applicable Endorsement Codes	Signature Requirement	Date
Operations	c., d., h. d., s., t., u., v., z.	ASI Operations Manager	
MPLM Program	a., b., e., f., g., i., l., m., n., o., u., v., x.	ASI Program Manager	
Utilization	a., b., h., i., m., n., o., r., v., y.	ASI Utilization Manager	
Safety & Mission Assurance (S&MA)	a., b., e., f., i., m., n., o., p., q., r., u., v., x. y.	ASI S&MA Manager	

_____ Approval _____ Approval _____

ASI ISS Program Manager NASA ISS Program Manager

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FIGURE C.2-2 ASI ISS CERTIFICATION OF FLIGHT READINESS LAUNCH PACKAGE AND INCREMENT/STAGE INTEGRATION READINESS (PAGE 4 OF4)

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ASI ISS Certification of Flight Readiness (CoFR)
Launch Package and Increment/Stage Integration Readiness (CoFR)

Flight Number_____ Launch Vehicle_____ Stage/Increment Description_____

Cargo Element___MPLM FM xxxxxxxxxx_____

ASI ISS CoFR Launch Package and Increment/Stage Integration Readiness Description	
This endorsement certifies that the above listed ASI HW/SW, support facilities, and personnel are ready to support the flight, stage, and/or increment.	
Endorsement Codes a. All ASI supported ground processing that allows the integration of MPLM HW/SW into the ISS LP has been completed. b. Limited-life hardware (time, cycle) has been identified and the logistics and maintenance planning has been accomplished that will support the on-orbit operations.	**Exceptions**
c. All ASI Space Station sites, facilities, personnel, and procedures that support the MPLM mission have been properly trained, and are certified and ready to support the flight and increment. d. All ASI ISS flight rule inputs have been defined, and all ISS related flight rules have been reviewed and concurred on e. All ASI ISS Operations Data File (ODF) procedure inputs have been defined, and all related ODF procedures have been reviewed and concurred on. f. All nonconformance items, discrepancies and problem reports associated with the ASI-developed flight HW/SW have been resolved, and design related corrective action have been implemented or documented as acceptable.	

ISS-CoFR-ASI01

FIGURE C.2-3 ASI ISS COFR - LAUNCH PACKAGE AND INCREMENT/STAGE INTEGRATION READINESS FOR FOLLOW-ON MPLM FLIGHTS (PAGE 1 OF 2)

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ASI ISS Certification of Flight Readiness (CoFR)
Launch Package and Increment/Stage Integration Readiness (CoFR)

ASI ISS CoFR - Launch Package and Increment/Stage Integration Readiness Certificate			
This statement certifies, based on the responsible manager's best knowledge, the satisfactory completion of the portion of the listed requirement codes for which each manager is responsible, and the readiness for the flight, contingent on closeout of any exceptions noted herein.			
Responsibility	Applicable Endorsement Codes	Signature Requirement	Date
MPLM Sustaining Engineering	t., u., v., z.,	ASI MPLM Sustaining Engineering Manager	
Safety & Mission Assurance (S&MA)	i. u., v.	ASI S&MA Manager	

Approval _____ ASI ISS Program Manager

Approval _____ NASA ISS Program Manager

ISS-CoFR ASI01

FIGURE C.2-3 ASI ISS COFR - LAUNCH PACKAGE AND INCREMENT/STAGE INTEGRATION READINESS FOR FOLLOW-ON MPLM FLIGHTS (PAGE 2 OF 2)

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the type of component or item provided. Two major categories of items exist: logistics or payload items and systems items. For those logistics or payload items that comprise complete racks or similar significant components, the Partner will provide ASI with the CoFR document (Figure C.2-2) as the accompanying documentation. For lesser logistics or payloads items, the letter contained in Figure C.2-4, Letter Certifying Other Partner's Items, or its equivalent will be used. Systems items that are Orbital Replacement Units (ORUs) will be accompanied by a Acceptance Data Packages (ADPs) or equivalent documentation, and safety documentation. The sub-ORU-level items will use the letter contained in Figure C.2-4. When ASI provides components or items to other Partners for inclusion in their elements or payloads, these same categories and documentation will be utilized.

For non-Italian launches to ISS as appropriate, ASI will provide, if applicable, the letter contained in Figure C.2-5, Letter of Support for Next Non-Italian Launch, to NASA to support NASA's CoFR 2 process. This letter states that the Italian elements, both already on-orbit and on the ground, are ready to support the upcoming launch and addition of the new elements to the ISS or major activity.

The inputs for the Shuttle CoFR process will be coordinated with the NASA/ISS Program Office. The ASI CoFR documentation for a single MPLM or Italian Payload flight will consist of one of the following:

A. ASI ISS CoFR Form #ISS-CoFR ASI01 (Figure C.2-2 and C.2-3)

B. Letter Certifying Other Partner's Items (Figure C.2-4)

C. Letter of Support for Next Non-Italian Launch (Figure C.2-5)

D. Delegation of Authority Letters

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Program Manager or Designee
International Space Station Program
(Recipient of Item)

Dear (Recipient of Item):

The items listed below are provided to you for integration into your module_____ deliverable payloads _____. These items have been developed according to specifications and meet functional and performance requirements. There are no known anomalies that would prevent the successful integration of these items.

(list of Partner(s) components/items here)

I will contact you immediately if this assessment changes at any point before launch.

Sincerely,

Program Manager or Designee
International Space Station Program
(Provider of items)

FIGURE C.2-4 LETTER CERTIFYING OTHER PARTNER'S ITEMS

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(Program Manager Name ISS Program)
Program Manager
International Space Station Program
NASA

Dear (Program Manager Name ISS Program):

All Italian elements of the International Space Station (ISS), both on-orbit and on the ground, are ready to support the additional elements to be launched in the upcoming mission. There are no known anomalies that would prevent the successful integration and operation of these new elements on the ISS. The on-orbit Italian elements covered by this letter include:

(List of Italian on-orbit elements here.)

I will contact you immediately if our assessment of this readiness changes at any point before launch.

Sincerely,

ASI

FIGURE C.2-5 LETTER OF SUPPORT FOR NEXT NON-ITALIAN LAUNCH

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APPENDIX D

CSA ISS COFR PROCESS REQUIREMENTS

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APPENDIX D - CSA ISS COFR PROCESS REQUIREMENTS

D.1 CONTROL AUTHORITY

Appendix D is subject to Space Station Control Board (SSCB) Change Control. Requirements defined herein have been negotiated and agreed to by the International Space Station (ISS) Program and the Canadian Space Agency (CSA) and are supported by internal implementation plans.

D.2 CSA ISS COFR PROCESS

Figure D.2-1, CSA ISS Certification of Flight Readiness Process, defines the agreed-to review process that culminates in the signing of the ISS documentation for a particular CSA flight, Stage, increment and/or major activity. Figure D.2-1 outlines the process for certification of CSA elements launched on the Space Shuttle.

This process has been developed to support the standard CSA Certification Process for certifying their elements or payloads, and to provide the ISS Program with the data and insight for integration of all Hardware/Software (HW/SW) supporting the ISS.

The CSA process will follow the standard timeline and procedure for certifying their elements or payloads. The data from the CSA Certificates of Acceptance (COAs), Acceptance Reviews (ARs), and the joint CSA/NASA Safety Review Process will support the endorsement statements for the CSA CoFR document contained in Figure D.2-2, CSA ISS COFR - Launch Package/Cargo Element Integration Readiness, and Figure D.2-3, CSA ISS COFR - Launch Package and Increment/Stage Integration Readiness. CSA will support development of a NASA Implementation Plan by the Launch Package Manager (LPM) that records the various reviews, tests, and analyses that precede the final CoFR certification.

Specific Canadian elements or payloads may contain components or items provided by other ISS Partners, including NASA. The CoFR documents provided by CSA for the Canadian elements or payloads will certify those other components or items as well, based on documentation provided by the original providing Partner. The type of documentation provided by the original providing Partner depends on the type of component or item provided. Two major categories of items exist: logistics/payload items and systems items. For those logistics/payload items that comprise complete racks or similar significant components, the original providing Partner will use its existing COFR (or single CoFR) document as the accompanying documentation. For lesser logistics/payloads items, the letter contained in Figure D.2-4, Letter Certifying Other Partner's Items, or its equivalent will be used. Systems items that are ORUs will be accompanied by a COFR, Acceptance Data Packages (ADPs) (or equivalent documentation), and safety documentation. The sub-Orbital Replacement Unit (ORU) level items will use the letter contained in Figure D.2-4. When CSA provides components or items to other Partners for inclusion in their modules or deliverable payloads, these same categories and documentation will be utilized.

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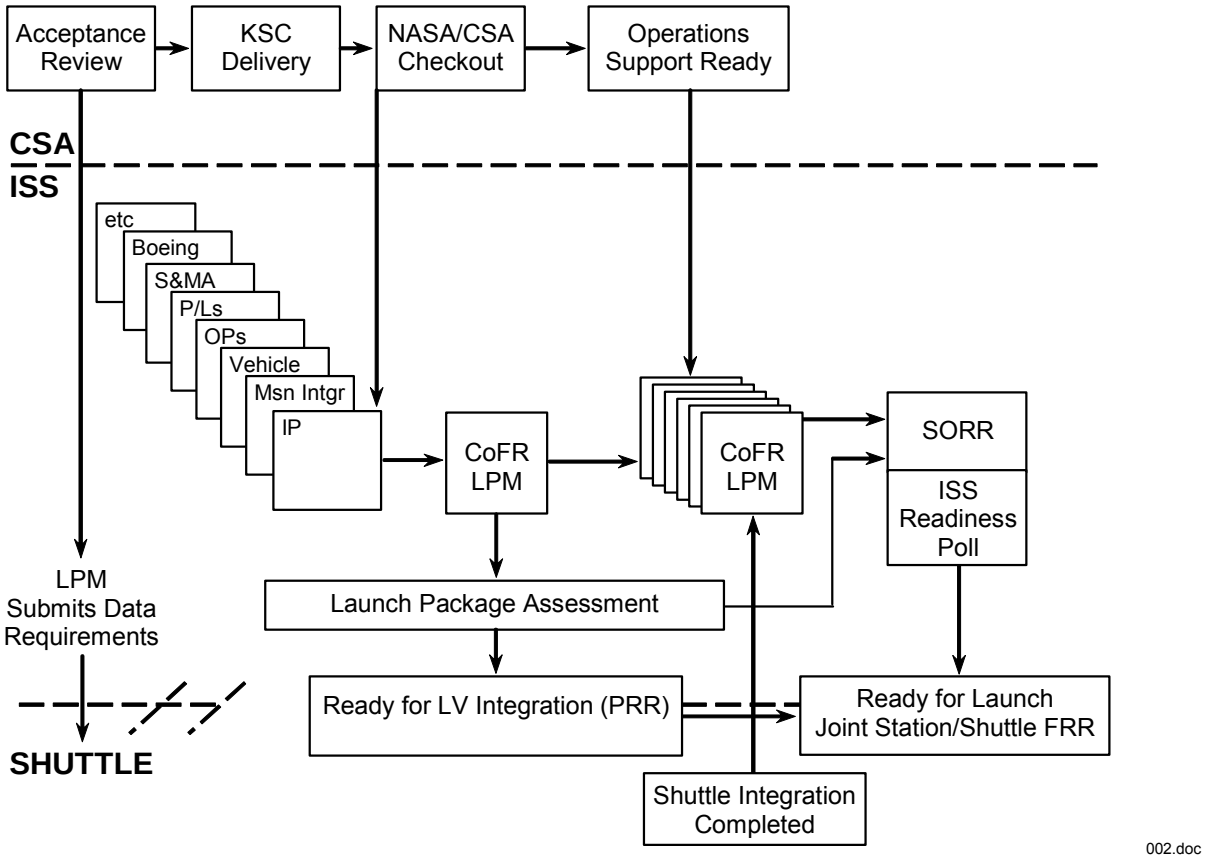

FIGURE D.2-1 CSA ISS CERTIFICATION OF FLIGHT READINESS PROCESS

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CSA ISS Certification of Flight Readiness (CoFR)
Launch Package/Cargo Element Integration Readiness (COFR)

Flight Number_____ Launch Vehicle _____ Stage/Increment Description_____

CSA ISS COFR - Launch Package/Cargo Element Integration Readiness Description			
CI/End Item(s)	Serial Number		
This endorsement certifies that the identified CSA ISS Configuration Item (CI), payload/experiment, Government Furnished Equipment (GFE), and other support HW/SW are ready for use by the ISS Program, and all the necessary activities required for integration of HW/SW into an ISS Launch Package (LP) and applicable transportation system have been accomplished.			
Endorsement Codes			**Exceptions**
a. "As-built" flight articles, CIs, and HW/SW satisfy the functional and performance requirements in accordance with the "design-to" specifications and/or joint segment specifications, SSP 41167, Mobile Servicing System Segment Specification for the International Space Station Program; any departure from requirements has been documented. Verification has been completed and documented. b. "As-built" flight articles, CIs, and HW/SW satisfy the physical requirements (weight, Center of Gravity (CG), surface finish, cleanliness, etc.) in accordance with design specification SSP 41167, and are correctly documented in accordance with SSP 50062, NASA/CSA Bilateral Safety and Mission Assurance Requirements. Any departure from design requirements has been documented, dispositioned, and approved. Verification has been completed and documented. c. The applicable CI configurations have not changed since CSA ARs; changes to the configuration have been documented in accordance with ISS Configuration Management (CM) procedures. d. All HW/SW requirements necessary for cargo item integration into ISS carriers have been documented in the applicable ISS configuration drawings and Interface Control Documents (ICDs), and have been implemented. e. HW/SW requirements necessary for Launch Package (LP) integration into the transportation system have been documented in the Mission Integration Plans (MIPs), applicable IP integration plans agreements, ICDs, etc., and have been implemented. f. Test, checkout, and servicing of the LP/Cargo Element (CE) have been completed and the LP/CE is prepared for integration into the transportation system. g. Limited-life hardware (time, cycle) has been identified and the logistics and maintenance planning has been accomplished that will support the on-orbit operations. h. All certification requirements for Ground Support Equipment (GSE) HW/SW for this flight and/or increment have been satisfied. i. The ISS safety review process has been completed in accordance with SSP 50062 and accepted. All analyses and assessments to ensure LP/Stage safety requirements have been performed. j. All CSA personnel are certified and ready to support integration activities into the transportation system. k. Any open items, or actions, from applicable design and integration readiness reviews that constrain installation into the Transportation Vehicle, have been identified, resolved, and closed. l. All nonconformance items and problem reports associated with the ISS flight HW/SW have been resolved and corrective action implemented or documented as acceptable.			

ISS-COFR-CSA01

FIGURE D.2-2 CSA ISS COFR-
LAUNCH PACKAGE/CARGO ELEMENT INTEGRATION READINESS
(PAGE 1 OF 2)

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CSA ISS Certification of Flight Readiness (CoFR)
Launch Package/Cargo Element Integration Readiness (COFR)

CSA ISS COFR - Launch Package/Cargo Element Integration Readiness Certificate			
This statement certifies, based upon the responsible manager's best knowledge and belief, the satisfactory completion of the portion of the listed requirement codes for which each manager is responsible, and the readiness for the LP/CE integration into the launch vehicle for the flight, contingent on closeout of any exceptions noted herein. This statement certifies flight and Stage/increment readiness for the flight, contingent on closeout of any exceptions noted herein.			
CSA Organization	Applicable Endorsement Codes	Signature Requirement	Date
Operations/Utilization	e., g., k.	Director MSS Operations and Utilization	
Engineering	a., b., c., d., e., f., g., h., i., j., k.	Director MSS Development	
Safety & Product Assurance	a., b., c., f., h., i., j., k., l.	MSS S&PA Manager	

ISS-COFR-CSA01

FIGURE D.2-2 CSA ISS COFR -
LAUNCH PACKAGE/CARGO ELEMENT INTEGRATION READINESS
(PAGE 2 OF 2)

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CSA ISS Certification of Flight Readiness (CoFR)
Launch Package and Increment/Stage Integration Readiness (COFR)

Flight Number_____ Launch Vehicle_____ Stage/Increment Description_____

CSA ISS COFR - Launch Package and Increment/Stage Integration Readiness Description	
This endorsement certifies CSA LP/CE ground HW/SW support facilities and personnel are ready to support the flight, Stage, and/or increment. The readiness of the on-orbit Stage configuration and design to accept this LP/CE and all action items, open work, and exceptions have been completed and/or approved.	
Endorsement Codes	**Exceptions**
a. The ISS safety review process has been completed, and residual risks accepted. b. All CSA Space Station sites, facilities, personnel, and procedures are certified and ready to support the flight and increment. c. All CSA flight rules have been defined, reviewed, concurred on/approved, and released for flight. d. All CSA ISS Operations Data File (ODF) procedure inputs and the CSA Payload Operations Data File (PODF) have been defined, reviewed, concurred on/approved, and released for flight. e. All mission support personnel and flight crew have been properly trained, and are ready to support this flight and/or increment. f. All open items, from previous reviews, have been resolved and their resolution documented. g. All nonconformance items, discrepancies, and problem reports associated with the ISS flight HW/SW have been resolved, and corrective action implemented, or documented, as acceptable. h. The final CSA flight SW flight load has been certified. i. LP configuration is compatible with the on-orbit Stage configuration. The CSA CEs are compatible with and support ISS system requirements for physical layout, function, performance, and operations. j. Limited-life hardware (time, cycle) has been identified and the logistics and maintenance planning have been accomplished that will support the on-orbit operations. k. Launch Commit Criteria (LCC) has been defined and approved.	

ISS-COFR-CSA01

FIGURE D.2-3 CSA ISS COFR -
LAUNCH PACKAGE AND INCREMENT/STAGE INTEGRATION READINESS
(PAGE 1 OF 2)

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CSA ISS Certification of Flight Readiness (CoFR)
Launch Package and Increment/Stage Integration Readiness (COFR)

CSA ISS COFR - Launch Package and Increment/Stage Integration Readiness Certificate			
This statement certifies flight and Stage/increment readiness for the flight, contingent on closeout of any exceptions noted herein.			
Responsibility	**Applicable Endorsement Codes**	**Signature Requirement**	**Date**
Operations/Utilization	a., b., c., d., e., f., i.	Director MSS Operations and Utilization	
Engineering	a., f., g., h., i	Director MSS Development	
Safety & Product Assurance	a. ,f. ,g., h.	MSS S&PA Manager	
Approval _____ CSA Program Manager		Approval _____ NASA ISS Program Manager	

ISS-COFR-CSA01

FIGURE D.2-3 CSA ISS COFR -
LAUNCH PACKAGE AND INCREMENT/STAGE INTEGRATION READINESS
(PAGE 2 OF 2)

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Program Manager or Designee
International Space Station Program
(Recipient of Item)

Dear (Recipient of Item):

The items listed below are provided to you for integration into your module/vehicle or deliverable payloads. These items have been developed according to specifications and meet functional and performance requirements. There are no known anomalies that would prevent the successful integration of these items.

(List of Partner(s) components/items here; and note any attachments to the letter.)

I will contact you immediately if this assessment changes at any point before launch.

Sincerely,

Program Manager or Designee
International Space Station Program
(Provider of Items)

FIGURE D.2-4 LETTER CERTIFYING OTHER PARTNER'S ITEMS

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For non-Canadian launches to ISS, CSA will provide the letter contained in Figure D.2-5, Letter of Support for Next Non-Canadian Launch, to NASA to support NASA's COFR process. This letter states that the Canadian elements, both already on-orbit and on the ground, are ready to support the upcoming launch and addition of the new elements to the ISS or major on-orbit activities. CSA will coordinate with the NASA LPM to determine which letter (Figure D.2-4 or D.2-5) is applicable to which hardware. See Section 1.5G for return hardware CoFR requirements.

The inputs for the Shuttle CoFR process will be coordinated with the NASA/ISS Program Office. The CSA CoFR documentation will consist of the following:

A. CSA ISS COFR Form #ISS-COFR-CSA01 (Figure D.2-2).

B. Letter of Certification of Items from Other Partners, when appropriate (Figure D.2-4).

C. Letter of Readiness for Launch by Other Partner (Figure D.2-5).

D. Delegation of Authority Letters.

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(Program Manager Name ISS Program)
Program Manager
International Space Station Program
NASA

(Program Manager Name ISS Program):

All Canadian elements of the International Space Station (ISS), both on-orbit and on the ground, are ready to support the additional elements to be launched in the upcoming mission. There are no known anomalies that would prevent the successful integration and operation of these new elements on the ISS. The on-orbit Canadian elements covered by this letter include:

(List of Canadian on-orbit elements here; and note any attachments to the letter.)

I will contact you immediately if our assessment of this readiness changes at any point before launch.

Sincerely,

CSA

FIGURE D.2-5 LETTER OF SUPPORT FOR NEXT NON-CANADIAN LAUNCH

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APPENDIX E

ESA ISS COFR PROCESS REQUIREMENTS

<TBR E-1>

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APPENDIX E - ESA ISS COFR PROCESS REQUIREMENTS

E.1 CONTROL AUTHORITY

Appendix E is subject to Space Station Control Board (SSCB) change control. Requirements defined herein have been negotiated and agreed-to by the International Space Station (ISS) Program and European Space Agency (ESA) and are supported by internal implementation plans.

E.2 ESA ISS COFR PROCESS

Figure E.2-1, ESA ISS Certification of Flight Readiness Process for Launch on Shuttle, and Figure E.2-2, ESA ISS Certification of Flight Readiness Process for Launch on Ariane, define the agreed-to review process that culminates in the signing of the ISS documentation for a particular ESA flight, Stage and/or increment. Figure E.2-1 outlines the process for certification of ESA elements launched on the Shuttle. Figure E.2-2 outlines the process for certification of elements or carriers launched on the Ariane Launch Vehicle (LV).

This process has been developed to support the standard ESA certification process for certifying their elements or payloads, and to provide the ISS Program with the data and insight for integration of all Hardware/Software (HW/SW) supporting the ISS.

The ESA process will follow the standard timeline and procedure for certifying their elements or payloads. The data from the ESA Certificate of Acceptance (COAs), Acceptance Review (ARs) and the joint ESA/NASA safety review process will support the endorsement statements for the ESA CoFR contained in Figure E.2-3, ESA ISS CoFR - Launch Package/Cargo Element Integration Readiness, and submitted to NASA during the CoFR process. ESA will support development of an Implementation Plan by the Launch Package Manager (LPM) that depicts the various reviews, tests, and analyses that precede the final CoFR certification.

Specific European elements or payloads may contain components or items provided by other ISS Partners, including NASA. The CoFR documents provided by ESA for the European modules/vehicles or deliverable or payloads will certify those other components or items as well, based on documentation provided by the original providing Partner. The type of documentation provided by the original providing Partner depends on the type of component or item provided. Two major categories of items exist: logistics/payload items and systems items. For those logistics/payloads items that comprise complete racks or similar significant components, the original providing Partner will use its existing COFR document as the accompanying documentation. For lesser logistics/payloads items, the letter contained in Figure E.2-4, Letter Certifying Other Partner's Items, or its equivalent will be used. Systems items that are Orbital Replacement Units (ORUs) will be accompanied by an Acceptance Data Packages (ADPs) or equivalent documentation, and safety documentation. The sub-ORU level items will use the letter contained in Figure E.2-4. When ESA provides components or

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items to other Partners for inclusion in their modules or deliverable payloads, these same categories and documentation will be utilized.

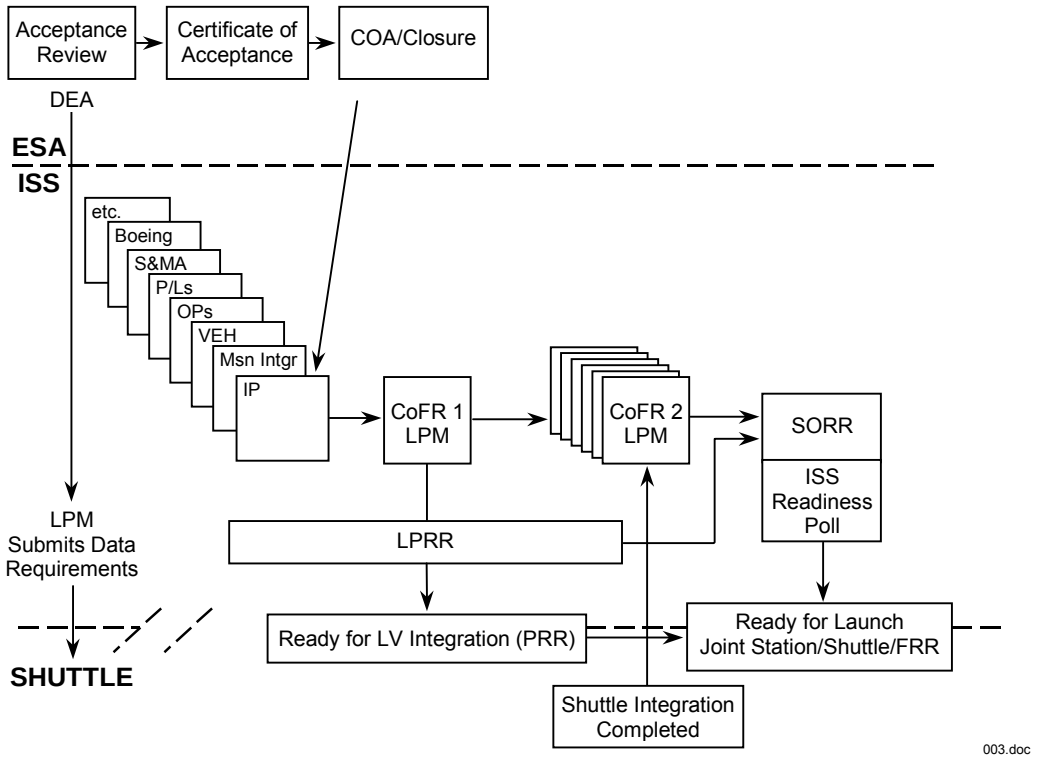

FIGURE E.2-1 ESA ISS CERTIFICATION OF FLIGHT READINESS PROCESS FOR LAUNCH ON SHUTTLE

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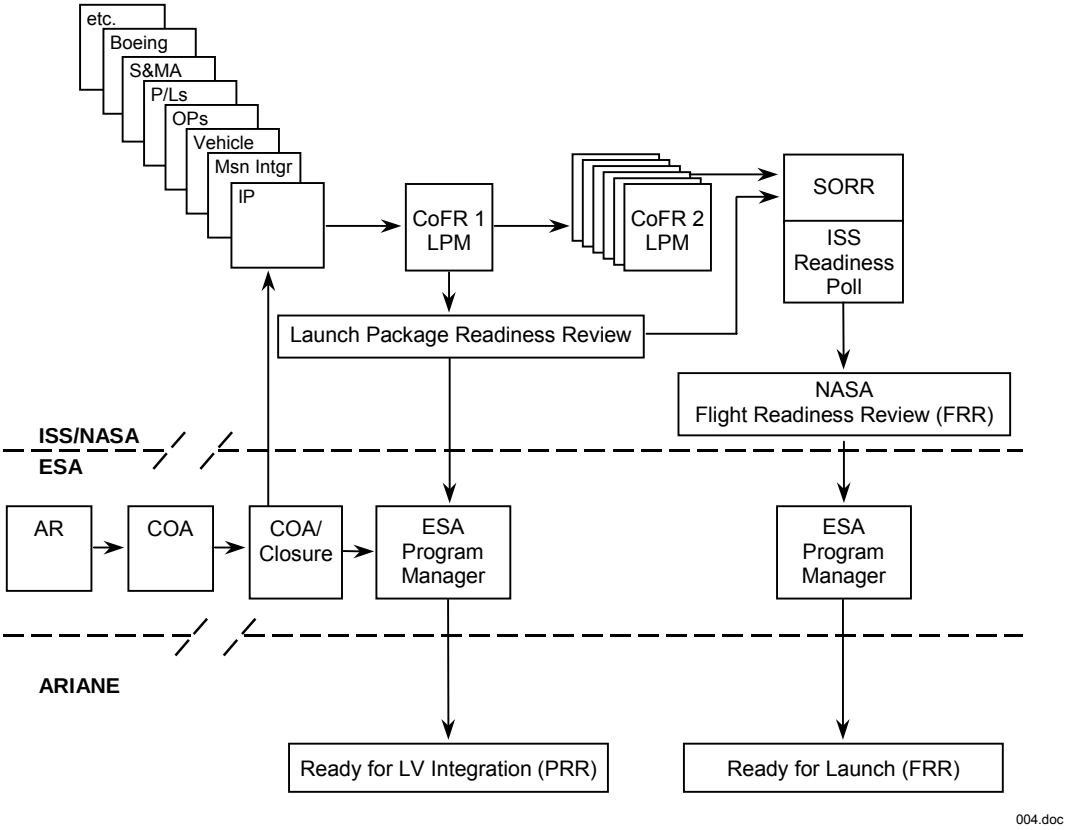

FIGURE E.2-2 ESA ISS CERTIFICATION OF FLIGHT READINESS PROCESS FOR LAUNCH ON ARIANE

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ESA ISS Certification of Flight Readiness (CoFR)
Launch Package/Cargo Element Integration Readiness

Flight Number_____ Launch Vehicle _____ Stage/Increment Description _____

ESA ISS CoFR - Launch Package/Cargo Element Integration Readiness Description											
Cargo Elements (CEs)			**Cargo Items**			**Racks (System/Payload)**			**Integration Hardware**		
Description	Part #	Config.	Description	Part #	Config.	Description	Part #	Config.	Description	Part #	Config.
This endorsement certifies that the above listed ESA HW/SW and other support HW/SW are ready for use by the ISS Program, and all the necessary activities required for integration of the HW/SW into an ISS Launch Package (LP) and the applicable transportation system has been accomplished.											

Endorsement Codes	**Exceptions**
a. "As-built" flight articles, Configuration Items (CIs), and HW/SW satisfy the functional and performance requirements in accordance with the International Partner's (IP) "design-to" specifications and/or SSP 41160, Segment Specification for the European Space Agency Attached Pressurized Module. Any departure from requirements have been documented. Verification has been completed and documented. b. "As-built" flight articles, CIs, and HW/SW satisfy the physical requirements (weight, center of gravity, surface finish, cleanliness, etc.) in accordance with the design specifications, and are correctly documented in accordance with ESA ADP Requirements. Any departure from design requirements has been documented, dispositioned, and approved. Verification has been completed and documented. c. All ground processing that allows the integration of payload/experiment HW/SW into the ISS LP has been satisfactorily completed. d. The applicable CI configurations have not changed since the ESA final AR, and changes to the configuration have been documented in accordance with ESA Configuration Management (CM) procedures and NASA/ESA Joint Management Plan (JMP). e. All HW/SW requirements necessary for cargo item integration into ISS carriers have been documented in the applicable configuration drawings and Interface Control Documents (ICDs), and have been implemented. f. HW/SW requirements necessary for LP integration into the transportation system have been documented in Mission Integration Plans (MIPs), applicable IP integration plan agreements, ICDs, etc., and have been implemented. N/A for Ariane Transfer Vehicle (ATRANSPORTATION VEHICLE) and Ariane LV. g. Test, checkout, and servicing of the LP/CE has been completed, and the LP/CE is prepared for integration into the transportation system. h. Limited life hardware (time, cycle) has been identified and the logistics and maintenance planning has been accomplished that will support the on-orbit operations. i. All certification requirements for Ground Support Equipment (GSE) HW/SW for this flight have been satisfied. j. The ISS safety review process has been completed in accordance with SSP 50019, NASA/ESA Joint Management Plan, and accepted. All analyses and assessments to ensure LP/Stage safety requirements have been performed, and residual risks accepted.	

ISS-CoFR-ESA01

FIGURE E.2-3 ESA ISS COFR - LAUNCH PACKAGE/CARGO ELEMENT INTEGRATION READINESS (PAGE 1 OF 3)

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ESA ISS Certification of Flight Readiness (CoFR)
Launch Package/Cargo Element Integration Readiness

ESA ISS CoFR - Launch Package/Cargo Element Integration Readiness Description (Continued)	
Endorsement Codes	**Exceptions**
k. All ESA personnel required to support integration activities into the transportation system have been adequately trained. l. Any open items, or actions, from applicable design and integration readiness reviews that constrain installation into the Transportation Vehicle, have been identified, resolved, and closed. m. All nonconformance items and problem reports associated with the identified flight HW/SW have been resolved, and corrective action implemented, or documented, as acceptable. n. All ESA Space Station sites, facilities, personnel, and procedures that support the ISS Program are ready to support the flight and increment. o. All ESA ISS flight rule inputs have been defined, reviewed, concurred on/approved, and released for flight. p. All ESA ISS Operations Data File (ODF) procedure inputs have been defined, reviewed, concurred on/approved, and released for flight. q. All mission support personnel and flight crew have been properly trained, and are ready to support this flight and/or increment. r. The final ESA flight SW has been certified. s. The LP configuration is compatible with the on-orbit Stage configuration. The ESA Cargo Elements (CEs) are compatible with and support ISS system requirements for physical layout, function, performance, and operations. t. The Transportation Vehicle will not impact the safety of the ISS during proximity operations, berthing/unberthing or docking/undocking, and on-orbit mated operations. All applicable hazards, Critical Item Lists (CILs), alerts, and procedures associated with ISS proximity, mating/berthing, and joint operations have been reviewed and accepted. u. Launch Commit Criteria (LCC) have been defined and approved.	

ISS-CoFR-ESA01

FIGURE E.2-3 ESA ISS COFR - LAUNCH PACKAGE/CARGO ELEMENT INTEGRATION READINESS (PAGE 2 OF 3)

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ESA ISS Certification of Flight Readiness (CoFR)
Launch Package/Cargo Element Integration Readiness

ESA ISS CoFR - Launch Package/Cargo Element Integration Readiness Certificate			
This statement certifies, based upon the responsible manager's best knowledge and belief, the satisfactory completion of the portion of the listed requirement codes for which each manager is responsible, and readiness for the LP/CE integration into the launch vehicle for the flight, contingent on close-out of any exceptions noted herein.			
ESA Organization	**Applicable Endorsement Codes**	**Signature Requirement**	**Date**
Operations		ESA Operations Manager	
Vehicle		ESA Vehicle Manager	
Utilization		ESA Utilization Manager	
Safety & Mission Assurance (S&MA)		ESA S&MA Manager	
The _____ ESA LP/CE is ready for integration on _____ Transportation System for Flight _____ .			
Approval _____ ESA Program Manager		Approval _____ NASA ISS Program Manager	

ISS-CoFR-ESA01

FIGURE E.2-3 ESA ISS COFR - LAUNCH PACKAGE/CARGO ELEMENT INTEGRATION READINESS (PAGE 3 OF 3)

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Program Manager or Designee
International Space Station Program
(Recipient of Item)

Dear (Recipient of Item):

The items listed below are provided to you for integration into your module/vehicle or deliverable payloads. These items have been developed according to specifications and meet functional and performance requirements. There are no known anomalies that would prevent the successful integration of these items.

(List of Partner(s) components/items here.)

I will contact you immediately if this assessment changes at any point before launch.

Sincerely,

Program Manager or Designee
International Space Station Program
(Provider of Items)

FIGURE E.2-4 LETTER CERTIFYING OTHER PARTNER'S ITEMS

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For non-European launches to ISS, ESA will provide the letter contained in Figure E.2-5, Letter of Support for Next Non-European Launch, to NASA to support NASA's CoFR process. This letter states that the European elements, both already on-orbit and on the ground, are ready to support the upcoming launch and addition of the new elements to the ISS or major on-orbit activities.

The inputs for the Shuttle CoFR process will be coordinated with the NASA/ISS Program Office. The ESA CoFR documentation will consist of the following:

A. ESA ISS CoFR Form #ISS-CoFR-ESA01 (Figure E.2-3).

B. Letter of Certification of Items from Other Partners, when appropriate (Figure E.2-4).

C. Letter of Readiness for Launch by Other Partner (Figure E.2-5).

D. Delegation of Authority Letters.

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(Program Manager Name ISS Program)
Program Manager
International Space Station Program
NASA

(Program Manager Name ISS Program):

All European elements of the International Space Station (ISS), both on-orbit and on the ground, are ready to support the additional elements to be launched in the upcoming mission. There are no known anomalies that would prevent the successful integration and operation of these new elements on the ISS. The on-orbit European elements covered by this letter include:

(List of European on-orbit elements here.)

I will contact you immediately if our assessment of this readiness changes at any point before launch.

Sincerely,

ESA

FIGURE E.2-5 LETTER OF SUPPORT FOR NEXT NON-EUROPEAN LAUNCH

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APPENDIX F

JAXA ISS CERTIFICATION OF FLIGHT READINESS PROCESS REQUIREMENTS

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APPENDIX F - JAXA ISS CERTIFICATION OF FLIGHT READINESS PROCESS REQUIREMENTS

F.1 CONTROL AUTHORITY

Appendix F is subject to Space Station Control Board (SSCB) change control. Requirements defined herein have been negotiated and agreed to by the International Space Station (ISS) Program and Japan Aerospace Exploration Agency (JAXA) and are supported by JAXA internal implementation plans.

F.2 JAXA ISS CERTIFICATION OF FLIGHT READINESS PROCESS

Figures F.2-1, JAXA ISS Certification of Flight Readiness Process for Launch on Shuttle, and Figure F.2-2, JAXA ISS Certification of Flight Readiness Process for Launch on H-II, define the agreed-to review process that culminates in the signing of the ISS documentation for a particular JAXA flight, Stage, increment and/or major activity. Figure F.2-1 outlines the process for certification of JAXA elements launched on the Shuttle. Figure F.2-2 outlines the process for certification of elements or carriers launched on the H-II Launch Vehicle (LV).

This process has been developed to support the standard JAXA Certification Process for certifying their elements or payloads, and to provide the ISS Program with the data and insight for integration of all Hardware/Software (HW/SW) supporting the ISS. This process utilizes data already described in NASA/JAXA documents, or data, to be developed by internal JAXA processes. No additional data should be required to complete the Certificate of Flight Readiness (CoFR) process.

The JAXA process will follow the standard timeline and procedure for certifying their elements or payloads. The data from JAXA internal review processes will support the endorsement statements for the JAXA CoFRs. JAXA will support development of an implementation plan by the Launch Package Manager (LPM) that depicts the various reviews, tests, and analyses that precede the final CoFR certification.

Specific Japanese elements or payloads may contain components or items provided by other ISS Partners, including NASA. A component is any hardware that may be as small as a piece-part or as large as a rack or Orbital Replacement Unit (ORU). The CoFR documents provided by JAXA for the Japanese elements or payloads will certify those other components or items as well, based on documentation provided by the original providing Partner. The type of documentation provided by the original providing Partner depends on the type of component or item provided. Two major categories of items exist: logistics/payload items and systems items. For those logistics/payload items that comprise complete racks or similar significant components, the original providing Partner will use its existing CoFR document as the accompanying documentation. For lesser logistics/payloads items, the letter contained in

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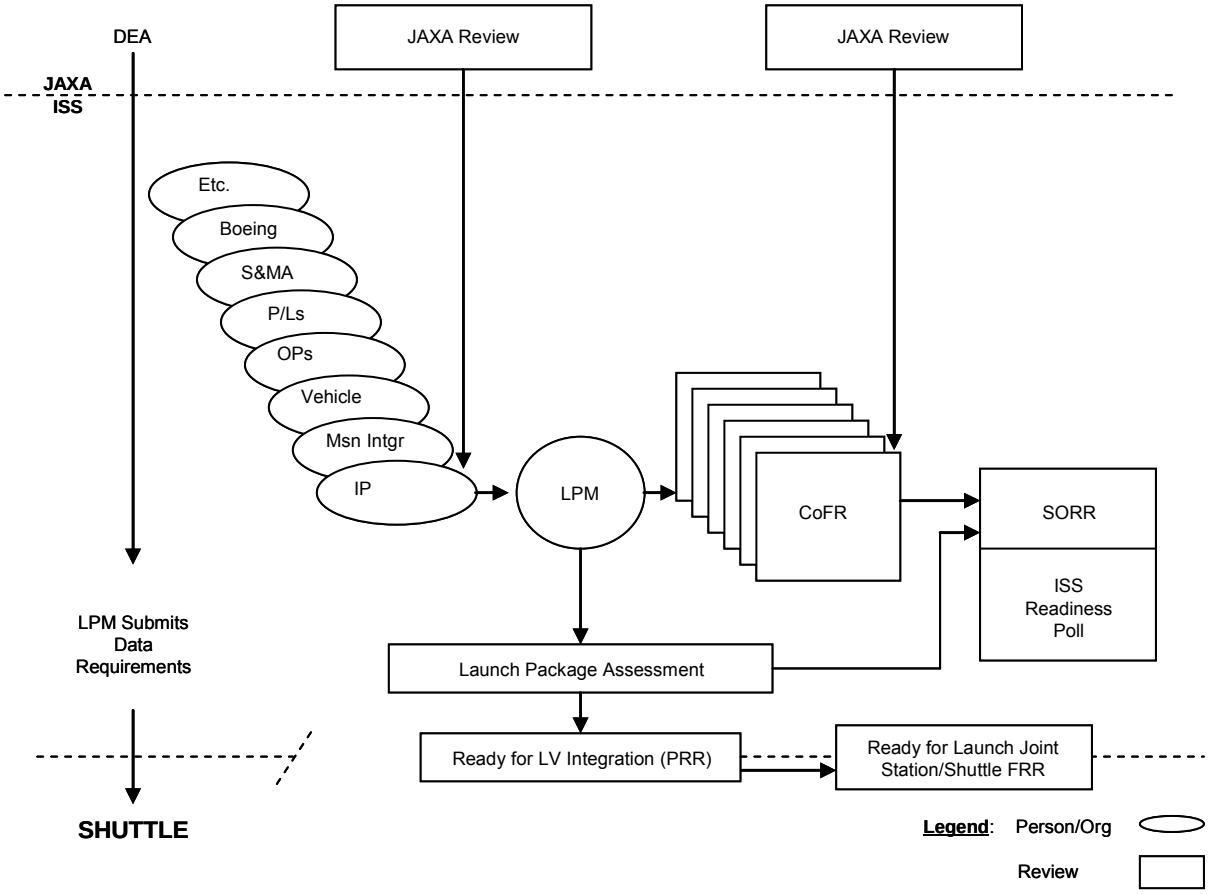

FIGURE F.2-1 JAXA ISS CERTIFICATION OF FLIGHT READINESS PROCESS FOR LAUNCH ON SHUTTLE

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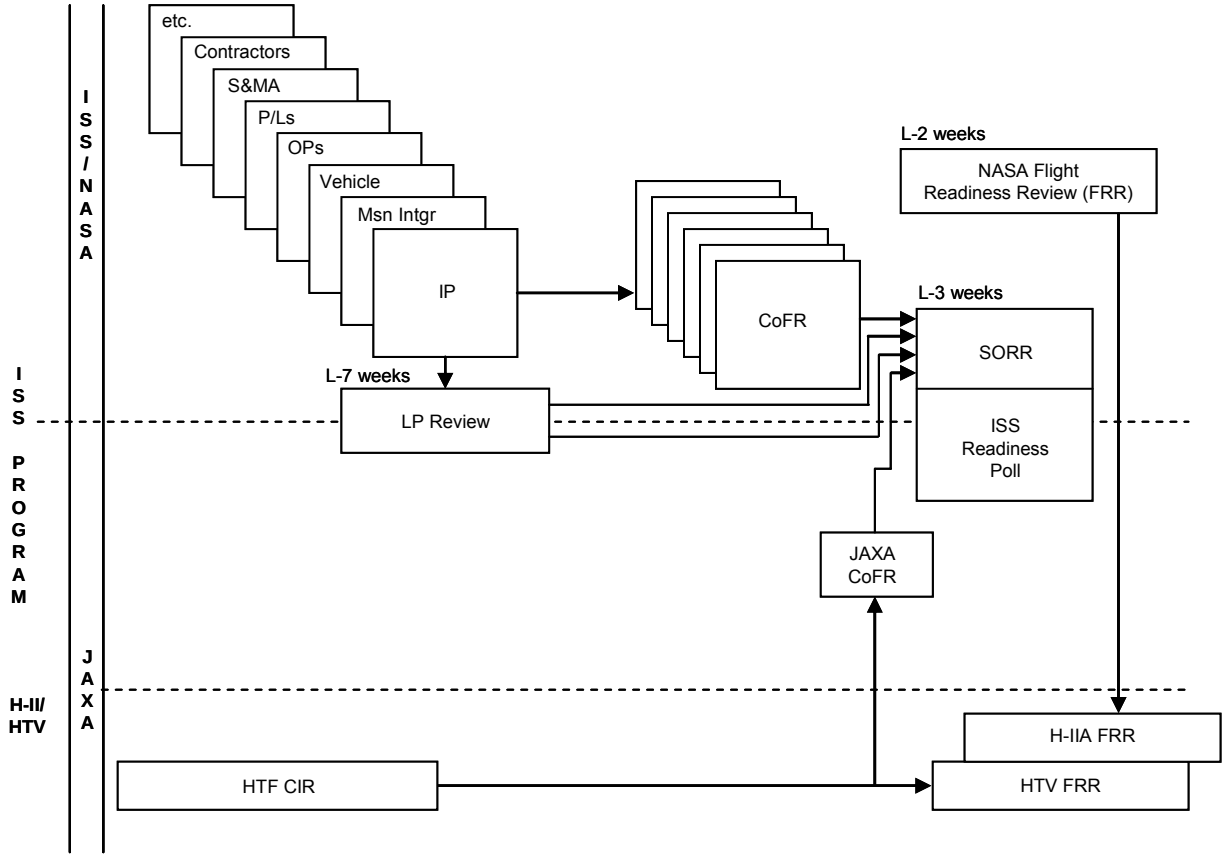

Note: JAXA internal review process and schedule is TBD.

FIGURE F.2-2 JAXA ISS CERTIFICATION OF FLIGHT READINESS PROCESS FOR LAUNCH ON H-II

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Figure F.2-4, Letter Certifying Other Partner's Items, or its equivalent will be used. Systems items that are ORUs will be accompanied by an Acceptance Data Packages (ADPs) or equivalent documentation, and safety documentation. The sub-ORU level items will use the letter contained in Figure F.2-4. When JAXA provides components or items to other Partners for inclusion in their elements on payloads, these same categories and documentation will be utilized.

For non-Japanese launches to ISS, JAXA will provide the letter contained in Figure F.2-5, Letter of Support for Next Non-Japanese Launch, to NASA to support NASA's CoFR process. This letter states that the Japanese elements, both already on-orbit and on the ground, are ready to support the upcoming launch and addition of the new elements to the ISS or major activity.

The inputs for the Shuttle CoFR process will be coordinated with the NASA/ISS Program Office. The JAXA CoFR documentation will consist of the following:

A. JAXA ISS CoFR Form #ISS-CoFR-JAXA01 (Figure F.2-3, JAXA ISS Certification of Flight Readiness - Launch Package and Increment/Stage Integration Readiness).

B. Letter Certifying Other Partner's Items, when appropriate (Figure F.2-4).

C. Letter of Support for Next Non-Japanese Launch (Figure F.2-5).

D. Delegation of Authority Letters.

F.2.1 JEM ELEMENTS LAUNCHED ON THE SHUTTLE

<TBD F-1>

F.2.2 HTV CARRIERS LAUNCHED ON H-IIA LAUNCH VEHICLE

<TBD F-2>

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JAXA ISS Certification of Flight Readiness (CoFR)
Launch Package and Increment/ Stage Integration Readiness

Flight Number_____ Launch Vehicle _____ Stage/Increment Description _____

JAXA ISS CoFR Launch Package and Increment/Stage Integration Readiness Description	
This endorsement certifies that listed JAXA HW/SW, other support HW/SW LP/CE ground HW/SW support facilities and personnel are ready to support the flight, stage, and/or increment. This endorsement certifies that the above are ready for use by the ISS Program. The readiness of the on-orbit stage configuration and design to accept this LP/CE, and all action items, open work, and exceptions have been completed and/or approved.	
Endorsement Codes	**Exceptions**
a. "As-built" flight articles, Configuration Items (CIs), and HW/SW satisfy the functional and performance requirements in accordance with the International Partner's (IP) "design-to" specifications and/or SSP 41165, Segment Specification for the Japanese Experiment Module. Any departure from requirements has been documented. Verification has been completed and documented. b. "As-built" flight articles, CIs, and HW/SW satisfy the physical requirements (weight, Center of Gravity (CG), surface finish, cleanliness, etc.) in accordance with the design specifications, and are correctly documented in accordance with JAXA Acceptance Data Package Requirements. Any departure from design requirements has been documented, dispositioned, and approved. Verification has been completed and documented. c. All ground processing that allows the integration of payload/experiment HW/SW into the ISS LP has been satisfactorily completed. N/A for transfer stage. All HW/SW requirements necessary for cargo item integration into ISS carriers have been documented in the applicable ISS configuration drawings and Interface Control Documents (ICDs), and have been implemented. HW/SW requirements necessary for LP integration into the transportation system have been documented in the Mission Integration Plans (MIPs), applicable IP integration plan agreements, ICDs, etc., and have been implemented. N/A for transfer stage and H-II. All certification requirements for Ground Support Equipment (GSE) HW/SW for this flight have been satisfied. d. Test, checkout, and servicing of the LP/Cargo Element (CE) have been completed and the LP/CE is prepared for integration into the transportation system. e. Limited-life hardware (time, cycle) has been identified and the logistics and maintenance planning has been accomplished that will support the on-orbit operations. f. Any open item, or action, from applicable design and integration readiness reviews that constrain installation into the transportation vehicle, have been identified, resolved, and closed. All open items from previous reviews have been resolved and their resolution documented g. All nonconformance items, discrepancies, and problem reports associated with the ISS flight HW/SW have been resolved and corrective action implemented, or documented, as acceptable h. The ISS Safety Review process has been completed and accepted in accordance with SSP 50145, NASA/JAXA Bilateral Safety and Mission Product Assurance Requirements. All analyses and assessments to ensure LP/Stage safety requirements have been performed and residual risks accepted. i. The applicable CI configurations have not changed since the JAXA preshipment review, and any changes to the configuration have been documented in accordance with JAXA Configuration Management (CM) procedures. j. All JAXA personnel to support integration activities into the transportation system has been adequately trained. k. All JAXA Space Station sites, facilities, personnel, and procedures that support the ISS Program are certified and ready to support the flight and increment.	

FIGURE F.2-3 JAXA ISS CERTIFICATION OF FLIGHT READINESS - LAUNCH PACKAGE AND INCREMENT/STAGE INTEGRATION READINESS (PAGE 1 OF 4)

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JAXA ISS Certification of Flight Readiness (CoFR)
Launch Package and Increment/ Stage Integration Readiness

JAXA ISS CoFR Launch Package and Increment/Stage Integration Readiness Description	
l. All JAXA ISS flight rule inputs (procedures, handbooks, guidelines, data, etc.) have been defined, reviewed, concurred on/approved, and released for flight. All JAXA ISS Operations Data File (ODF) procedure inputs (procedures, handbooks, guidelines, data, etc.) have been defined, reviewed, concurred on/approved, and released for flight. m. All mission support personnel and flight crew have been properly trained and are ready to support this flight and/or increment. n. The final JAXA flight SW has been certified. o. Launch Commit Criteria (LCC) have been defined and approved. p. The LP configuration is compatible with the on-orbit stage configuration. The JAXA CEs are compatible with and support ISS system requirements for physical layout, function, performance, and operations. q. The transportation vehicle will not impact the safety of the ISS during proximity operations, berthing/unberthing or docking/undocking, and on-orbit mated operations. All applicable hazards, Critical Item Lists (CILs), alerts, and procedures associated with ISS proximity, mating/berthing, and joint operations have been received and accepted. N/A for Partner elements on Shuttle.	

FIGURE F.2-3 JAXA ISS CERTIFICATION OF FLIGHT READINESS - LAUNCH PACKAGE AND INCREMENT/STAGE INTEGRATION READINESS (PAGE 2 OF 4)

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JAXA ISS Certification of Flight Readiness (CoFR)
Launch Package and Increment/ Stage Integration Readiness

JAXA ISS CoFR - Launch Package and Increment/Stage Integration Readiness Certificate
This statement certifies, based on the responsible manager's best knowledge, the satisfactory completion of the portion of the listed requirement codes for which each manager is responsible, and the readiness the flight, contingent on closeout of any exceptions noted herein.
The _____ JAXA LP/CE is ready for flight on _____ Transportation System and on-orbit _____ Stage/Increment Operations for Flight _____ . Approval: _____ JAXA ISS Program Manager Approval: _____ NASA ISS Program Manager

ISS-CoFR-JAXA01

FIGURE F.2-3 JAXA ISS CERTIFICATION OF FLIGHT READINESS - LAUNCH PACKAGE AND INCREMENT/STAGE INTEGRATION READINESS (PAGE 3 OF 4)

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JAXA ISS Certification of Flight Readiness
Launch Package and Increment/Stage Integration Readiness

JAXA ISS CoFR - Launch Package and Increment/Stage Integration Readiness Certificate
This statement certifies, based on the responsible manager's best knowledge, the satisfactory completion of the portion of the listed requirement codes for which each manager is responsible, and the readiness the flight, contingent on closeout of any exceptions noted herein.
The _____ JAXA LP/CE is ready for flight on _____ Transportation System and on-orbit _____ Stage/Increment Operations for Flight _____ . Approval: _____ JAXA Program Manager Approval: _____ NASA ISS Program Manager

ISS-CoFR-JAXA01

Note: Determination of proper signature authorization is TBD.

FIGURE F.2-3 JAXA ISS CERTIFICATION OF FLIGHT READINESS - LAUNCH PACKAGE AND INCREMENT/STAGE INTEGRATION READINESS (PAGE 4 OF 4)

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Program Manager or Designee
International Space Station Program
(Recipient of Item)

Dear (Recipient of Item):

The items listed below are provided to you for integration into your module/vehicle or deliverable payloads. These items have been developed according to specifications and meet functional and performance requirements. There are no known anomalies that would prevent the successful integration of these items.

(List of Partner(s) components/items here.)

I will contact you immediately if this assessment changes at any point before launch.

Sincerely,

Program Manager or Designee
International Space Station Program
(Provider of Items)

FIGURE F.2-4 LETTER CERTIFYING OTHER PARTNER'S ITEMS

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(Program Manager Name ISS Program)
Program Manager
International Space Station Program
NASA

(Program Manager Name ISS Program):

All Japanese elements of the International Space Station (ISS), both on-orbit and on the ground, are ready to support the additional elements to be launched in the upcoming mission. There are no known anomalies that would prevent the successful integration and operation of these new elements on the ISS. The on-orbit Japanese elements covered by this letter include:

(List of Japanese on-orbit elements here.)

I will contact you immediately if our assessment of this readiness changes at any point before launch.

Sincerely,

JAXA

FIGURE F.2-5 LETTER OF SUPPORT FOR NEXT NON-JAPANESE LAUNCH

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APPENDIX G

ROSCOSMOS ISS CoFR PROCESS REQUIREMENTS

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APPENDIX G - ROSCOSMOS ISS COFR PROCESS REQUIREMENTS

G.1 CONTROL AUTHORITY

Appendix G is subject to Space Station Control Board (SSCB) change control. Requirements defined herein have been negotiated and agreed to by NASA and ROSCOSMOS ISS Program and are supported by internal implementation plans.

G.2 ROSCOSMOS ISS CoFR PROCESS

Appendix G documents the requirements to support the ISS CoFR Process as agreed to by NASA and Roscosmos. Details on the Joint Safety and HW/SW certification processes to support the CoFR process are contained in SSP 50146 and **<TBD G-1>** respectively.

G.2.1 CERTIFICATION OF RUSSIAN LAUNCH

Figure G.2.1-1, Roscosmos CoFR for ISS Russian Elements, defines the agreed-to process that culminates in the signing of the ISS documentation for a particular Roscosmos flight, element, and/or increment.

These processes have been developed to be consistent with the standard Russian certification process for certifying their modules/vehicles or deliverable cargoes and to allow the ISS Program (NASA) to have access to the data and insight for integration of all HW/SW supporting the ISS.

The Russian process will follow the standard timeline and procedure for certifying their modules/assembly Stages or deliverable cargoes. The agreed-upon process is as follows:

A. At approximately L-6 months, the Russian organizations and NASA will jointly develop a list of information required by the ISS Program (NASA) to support the Russian readiness review (General Designer's Review (GDR)) for that particular launch and from Roscosmos to support preparation for the (SORR).

B. At approximately L-2 months, the ISS Program (NASA) will send Roscosmos an official message for the Russian readiness review (GDR) on the status of information determined in the joint list at L-6 months.

C. At approximately L-1 Month, based on the results of the module/vehicle Flight Readiness Review (GDR), the Prime Roscosmos ISS contractor will send to the ISS Program (NASA) a certificate using the form shown in Figure G.2.1-2, Roscosmos Module/Vehicle Flight Readiness Certificate.

   The NASA ISS Program Manager (or an authorized representative) will make a report on ISS readiness for that particular launch during the FRR of the Russian module (at the GDR).

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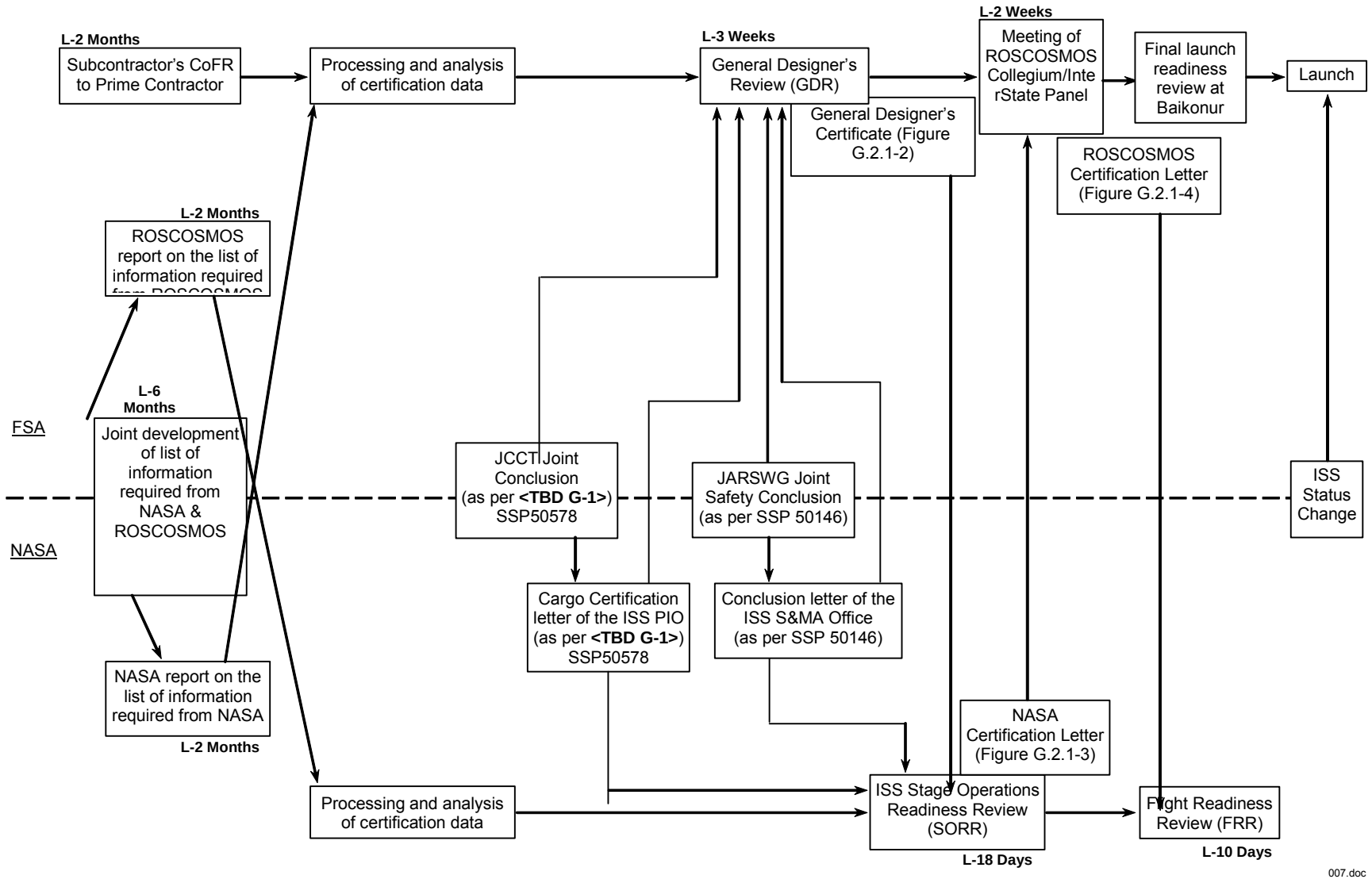

FIGURE G.2.1-1 ROSCOSMOS CoFR FOR ISS RUSSIAN ELEMENTS

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Approved: **<TBD G-1>**	Approved: **<TBD G-1>**

Module/Vehicle Flight Readiness Certificate
(ISS FLIGHT NO. ___)

Khrunichev Space Center	ISS Program Director, RSC Energia
Mission Control Center – Moscow	
Gagarin Cosmonaut Training Center	

Moscow, Date

Note: Signatories may change for specific flights.

FIGURE G.2.1-2 ROSCOSMOS MODULE/VEHICLE FLIGHT READINESS CERTIFICATE (PAGE 1 OF 2)

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1. This certificate confirms the completion of all design, manufacturing, testing, and integration work for the module/vehicle, including work to ensure readiness of ground support facilities, flight preparation personnel, and flight support personnel.
2. Module/vehicle flight readiness is confirmed by the following conclusions, taking into consideration the current status of module/vehicle flight preparations.
   - **a.** The module/vehicle manufactured and tested at the Integrated Test Facility satisfies the functional and performance requirements in accordance with SSP 41163, Russian Segment Specification, and applicable Russian requirements documentation. Verification methods for the module/vehicle and its systems conforms with SSP 50101, NASA/Roscosmos Bilateral Integration and Verification Plan. Any deviations from requirements have been documented, analyzed, and each deviation has been approved. Module/vehicle verification has been completed and documented.
   - **b.** The module/vehicle meets the dimensional, mass, and physical parameters from the design documentation, approved by the General Designer. Any deviations from requirements have been documented, analyzed, and each deviation has been approved. Requirement verification has been completed and documented.
   - **c.** All ground processing that allows the integration of cargo HW/SW into the module/vehicle has been successfully completed. The cargo HW/SW have been approved for planned mission operations.
   - **d.** The module/vehicle and deliverable cargoes configuration fully comply with the General Designer's design documentation. All module/vehicle configuration changes have been documented in accordance with current Roscosmos change guidelines, taking into consideration the Russian Segment Configuration Management Plan (Contract NAS15-10110, p. 0005B4).
   - **e.** The module/vehicle undergoes ground processing at the Baikonur launch facility and, upon successful completion, will be ready for launch and operation on-orbit.
   - **f.** The module/vehicle meets the stated requirements for operational life and on-orbit maintenance.
   - **g.** All ground facilities, support facilities, support personnel, and procedures necessary to perform work on the module/vehicle are certified and ready to support the launch, support the flight, and module/vehicle on-orbit operations.
   - **h.** The module/vehicle flight safety analysis, including operations as part of the ISS RS, and conducted in accordance with SSP 50146, NASA/Roscosmos Bilateral S&MA Process Requirements for the International Space Station, yielded positive results.
   - **i.** Operational (flight and ground) documentation for module/vehicle flight management have been developed, concurred on/approved, and released for flight support.
   - **j.** Module/vehicle flight support SW has been certified for mission operations.
   - **k.** All mission support personnel and flight crew have been properly trained and are ready to support the flight and subsequent work within the ISS Program.
   - **l.** All open items and unresolved issues related to the module/vehicle and its on-orbit operations that have to do with the status of module/vehicle preparation have been resolved, documented, and closed in the normal manner.
3. The module/vehicle is ready for flight XR under the ISS Program and for operations on-orbit as part of the ISS in accordance with its operational requirements, contingent upon the successful completion of the planned module launch preparations.

RSC Energia

FIGURE G.2.1-2 ROSCOSMOS MODULE/VEHICLE LAUNCH READINESS CERTIFICATE (PAGE 2 OF 2)

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D. No earlier than L-17 days, after the ISS SORR, the ISS Program (NASA) issues a certificate of Station on-orbit readiness to Roscosmos to support the InterState Panel (Collegium) meeting, using the letter format contained in Figure G.2.1-3, NASA Certification Letter on ISS Readiness for Russian Module/Vehicle Launch. A copy of the ISS CoFR certificate will be attached for information.

   The Roscosmos Prime ISS contractor Program Manager (or an authorized representative) will make a report on the readiness of the Russian module/vehicle and ISS RS for launch during the SORR.

E. At approximately L-2 weeks, based on the results of the module/vehicle flight readiness review (meeting of Roscosmos collegium/InterState Panel), Roscosmos will send a certification letter to the ISS Program (NASA) using the format shown in Figure G.2.1-4, Roscosmos Certification Letter on ISS RS Elements Readiness for Russian Module/Vehicle Launch.

F. The final decision on launch will be made during the final readiness review conducted at Baikonur. The ISS Program Manager (or an authorized representative) from NASA will take part in this review.

G. Roscosmos will coordinate with NASA a procedure for the routine exchange of data between the Russian manager in charge of preparing and launching the Russian spacecraft and the NASA Launch Package Manager, with respect to those revisions and updates in the process of spacecraft preparation and aboard ISS that arise after the certification letter has been issued by Roscosmos, in order to introduce a possible change in Station certification.

   For launch of Russian elements, theRoscosmos Program Manager, or his designee, will serve as a Co-Deputy Chair of the ISS SORR Board, and representatives from RSC Energia and Khrunichev will serve as members of the ISS SORR Board and will participate in the ISS SORR process. If the Roscosmos Program Manager, or his designee, wishes to send a representative in his place, a letter delegating authority will be required for the Roscosmos representative. Likewise, the NASA ISS Program Manager, or his designee, may participate in all Russian vehicle FRR, or relevant meetings, such as the GDR or InterState Panel Meeting.

   This CoFR process is separate from the independent pre-existing Russian launch vehicles certification process.

G.2.2 ROSCOSMOS SUPPORT OF THE LAUNCH CERTIFICATION PROCESS FOR SHUTTLE IN DELIVERING CARGOES TO THE ISS

The general process of Roscosmos participation in the CoFR process for Shuttle launches to ISS is shown in the diagram in Figure G.2.2-1, Roscosmos Participation in Shuttle CoFR Process for Flight to ISS (Cargo Delivery). The agreed-upon process is as follows:

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To: ISS Program Manager
ROSCOSMOS/RSC Energia

Mr._____

Dear Mr._____:

All elements of the International Space Station, both on-orbit and on the ground, are ready to receive the elements to be launched by ROSCOSMOS in the upcoming launch. These Russian elements include: **<TBD G-1>**.

If our assessment changes before launch, I will contact you immediately.

Sincerely,

Program Manager
International Space Station
NASA

_____

FIGURE G.2.1-3 NASA CERTIFICATION LETTER ON ISS READINESS FOR RUSSIAN MODULE/VEHICLE LAUNCH

To: ISS Program Manager
International Space Station
NASA

Mr._____

Dear Mr._____:

All elements of the International Space Station Russian Segment, both on-orbit and on the ground, are ready for the launch of the Russian module/vehicle. If our assessment changes before launch, I will contact you immediately.

Sincerely,

Deputy General Director
Roscosmos

_____

FIGURE G.2.1-4 ROSCOSMOS CERTIFICATION LETTER ON ISS RS ELEMENTS READINESS FOR RUSSIAN MODULE/VEHICLE LAUNCH

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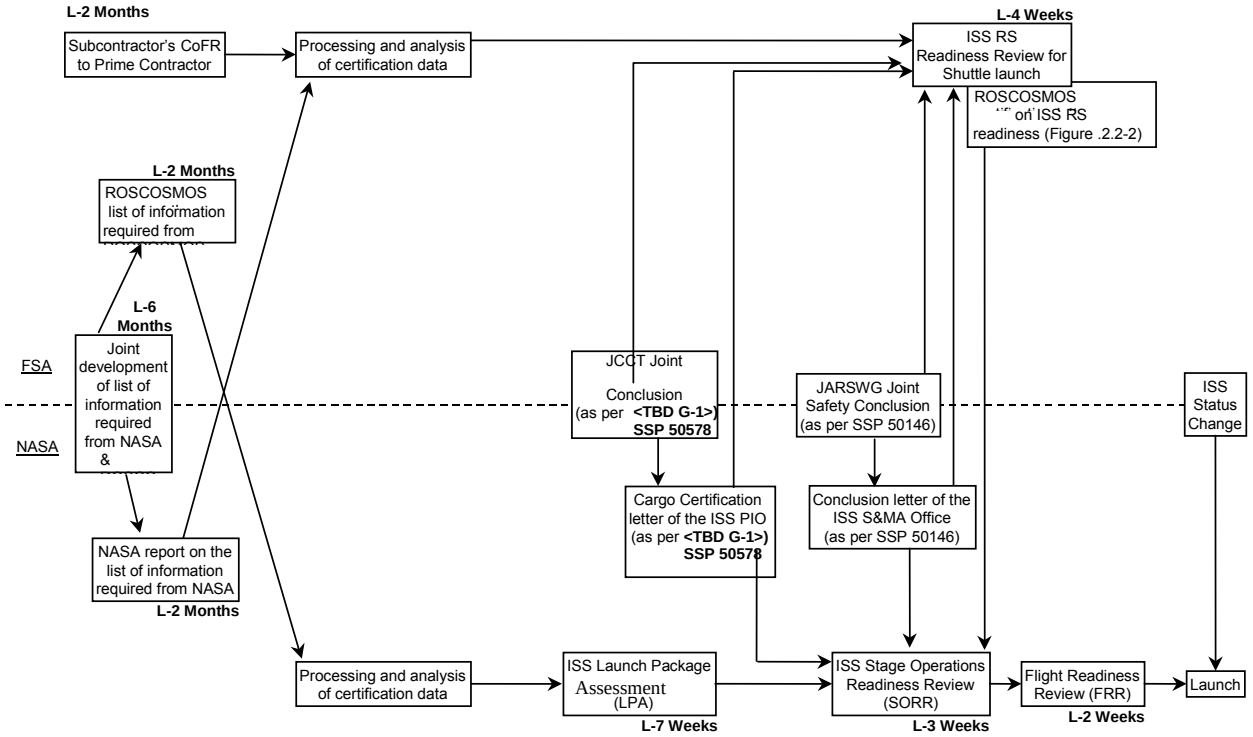

FIGURE G.2.2-1 ROSCOSMOS PARTICIPATION IN SHUTTLE CoFR PROCESS FOR FLIGHT TO ISS (CARGO DELIVERY)

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A. The responsible Roscosmos/NASA ISS Program representatives will take part in NASA/Roscosmos reviews with a report on the on-orbit segment/ISS readiness status and the readiness of the set of deliverable cargoes for the Shuttle launch. The status of these items will be addressed at a Launch Package Readiness Review (LPRR) to ensure that the Program is ready for installation into the Shuttle.

B. At L-25 days, upon completion of a review of all materials related to ISS RS readiness for Shuttle launch, Roscosmos will send NASA a certification letter concerning ISS RS readiness for Shuttle launch using the form shown in Figure G.2.2-2, Roscosmos Certificate Letter on ISS RS Readiness for Shuttle Launch.

NASA will coordinate with Roscosmos the procedure for monitoring changes that may arise in the Shuttle launch preparation process that may directly or indirectly affect the ISS RS status.

G.2.3 ROSCOSMOS SUPPORT OF THE CERTIFICATION PROCESS FOR A SHUTTLE LAUNCH WITH AN ISS RUSSIAN MODULE (SPP TYPE)

The general sequence for certifying the readiness of a Russian element (module) for launch and for the Shuttle flight as a whole is shown in the diagram provided in Figure G.2.3-1, Roscosmos Participation in Shuttle CoFR Process for Flight to ISS (Delivery of Russian Module). The following sequence for performing work has been agreed to:

A. At L-9 weeks, Roscosmos will issue certificate (CoFR) based on the results of the module check at KSC after its transport to support the LPA. The certificate is issued using the form shown in Figure G.2.3-2, Roscosmos Certificate on Readiness for ISS RS Module Integration and Assembly Stage.

B. At L-4 weeks, Roscosmos will issue certificate (CoFR) on the module and all ISS RS elements for launch to support the SORRs. The certificate is issued using the form shown in Figure G.2.3-3

The Roscosmos ISS Program Manager, or his designee, will take part in the Station/Shuttle FRR and will present data on the readiness of the module and the ISS RS for Shuttle launch.

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Program Manager
International Space Station
NASA

Mr._____

Dear Mr._____:

All elements of the International Space Station Russian Segment, both on-orbit and on the ground, are ready for the launch of Shuttle STS-XX. Cargoes delivered to ISS on Shuttle, Roscosmos being responsible for its certification, have been verified and are ready for flight.

If our readiness assessment changes before launch, I will contact you immediately.

Sincerely,

Deputy General Director
Roscosmos

FIGURE G.2.2-2 ROSCOSMOS CERTIFICATE LETTER ON ISS RS READINESS FOR SHUTTLE LAUNCH

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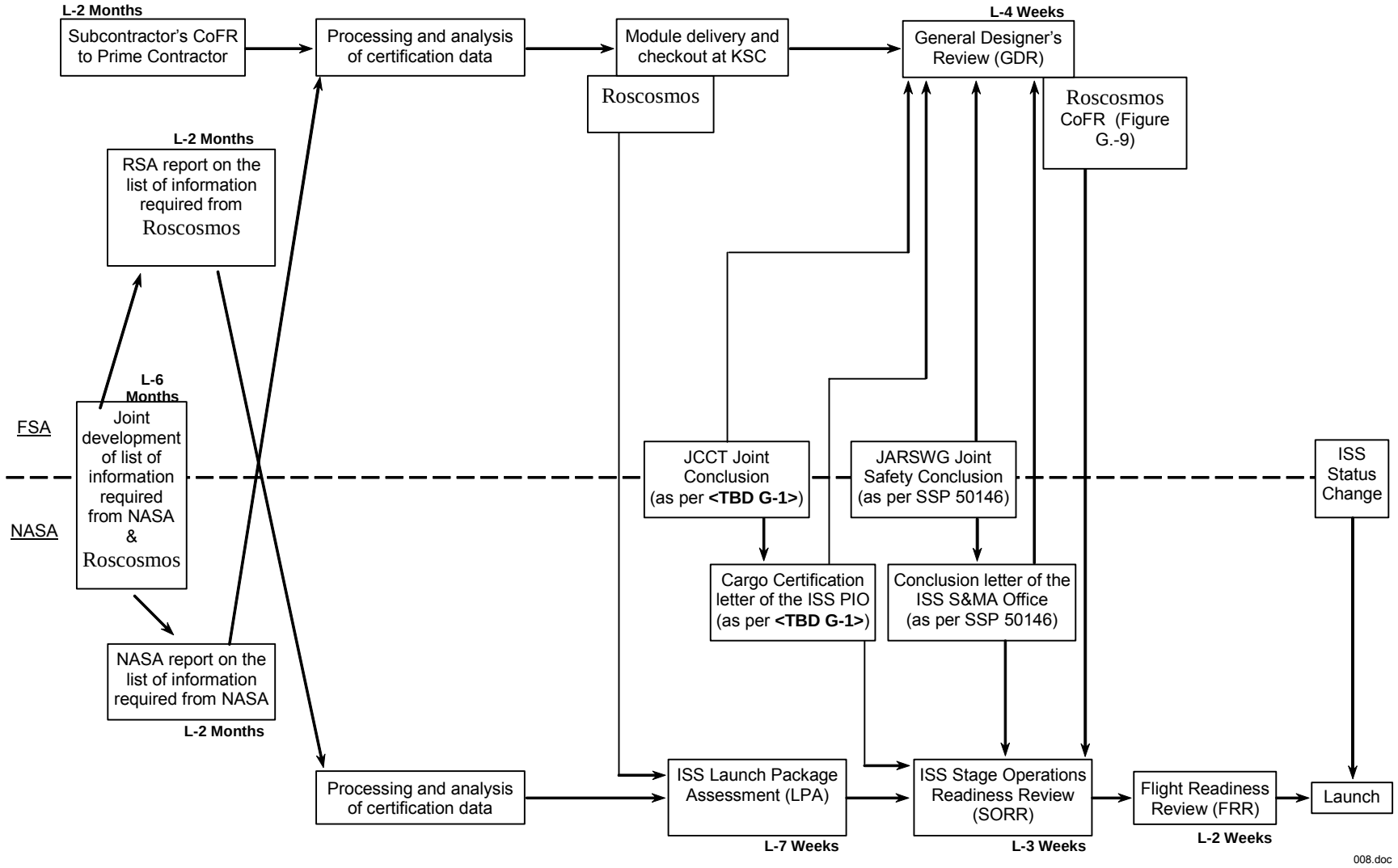

FIGURE G.2.3-1 ROSCOSMOS PARTICIPATION IN SHUTTLE CoFR PROCESS FOR FLIGHT TO ISS (DELIVERY OF RUSSIAN MODULE)

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Roscosmos Conclusion on ISS RS Module _____ Flight Readiness to Be Launched on Shuttle STS-____

Launch Package and Assembly Stage Operations Readiness Review (SORR)

Flight No. ____. Transport Vehicle – USA Space Transportation System (STS).

Assembly Stage ____.

COFR for ISS RS Module ____, to Be Launched on the Shuttle – Readiness for Launch Package Integration	
Conclusion	**Exceptions/ Unresolved Issues**
a. Module ____ "in fully fabricated form" meets the requirements for the performance and working specifications stipulated in the design documentation and Russian Segment specifications, SSP 41163, and the requirements for physical properties (mass, CG position, surface finishing, cleanliness, etc.), contained in the specifications. All deviations from the requirements were documented. Verifications have been completed, and the results were documented.	
b. The planning-and-design configuration of the module's elements has not changed since the time of Roscosmos acceptance. All changes in configuration were approved and duly documented.	
c. All hardware and software requirements for module integration with the transport system are described in ISS documentation and ICDs, and they have been met.	
d. Verification tests and servicing of the launch package have been completed. The launch package is prepared for integration into the transport system.	
e. Module _____ meets the requirements imposed for its service life and technical maintenance in orbital flight conditions.	
f. All requirements for certification of GSE hardware and software have been met by Roscosmos..	
g. The module safety review process has been completed and approved in accordance with the NASA/Roscosmos Bilateral S&MA Process Requirements for the International Space Station (SSP 50146).	
h. All Roscosmos personnel participating in this work are certified and ready for working on hardware integration into the transport system.	
i. All unresolved issues ensuing from the respective design and integration readiness analysis results and that have impeded installation into the transport vehicle have been defined, resolved, and closed.	
j. All hardware/software issues have been closed, eliminated, or are documented as aceptable.	
k. ISS RS safety review process for the assembly Stage is complete.	
l. All Russian facilities related to the space station, hardware, support personnel, and procedures that support the ISS Program are certified and ready to support the flight.	
m. All necessary onboard documentation and documentation for flight control has been developed, reviewed, agreed/approved, and published.	
n. All necessary flight support software has been certified.	
o. Flight support personnel and crew have undergone the appropriate training and are ready to support the flight and/or assembly Stage.	

FIGURE G.2.3-2 ROSCOSMOS CERTIFICATE ON READINESS FOR ISS RS MODULE INTEGRATION AND ASSEMBLY STAGE (PAGE 1 OF 2)

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COFR for ISS RS Module ____, to Be Launched on the Shuttle – Readiness for Launch Package Integration			
Conclusion			**Exceptions/ Unresolved Issues**
p. All unresolved issues from previous reviews, deviations from the requirements, noted malfunctions, and comments associated with the module have been analyzed, resolved/eliminated, or the appropriate corrective measures have been taken. **g.** Launch package configuration is compatible with the configuration of the ISS RS orbital segment.			
Module ____ is ready for launch on the Shuttle and operations on orbit _____ during the assembly Stage during flight _____ contingent on closeout of all exceptions/unresolved issues noted in this certificate.			
Responsibility	Name	Signature	Date
Approved: _____ ROSCOSMOS Deputy General Director		Approved: _____ ISS NASA Program Director	

FIGURE G.2.3-2 ROSCOSMOS CERTIFICATE ON READINESS FOR ISS RS MODULE INTEGRATION AND ASSEMBLY STAGE (PAGE 2 OF 2)

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APPENDIX H

NASA ISS PROGRAM CERTIFICATION OF FLIGHT READINESS PROCESS REQUIREMENTS

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APPENDIX H - NASA ISS PROGRAM CERTIFICATION OF FLIGHT READINESS PROCESS REQUIREMENTS

H.1 CONTROL AUTHORITY

Appendix H is a part of the International Space Station (ISS) Program baseline and, therefore, is subject to Space Station Control Board (SSCB) change control. This appendix will be revised as required, and changes will be issued as replacement pages or by complete revision of the appendix as appropriate.

H.2 NASA ISS PROGRAM CERTIFICATION OF FLIGHT READINESS PROCESS

H.2.1 OVERVIEW

Each applicable United States (U.S.) ISS Program organization, NASA Directorate, and contractor will participate in the ISS Program Certification of Flight Readiness (CoFR) reviews, as described in Section 5.0 of this document. Section H.2.2 identifies the CoFR endorsement codes and statements that must be satisfied by NASA to ensure the safety, flight readiness, and operational readiness of the ISS Launch Package/Cargo Element (LP/CE) and complement of flight Hardware/Software (HW/SW) for pre-launch activity, launch/return, on-orbit assembly, operations, and utilization. This section also provides an organizational cross-reference matrix between endorsement codes and certifying organizations.

Each organization is responsible for the development and maintenance of an organizational CoFR implementation plan. Sub endorsements defining the activities that organizations perform to satisfy the CoFR endorsements statements defined in Figure H.2.1-1, ISSP COFR Endorsement Codes and Statements, will be documented in the plan. Included with each sub endorsement will be a reference to the objective evidence (products) that substantiate certification of the sub endorsement and the organization(s) responsible for satisfying the sub endorsement. Each organization shall review their plan prior to beginning their flight preparations to ensure that the plan accurately reflects their current roles and responsibilities and is consistent with the requirements identified herein. Necessary changes shall be made to the organizations CoFR processes to cover any identified shortfalls. Plans are to be periodically updated to be consistent with program and organizational practice. Organizations may have flight specific implementation plans to satisfy this requirement.

Prior to each SORR, each organization with CoFR responsibilities for the flight will conduct a formal internal review with minutes and objective evidence to ensure that all CoFR requirements have been satisfied. Records of the reviews will be detailed enough to review the discussions and decision logic used. Dissenting opinions will also be recorded. The minutes and records of objective evidence will be archived.

Section H.2.6 contains representative versions of the CoFR certificates that will be signed at the conclusion of the ISS Program CoFR reviews, including the NASA Flight Readiness Review (FRR) as required. Section H.2.6 contains a template for letters the

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CODES	ISSP CoFR ENDORSEMENT STATEMENTS
a.	The design of the flight articles (HW/SW) has been verified to meet the functional and performance requirements in the design-to specifications and will support ISS buildup to Assembly Complete configuration. Any waivers, deviations, or changes from the requirements have been approved.
b.	The as-built flight articles (HW/SW) have been built to the applicable specifications and drawings. Any waivers, deviations or changes from the design requirements have been approved.
c.	All ground processing required for the integration of ISS hardware/software into the Launch Package/Cargo Element has been completed or it is standard open work.
d.	Test, checkout, servicing, and ground processing of the LP/CE and cargo items have been completed or is standard open work.
e.	Limited-life hardware (time, cycle) has been identified and the logistics and maintenance planning has been accomplished that will support the on-orbit operations.
f.	All open items and actions from design, integration, and operations reviews have been dispositioned
g.	All reported HW/SW anomalies (including problems and non-conformances) have been dispositioned and do not pose a constraint to flight or to on-orbit operations.
h.	The safety review process, mission assurance analysis, and assessments have been completed, documented and identified risks have been dispositioned and pose no constraint to flight or operations. Hazard control verification has been completed or it is standard open work.
i.	All risk management activities associated with the Launch Package, flight, and on-orbit operations have been completed or open risks have been documented as acceptable. All open risks have been reviewed for Flight and/or Stage applicability. Flight effectivity rationale has been documented and acceptance rationale has been provided for each applicable open risk.
j.	The manifest supports the flight and on-orbit operations.
k.	Requirements, design, and configuration changes have been dispositioned, and the resulting HW/SW is ready to support the flight and on-orbit operations.
l.	All sites, facilities, personnel, and procedures are ready to support launch, flight, and on-orbit operations or it is standard open work.
m.	Flight rules and crew procedures have been defined and approved or it is standard open work.
n.	The mission support team and crew have completed training and are ready to support launch, flight, and on-orbit operations or it is standard open work.
o.	Final flight software loads have been verified and are acceptable or it is standard open work.
p.	All operations requirements necessary for successful on-orbit operations have been defined, and the planning for implementation has been accomplished or it is standard open work.
q.	Launch Commit Criteria (LCC) have been defined and approved.
r.	Pending planned operations, the on-orbit ISS is ready to accept the LP/CE and the Transportation Vehicle.
s.	The induced environment during proximity operations, berthing, docking, mated operations, and departure has been reviewed and is acceptable.
t.	The design of the flight article (hardware/cargo) has been assessed as acceptable for ground handling and transportation, launch, flight and on-orbit environments, or appropriate protective measures have been identified and /or implemented to prevent exposure to the environments.

FIGURE H.2.1-1 ISSP COFR ENDORSEMENT CODES AND STATEMENTS

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NASA ISS Program Manager is required to send for launch of U.S. hardware on an International Partner (IP) flight and readiness of the U.S. segment for an IP launch.

H.2.2 CERTIFICATION

In preparation for the SORR, each organization assesses its readiness and evaluates whether or not it has met all the criteria for their associated ISS Program Endorsement Statements as documented in Figure H.2.2-1, Certification of Flight Readiness Responsibility Matrix. When the criteria for an Endorsement Statement cannot be completely met, it is documented as a CoFR Exception per the requirements specified in Section 4.0 and Section H.2.3. At the SORR, each certifying organization will present the results of their readiness assessment, including any CoFR Exceptions that have been identified.

The SORR CoFR Statement of Readiness will contain all required signatures and state the following : “Pending completion of the identified open work, and resolution of any identified CoFR Exceptions, [ISS Program Office name] is ready to proceed with the XX Launch/XX (if required)/ Increment XX on-orbit Stage operations.”

Completion of the following endorsements (Figure H.2.1-1) provides confidence that the LP/CE and on-orbit Stage are ready for launch, flight, on-orbit operations and return. Each organization with responsibility for a specific endorsement, either in part or in whole, is indicated in the responsibility matrix for CoFR (Figure H.2.2-1).

H.2.3 CERTIFICATION OF FLIGHT READINESS PROCESS EXCEPTIONS

When the criteria for an Endorsement Statement cannot be completely met, it is documented as a CoFR Exception.

A CoFR Exception is not required if an approved wavier or deviation exists for mandatory requirements that must be met to satisfy the completion of the ISS Program CoFR Endorsement statement.

A CoFR Exception is not required if the completion of criteria for a specific endorsement statement is dependent upon Standard Open Work.

A CoFR Exception is required if the completion of criteria for a specific Endorsement Statement is dependent upon the completion of Standard Work that is incomplete at the time of the SORR, but should have been complete, according to a certifying organization’s nominal processes. Such late or delinquent work is referred to as non-Standard Open Work. When any of the criterions for an Endorsement Statement cannot be met due to non-Standard Open Work a CoFR Exception is required.

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CERTIFYING ORGANIZATIONS	ISS PROGRAM COFR ENDORSEMENT CODES																				
	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	
Program Office Organizations																					
Vehicle Office (OB)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Avionics and Software Office (OD)	X	X		X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	
Mission Integration and Operations Office (OC)	X		X			X	X	X	X	X		X	X	X		X	X	X	X		
S&MA (OE)		X			X		X	X	X			X	X		X						
Program Planning and Control Office, Management Integration (OH2)	X	X									X										
Program Integration (OM)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Payloads (OZ)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			X	
JSC/NASA Organizations																					
JSC Engineering (EA) Note 1	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
JSC EVA Office (XA)	X	X		X	X	X	X	X	X	X	X	X	X	X		X				X	
JSC Space Life Sciences (SA)	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X				X	
JSC Mission Operations (DA)	X	X	X		X		X	X	X	X	X	X	X	X		X	X	X			
JSC Flight Crew (CA) Notes 2, 3	X									X		X	X	X							
KSC ISS/Payload Processing (KSC-UB)		X	X	X	X	X	X	X	X		X	X	X		X		X				
JSC SSP (MA) Note 4																					
MSFC Flight Projects Directorate Note 5																					
Major Contractor																					
Boeing (U.S. flights) Note 6	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
Boeing (IP flights)	X	X			X		X	X	X	X	X	X	X	X	X	X		X	X		
United Space Alliance (USA) ISS Program							X				X	X	X	X	X	X					
Program Integration and Control Contract	X	X				X			X	X	X			X				X	X		
Mission Integration Contract	X					X	X	X	X	X	X	X	X	X		X					
Cargo Mission Contract	X	X	X	X	X	X	X	X	X	X	X	X		X		X			X	X	
International Partners/Participants																					
Roscosmos	Refer to Appendix G																				
CSA	Refer to Appendix D																				
ESA	Refer to Appendix E																				
JAXA	Refer to Appendix F																				
ASI	Refer to Appendix C																				

Note 1: EA responsibilities noted for information only; certification reported through other organizations.
Note 2: If the mission is to fly a U.S. astronaut on a Russian vehicle, CA endorses only codes J, L, M, and N.
Note 3: For unmanned LVs, CA endorses only codes J and N.
Note 4: SSP responsibility defined in MOA between ISS Program and SSP.
Note 5: MSFC integration, FSE, carrier, and POIF/POIC responsibility in ISS tasking organization.
Note 6: If Boeing hardware on manifest. Applicable to Boeing (IP) flights; endorsement statements b and l

FIGURE H.2.2-1 CERTIFICATION OF FLIGHT READINESS RESPONSIBILITY MATRIX

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H.2.4 CRITERIA FOR ORGANIZATIONAL ENDORSEMENT STATEMENT SIGNATURE

Criteria to assist in determining whether an organization should sign a particular endorsement statement is shown in Figure H.2.4-1, Endorsement Statement Signature Criteria. The sub-endorsement products/processes shown in organization CoFR implementation plans will provide insight into the appropriateness of endorsement signatures.

H.2.5 RISK MANAGEMENT

Each NASA ISS certifying organization will review all of their open risk records (excluding Concerns and Cost Issues) in the NASA ISS risk database and identify those that are applicable to the specified flight/Stage.

The criteria defined in 5.2.A - 5.2.E will be used to determine if the risk record is applicable to the Flight and/or Stage.

Rationale for choosing the appropriate flight/Stage as well as rationale for recommending acceptance by the Program Manager of the risk records for the flight/stage should be documented within the NASA ISS risk database.

The open risk records applicable to the flight/Stage will be presented at the SORR and formal acceptance by the Program Manager will be requested. Organizations shall ensure the acceptance of the risk at the SORR is documented in the ISS risk database. Records of the reviews will be detailed enough to review discussions and decision logic. Dissenting opinions will also be recorded. These records will be archived in the NASA ISS risk database.

H.2.6 CERTIFICATION OF FLIGHT READINESS CERTIFICATES AND LETTERS

The CoFR certificates shown here are representative of the CoFR certificates that will be signed at the conclusion of the CoFR reviews. The organizations signing for readiness or concurrence change depending on the specific responsibilities for each flight and on-orbit Stage. The certificates are under configuration control and managed by the NASA ISS PP&C office. The PP&C Office will revise the certificates, as necessary, to support the signature requirements of each meeting.

Figure H.2.6-1, Certification of Flight Readiness Certificate for a Space Shuttle-Based Flight, Form ISS_CM_- 024, contains a representative Stage Operations Readiness Review (SORR) certificate for a Shuttle flight.

Figure H.2.6-2, Certification of Flight Readiness Certificate for an IP Vehicle-Based Flight, contains a representative NASA FRR certificate for an IP Launch with crew transportation. Certification of Flight Readiness Certificate for an IP Vehicle-Based Flight, Form ISS_CM-025, contains a representative SORR certificate for an IP Transportation Vehicle flight, e.g., ATV, Progress, Soyuz, HTV. For the Joint Shuttle/Station FRR, the certificate is documented in NSTS 08117.

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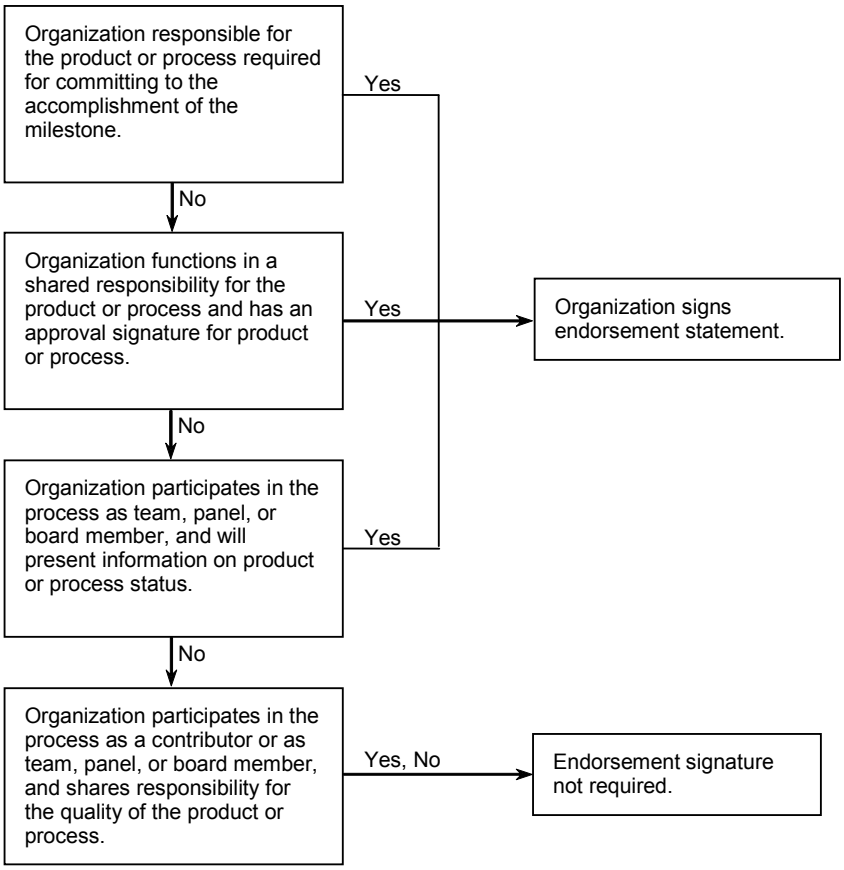

FIGURE H.2.4-1 ENDORSEMENT STATEMENT SIGNATURE CRITERIA

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NASA ISS PROGRAM CERTIFICATION OF FLIGHT READINESS CERTIFICATE
Stage Operations Readiness Review
For XX (as defined in Announcement Letter)

READINESS

Based upon the best knowledge of the identified responsible managers, the following organizations endorse that the requirements for CoFR documented in SSP 50108 and their organizational CoFR Implementation Plan have been or will be satisfied in accordance with their specific responsibilities for this flight and on-orbit phase. All standard open work and CoFR Exceptions have been identified, documented and are scheduled for completion. Any identified constraints are scheduled for completion prior to the applicable launch, return, or on-orbit operations for this stage.

MANAGER, VEHICLE OFFICE, ISS PROGRAM	DATE	MANAGER, MISSION INTEGRATION AND OPERATIONS OFFICE, ISS PROGRAM	DATE
MANAGER, AVIONICS AND SOFTWARE OFFICE, ISS PROGRAM	DATE	MANAGER, PROGRAM INTEGRATION OFFICE, ISS PROGRAM	DATE
MANAGER, PROGRAM PLANNING AND CONTROL OFFICE, ISS PROGRAM	DATE	MANAGER, SAFETY AND MISSION ASSURANCE/PROGRAM RISK OFFICE, ISS PROGRAM	DATE
MANAGER, PAYLOADS OFFICE, ISS PROGRAM	DATE	DIRECTOR, FLIGHT CREW OPERATIONS, JSC	DATE
MANAGER, EVA OFFICE, JSC	DATE	DIRECTOR, SPACE LIFE SCIENCES, JSC	DATE
DIRECTOR, MISSION OPERATIONS, JSC	DATE	DIRECTOR, ISS/PAYLOAD PROCESSING, KSC	DATE
PROGRAM MANAGER, SPACE STATION, USA	DATE		

CONCURRENCE

The following organizations have participated in the flight/on-orbit preparation process and/or this review, but do not have direct responsibilities for the CoFR requirements being reviewed. Based on their participation in the process and the information presented at this review, they concur with the readiness for launch and on-orbit operations, pending closure of the identified standard open work and CoFR Exceptions.

DIRECTOR, SAFETY, AND MISSION ASSURANCE, JSC	DATE	(See Deputy Manager ISS Program, NASA) MANAGER, OPERATIONS INTEGRATION, ISS PROGRAM	DATE
(See Director Space Life Sciences, JSC) CHIEF HEALTH & MEDICAL OFFICER, JSC	DATE	DEPUTY MANAGER, ISS PROGRAM	DATE
DIRECTOR,ENGINEERING, JSC	DATE		

FIGURE H.2.6-1 CERTIFICATION OF FLIGHT READINESS CERTIFICATE FOR A SPACE SHUTTLE-BASED FLIGHT (PAGE 1 OF 3)

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NASA ISS PROGRAM CERTIFICATION OF FLIGHT READINESS CERTIFICATE
Stage Operations Readiness Review
For XX (as defined in Announcement Letter)

BOEING READINESS

Based upon the best knowledge of the identified responsible Boeing Managers, Boeing endorses that the requirements for CoFR documented in SSP 50108 and the Boeing Flight CoFR Implementation Plan have been or will be satisfied in accordance with the Boeing specific responsibilities for this flight. This certification is subject to clause H.23 of NAS 15-10000.

VEHICLE DIRECTOR, BOEING	DATE	DIRECTOR, PAYLOAD INTEGRATION, ISS, BOEING	DATE
PROGRAM INTEGRATION DIRECTOR, BOEING	DATE	SAFETY AND MISSION ASSURANCE DIRECTOR, BOEING	DATE
AVIONICS AND SOFTWARE DIRECTOR, BOEING	DATE	LAUNCH PACKAGE MANAGER, BOEING	DATE
CHIEF ENGINEER, BOEING	DATE		

VICE PRESIDENT AND PROGRAM MANAGER, ISS, BOEING — DATE

PROGRAM MANAGER - PROGRAM INTEGRATION AND CONTROL CONTRACT READINESS

Based upon the best knowledge of the identified responsible Managers, the Program Integration and Control Contract endorses that the requirements for CoFR documented in SSP 50108 and the Program Integration and Control Certification of Flight Readiness Plan have been or will be satisfied in accordance with the Program Integration and Control Contractor specific responsibilities for these flights/on-orbit phases. All standard open work and CoFR Exceptions have been identified, documented and are scheduled for completion. Any identified constraints are scheduled for completion prior to the applicable launch, return, or on-orbit operations for this stage.

PROGRAM MANAGER - PROGRAM INTEGRATION AND CONTROL CONTRACT — DATE

PROGRAM MANAGER - MISSION INTEGRATION CONTRACT READINESS

Based upon the best knowledge of the identified responsible Managers, the Mission Integration Contract endorses that the requirements for CoFR documented in SSP 50108 and the Certificate of Flight Readiness Implementation Plan have been or will be satisfied in accordance with the Mission Integration Contract's specific responsibilities for these flights/on-orbit phases. All standard open work and CoFR Exceptions have been identified, documented and are scheduled for completion. Any identified constraints are scheduled for completion prior to the applicable launch, return, or on-orbit operations for this stage.

PROGRAM MANAGER - MISSION INTEGRATION CONTRACT — DATE

FIGURE H.2.6-1 CERTIFICATION OF FLIGHT READINESS CERTIFICATE FOR A SPACE SHUTTLE-BASED FLIGHT (PAGE 2 OF 3)

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NASA ISS PROGRAM CERTIFICATION OF FLIGHT READINESS CERTIFICATE
Stage Operations Readiness Review
For XX (as defined in Announcement Letter)

PROGRAM MANAGER - CARGO MISSION CONTRACT READINESS

Based upon the best knowledge of the identified responsible Managers, the Cargo Mission Contract endorses that the requirements for CoFR documented in SSP 50108 and the Cargo Mission Contract Certificate of Flight Readiness Plan have been or will be satisfied in accordance with the Cargo Mission Contract's specific responsibilities for these flights/on-orbit phase. All standard open work and CoFR Exceptions have been identified, documented and are scheduled for completion. Any identified constraints are scheduled for completion prior to the applicable launch, return, or on-orbit operations for this stage.

PROGRAM MANAGER - CARGO MISSION CONTRACT — DATE

NASA ISS PROGRAM APPROVAL

All necessary activities required tosupport the flight, Stage and increment have been accomplished or are planned. All deviations, waivers, and CoFR Exceptions have been reviewed and satisfactorily dispositioned. The ISS Program is ready to proceed with launch, return, and on-orbit operations, pending closure of the identified standard open work and CoFR Exceptions.

ISS PROGRAM MANAGER, NASA — DATE

FIGURE H.2.6-1 CERTIFICATION OF FLIGHT READINESS CERTIFICATE FOR A SPACE SHUTTLE-BASED FLIGHT (PAGE 3 OF 3)

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NASA ISS PROGRAM CERTIFICATION OF FLIGHT READINESS CERTIFICATE
Stage Operations Readiness Review
For XX (as defined in Announcement Letter)

READINESS

Based upon the best knowledge of the identified responsible managers, the following organizations endorse that the requirements for CoFR documented in SSP 50108 and their organizational CoFR Implementation Plan have been or will be satisfied in accordance with their specific responsibilities for this flight and on-orbit phase. All standard open work and CoFR Exceptions have been identified, documented and are scheduled for completion. Any identified constraints are scheduled for completion prior to the applicable launch, return, or on-orbit operations for this stage.

MANAGER, VEHICLE OFFICE, ISS PROGRAM	DATE	MANAGER, MISSION INTEGRATION AND OPERATIONS OFFICE, ISS PROGRAM	DATE
MANAGER, AVIONICS AND SOFTWARE OFFICE, ISS PROGRAM	DATE	MANAGER, PROGRAM INTEGRATION OFFICE, ISS PROGRAM	DATE
MANAGER, PROGRAM PLANNING AND CONTROL OFFICE, ISS PROGRAM	DATE	MANAGER, SAFETY AND MISSION ASSURANCE/PROGRAM RISK OFFICE, ISS PROGRAM	DATE
MANAGER, PAYLOADS OFFICE, ISS PROGRAM	DATE	DIRECTOR, FLIGHT CREW OPERATIONS, JSC	DATE
MANAGER, EVA OFFICE, JSC	DATE	DIRECTOR, SPACE LIFE SCIENCES, JSC	DATE
DIRECTOR, MISSION OPERATIONS, JSC	DATE	_____(Not Required for this Flight)_____ DIRECTOR, ISS/PAYLOAD PROCESSING, KSC	DATE
PROGRAM MANAGER, SPACE STATION, USA	DATE		

CONCURRENCE

The following organizations have participated in the flight/on-orbit preparation process and/or this review, but do not have direct responsibilities for the CoFR requirements being reviewed. Based on their participation in the process and the information presented at this review, they concur with the readiness for launch and on-orbit operations, pending closure of the identified standard open work and CoFR Exceptions.

DIRECTOR, SAFETY, AND MISSION ASSURANCE, JSC	DATE	_____(See Deputy Manager ISS Program, NASA)_____ MANAGER, OPERATIONS INTEGRATION, ISS PROGRAM	DATE
_____(See Director Space Life Sciences, JSC) ___ CHIEF MEDICAL OFFICER, JSC	DATE	DEPUTY MANAGER, ISS PROGRAM	DATE
DIRECTOR,ENGINEERING, JSC	DATE		

FIGURE H.2.6-2 CERTIFICATION OF FLIGHT READINESS CERTIFICATE FOR AN IP VEHICLE-BASED FLIGHT (PAGE 1 OF 3)

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NASA ISS PROGRAM CERTIFICATION OF FLIGHT READINESS CERTIFICATE
Stage Operations Readiness Review
For XX (as defined in Announcement Letter)

BOEING READINESS (IP)

Based upon the best knowledge of the identified responsible Boeing Managers, Boeing endorses that the requirements for CoFR documented in SSP 50108 and the Boeing Flight CoFR Implementation Plan have been or will be satisfied in accordance with the Boeing specific responsibilities for this flight. This certification is subject to clause H.23 of NAS 15-10000.

VEHICLE DIRECTOR, BOEING	DATE	_____(Not Required for this Flight_____ DIRECTOR, PAYLOAD INTEGRATION , ISS, BOEING	DATE
_____(Not Required for this Flight)_____ PROGRAM INTEGRATION DIRECTOR, BOEING	DATE	SAFETY AND MISSION ASSURANCE DIRECTOR, BOEING	DATE
AVIONICS AND SOFTWARE DIRECTOR, BOEING	DATE	_____(Not Required for this Flight)_____ LAUNCH PACKAGE MANAGER, BOEING	DATE
CHIEF ENGINEER, BOEING	DATE		

VICE PRESIDENT AND PROGRAM MANAGER, ISS, BOEING — DATE

PROGRAM MANAGER - PROGRAM INTEGRATION AND CONTROL CONTRACT READINESS

Based upon the best knowledge of the identified responsible Managers, the Program Integration and Control Contract endorses that the requirements for CoFR documented in SSP 50108 and the Program Integration and Control Certification of Flight Readiness Plan have been or will be satisfied in accordance with the Program Integration and Control Contractor specific responsibilities for these flights/on-orbit phases. All standard open work and CoFR Exceptions have been identified, documented and are scheduled for completion. Any identified constraints are scheduled for completion prior to the applicable launch, return, or on-orbit operations for this stage.

PROGRAM MANAGER - PROGRAM INTEGRATION AND CONTROL CONTRACT — DATE

PROGRAM MANAGER - MISSION INTEGRATION CONTRACT READINESS

Based upon the best knowledge of the identified responsible Managers, the Mission Integration Contract endorses that the requirements for CoFR documented in SSP 50108 and the Certificate of Flight Readiness Implementation Plan have been or will be satisfied in accordance with the Mission Integration Contract's specific responsibilities for these flights/on-orbit phases. All standard open work and CoFR Exceptions have been identified, documented and are scheduled for completion. Any identified constraints are scheduled for completion prior to the applicable launch, return, or on-orbit operations for this stage.

PROGRAM MANAGER - MISSION INTEGRATION CONTRACT — DATE

FIGURE H.2.6-2 CERTIFICATION OF FLIGHT READINESS CERTIFICATE FOR AN IP VEHICLE-BASED FLIGHT (PAGE 2 OF 3)

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NASA ISS PROGRAM CERTIFICATION OF FLIGHT READINESS CERTIFICATE
Stage Operations Readiness Review
For XX (as defined in Announcement Letter)

PROGRAM MANAGER - CARGO MISSION CONTRACT READINESS

Based upon the best knowledge of the identified responsible Managers, the Cargo Mission Contract endorses that the requirements for CoFR documented in SSP 50108 and the Cargo Mission Contract Certificate of Flight Readiness Plan have been or will be satisfied in accordance with the Cargo Mission Contract's specific responsibilities for these flights/on-orbit phase. All standard open work and CoFR Exceptions have been identified, documented and are scheduled for completion. Any identified constraints are scheduled for completion prior to the applicable launch, return, or on-orbit operations for this Stage.

_____ _____
PROGRAM MANAGER - CARGO MISSION CONTRACT DATE

NASA ISS PROGRAM APPROVAL

All necessary activities required to support the flight, stage and increment have been accomplished or are planned. All deviations, waivers, and CoFR Exceptions have been reviewed and satisfactorily dispositioned. The ISS Program is ready to proceed with launch, return, and on-orbit operations, pending closure of the identified standard open work and CoFR Exceptions.

_____
ISS PROGRAM MANAGER, NASA

_____
DATE

FIGURE H.2.6-2 CERTIFICATION OF FLIGHT READINESS CERTIFICATE FOR AN IP VEHICLE-BASED FLIGHT (PAGE 3 OF 3)

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Figure H.2.6-3, Flight Readiness Review Certificate for an IP Launch with Crew Transportation, Form ISS_CM-026, contains a representative FRR certificate for an IP launch which includes crew transportation, e.g., Soyuz.

For IP launches, the NASA/ISS PM will send a letter to the IP PM indicating that the ISS is ready to receive the Transportation Vehicle, Cargo Elements, and /or Cargo being launched. A template for the letter is shown in Figure H.2.6-4, ISS Readiness Certification for International Partner Launch. For U.S. HW/SW to be integrated into an IP module/vehicle or deliverable payload, the NASA ISS Program Manager will send a letter to the recipient of the item indicating that the items were developed according to specifications and meet functional and performance requirements. A template for the letter is shown in Figure H.2.6-5, Letter Certifying U.S. Hardware/Software for International Partner Launch.

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NASA ISS PROGRAM CERTIFICATION of FLIGHT READINESS

CERTIFICATE
FLIGHT READINESS REVIEW (FRR) FOR FLIGHT XX LAUNCH, XX RETURN, XX DISPOSAL, AND INCREMENT XX (STAGE XX)

UNITED SPACE ALLIANCE READINESS

United Space Alliance endorses that the requirements for CoFR documented in SSP 50108 and the United Space Alliance CoFR Implementation Plan have been satisfied in accordance with the United Space Alliance specific responsibilities for these flights and on-orbit operations. Any issues that have arisen since the Stage Operations Readiness Review (SORR) have been resolved or have been presented at the Flight Readiness Review.

_____ _____
VICE PRESIDENT, SAFETY, QUALITY AND MISSION ASSURANCE, USA DATE

_____ _____
PROGRAM MANAGER, INTERNATIONAL SPACE STATION AND SPACE SHUTTLE PROGRAMS, USA DATE

BOEING READINESS

Boeing endorses that the requirements for CoFR documented in SSP 50108 and the Boeing Flight CoFR Endorsement Document have been satisfied in accordance with the Boeing specific responsibilities for these flights and on-orbit operations. Any issues that have arisen since the Stage Operations Readiness Review (SORR) have been resolved or have been presented at the Flight Readiness Review. This certification is subject to clause H.23 of NAS 15-10000.

_____ _____
PROGRAM MANAGER, INTERNATIONAL SPACE STATION, BOEING DATE

FIGURE H.2.6-3 FLIGHT READINESS REVIEW CERTIFICATE FOR AN IP LAUNCH WITH CREW TRANSPORTATION (PAGE 1 OF 4)

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NASA ISS PROGRAM CERTIFICATION of FLIGHT READINESS

CERTIFICATE
FLIGHT READINESS REVIEW (FRR) FOR FLIGHT XX LAUNCH, XX RETURN, XX DISPOSAL, AND INCREMENT XX (STAGE XX)

PROGRAM INTEGRATION AND CONTROL CONTRACT READINESS

Program Integration and Control Contract (PI&C) endorses that the requirements for CoFR documented in SSP 50108 and the PI&C CoFR Implementation Plan have been satisfied in accordance with the PI&C specific responsibilities for these flights and on-orbit operations. Any issues that have arisen since the Stage Operations Readiness Review (SORR) have been resolved or have been presented at the Flight Readiness Review.

PROGRAM MANAGER, PROGRAM INTEGRATION AND CONTROL CONTRACT _____ DATE _____

MISSION INTEGRATION CONTRACT READINESS

Mission Integration Contract (MIC) endorses that the requirements for CoFR documented in SSP 50108 and the MIC CoFR Implementation Plan have been satisfied in accordance with the MIC specific responsibilities for these flights and on-orbit operations. Any issues that have arisen since the Stage Operations Readiness Review (SORR) have been resolved or have been presented at the Flight Readiness Review.

PROGRAM MANAGER, MISSION INTEGRATION CONTRACT _____ DATE _____

CARGO MISSION CONTRACT READINESS

Cargo Mission Contract (CMC) endorses that the requirements for CoFR documented in SSP 50108 and the CMC CoFR Implementation Plan have been satisfied in accordance with the CMC specific responsibilities for these flights and on-orbit operations. Any issues that have arisen since the Stage Operations Readiness Review (SORR) have been resolved or have been presented at the Flight Readiness Review.

PROGRAM MANAGER, CARGO MISSION CONTRACT _____ DATE _____

FIGURE H.2.6-3 FLIGHT READINESS REVIEW CERTIFICATE FOR AN IP LAUNCH WITH CREW TRANSPORTATION(PAGE 2 OF 4)

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NASA ISS PROGRAM CERTIFICATION of FLIGHT READINESS

CERTIFICATE
FLIGHT READINESS REVIEW (FRR) FOR FLIGHT XX LAUNCH, XX RETURN, XX DISPOSAL, AND INCREMENT XX (STAGE XX)

CANADIAN SPACE AGENCY APPROVAL

All necessary activities required supporting the flights, Stage, and increment have been accomplished or are planned. All deviations, waivers, and CoFR Exceptions have been reviewed and satisfactorily dispositioned. The International Space Station Program is ready to proceed with launch, return, and on-orbit operations. Any issues that have arisen since the Stage Operations Readiness Review (SORR) have been resolved or have been presented at the Flight Readiness Review.

CANADIAN SPACE AGENCY _____ DATE _____

ROSCOSMOS APPROVAL

All necessary activities required supporting the flights, Stage, and increment have been accomplished or are planned. The International Space Station Program is ready to proceed with launch, return, and on-orbit operations. Any issues that have arisen since the Stage Operations Readiness Review (SORR) have been resolved or have been presented at the Flight Readiness Review.

ROSCOSMOS _____ DATE _____

NASA ISS PROGRAM APPROVAL

All necessary activities required supporting the flights, Stage, and increment have been accomplished or are planned. All deviations, waivers, and exceptions have been reviewed and satisfactorily dispositioned. The International Space Station Program is ready to proceed with launch, return, and on-orbit operations. Any issues that have arisen since the Stage Operations Readiness Review (SORR) have been resolved or have been presented at the Flight Readiness Review.

INTERNATIONAL SPACE STATION PROGRAM MANAGER, NASA _____ DATE _____

FIGURE H.2.6-3 FLIGHT READINESS REVIEW CERTIFICATE FOR AN IP LAUNCH WITH CREW TRANSPORTATION(PAGE 3 OF 4)

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NASA ISS PROGRAM CERTIFICATION of FLIGHT READINESS

CERTIFICATE

FLIGHT READINESS REVIEW (FRR) FOR FLIGHT XX LAUNCH, XX RETURN, XX DISPOSAL, AND INCREMENT XX (STAGE XX)

CONCURRENCE

I concur that the International Space Station Program is ready to proceed with this mission pending completion of planned work.

ASSISTANT ASSOCIATE ADMINISTRATOR FOR INTERNATIONAL SPACE STATION PROGRAMS — DATE

CONCURRENCE

As a member of the FRR Board, I concur that, pending completion of planned work, the International Space Station Program is ready to execute this mission.

CHIEF HEALTH AND MEDICAL OFFICER — DATE

CHIEF ENGINEER — DATE

DIRECTOR, JOHNSON SPACE CENTER — DATE

DIRECTOR, KENNEDY SPACE CENTER — DATE

DIRECTOR, MARSHALL SPACE FLIGHT CENTER — DATE

DIRECTOR, STENNIS SPACE CENTER — DATE

NASA S&MA has reviewed the status of preparations for this mission and has performed an independent assessment of the readiness of the International Space Station Program for launch, return, and on-orbit operations. We are in concurrence with proceeding with this mission.

SAFETY AND MISSION ASSURANCE CHIEF OFFICER — DATE

APPROVAL

The FRR Board has conducted a comprehensive assessment of the readiness of the Launch Package/Cargo Element (LP/CE), ground HW/SW support facilities, and personnel to support these flights, Stage and increment. The readiness of the on-orbit configuration to accept this LP/CE and return items has been verified and/or planned. All action items, open work, and COFR Exceptions have been accomplished, dispositioned, or are planned. The Certification of Flight Readiness Certificate has been endorsed by each Program element. I have concluded, with the concurrence of the FRR Board, that pending completion of the planned work, the International Space Station Program is ready to proceed with the launch, return, and on-orbit operations for XX Launch, XX Return, XX Disposal, and XX Stage.

ASSOCIATE ADMINISTRATOR, SPACE OPERATION MISSION DIRECTORATE (CHAIR, FRR BOARD) — DATE

FIGURE H.2.6-3 FLIGHT READINESS REVIEW CERTIFICATE FOR AN IP LAUNCH WITH CREW TRANSPORTATION(PAGE 4 OF 4)

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Mr. [Deputy Director General's Name]
Deputy Director General for Manned Space Flight
Roscosmos

Or appropriate IP POC

Dear [Name]:

All systems and elements of the International Space Station, both on-orbit and on the ground, are ready to receive the elements to be launched by [IP] in the upcoming launch. Those elements include: **<TBD H-1>.** If our assessment of this readiness changes before launch, I will contact you immediately.

Sincerely,

(Program Manager Name ISS Program)
International Space Station Program Manager

Enclosure:
ISS CoFR

FIGURE H.2.6-4 ISS READINESS CERTIFICATION FOR INTERNATIONAL PARTNER LAUNCH

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Program Manager or Designee
International Space Station Program
(Recipient of Item)

Dear (Recipient of Item):

The items listed below are provided to you for integration into your module/vehicle or deliverable payloads. These items have been developed according to specifications and meet functional and performance requirements. There are no known anomalies that would prevent the successful integration of these items.

(List of Partner(s) components/items here.)

I will contact you immediately if this assessment changes at any point before launch.

Sincerely,

Program Manager or Designee
International Space Station Program
(Provider of Items)

FIGURE H.2.6-5 LETTER CERTIFYING U.S. HARDWARE/SOFTWARE FOR INTERNATIONAL PARTNER LAUNCH

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APPENDIX I

OPEN WORK

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APPENDIX I - OPEN WORK

Table I-1 lists the specific To Be Determined (TBD) items in the document that are not yet known. The TBD is inserted as a placeholder wherever the required data is needed and is formatted in bold type within brackets. The TBD item is numbered based on the section where the first occurrence of the item is located as the first digit and a consecutive number as the second digit (E.g., **<TBD 4-1>** is the first undetermined item assigned in Section 4 of the document). As each TBD is solved, the updated text is inserted in each place that the TBD appears in the document and the item is removed from this table. As new TBD items are assigned, they will be added to this list in accordance with the above described numbering scheme. Original TBDs will not be renumbered.

TABLE I-1 TO BE DETERMINED ITEMS

TBD	Section	Description
2-1	Section 2.1	The bilateral ISS Program documents that relate to Node 3 and Cupola to be provided by change engineer.
B-1	Appendix B	To be determined by change engineer.
F-1	Section F.2.1	To be determined by change engineer.
F-2	Section F.2.2	To be determined by change engineer.
G-1	Section G.2, Figure G.2.1-1 Figure G.2.1-2, Figure G.2.1-3	To be determined by change engineer.
H-1	Figure H.2.6-4	To be determined by change engineer.
J-1	Appendix J	To be determined by change engineer.

Table I-2 lists the specific To Be Resolved (TBR) issues in the document that are not yet known. The TBR is inserted as a placeholder wherever the required data is needed and is formatted in bold type within brackets. The TBR issue is numbered based on the section where the first occurrence of the issue is located as the first digit and a consecutive number as the second digit (E.g., **<TBR 4-1>** is the first unresolved issue assigned in Section 4 of the document). As each TBR is resolved, the updated text is inserted in each place that the TBR appears in the document and the issue is removed from this table. As new TBR issues are assigned, they will be added to this list in accordance with the above described numbering scheme. Original TBRs will not be renumbered.

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TABLE I-2 TO BE RESOLVED ISSUES

TBR	Section	Description
TBR	Page v	Further work is required to expand and modify Appendix E to adequately address ESA Exploitation Program activities involving Columbus post-activation and check-out. In addition, further work is required to expand and modify Appendix E to adequately address the certification of readiness process to be implemented by ESA for the ATV.
1-1	Section 1.5	This change needs to be coordinated with the other IP/P's and NASA before the change can be made.
1-2	Section 1.6.3	This change needs to be coordinated with the NASA Payloads organization (OZ) before the change can be made.
5-1	Section 5.4.1	To be provided by change engineer.
E-1	Appendix E	This TBR created to indicate that this entire appendix is still TBR.

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APPENDIX J

EXAMPLES OF ISS PROGRAM COFR-RELATED DOCUMENTS
<TBD J-1>