Multi-Increment Manifest Document

International Space Station Program

Revision F

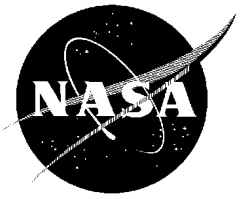
June 2000 Draft

Russian Space Agency

Canadian Space Agency

Agence spatiale canadienne

National Aeronautics and Space Administration
International Space Station Program
Johnson Space Center
Houston, Texas



REVISION AND HISTORY PAGE

REV.	DESCRIPTION	PUB. DATE
-	Initial release per SSCD 000362, EFF. 11-02-96	12-03-96
A	Revision A Release per SSCD 000580R1, EFF. 09-30-97	10-30-97
B	Revision B Release per SSCD 001334, EFF. 05-12-98 ***[Overcome by Revision C (Release to File).]***	06-03-98
C	Revision C Release per SSCD per 001711R2, EFF. 12-03-98 ***[Revision C encompasses Flight 1A/R through Flight 7A.]***	06-03-99
	[Due to Program direction to align the MIM and Assembly Sequence revision letters, there will be no MIM Revision D released.]	
E	Revision E Release per SSCD 002073, EFF. 06-09-99 ***[Also incorporates DCN 001 per SSCD 002073R1, EFF. 11-29-99.]***	03-17-00
	DCN 002 (per SSCD 002677, EFF. 03-06-00 and SSCD 002677R1, EFF. 03-20-00)	XX-XX-XX
	(SSCD 002677R1 authorized an administrative action to upgrade the documentation software applied to SSP 50110 to MS Office 97. All pages which have been affected by the implementation of Office 97 have been included in this package and reflect the package release date header. No technical content has been impacted.)	
	DCN 003 was cancelled and SSCD 002858 was updated to remove all language affecting the MIM. However, SSCD 002858 is still in the system.	N/A
	DCN 004 (SSCD 003412) was not published and has been incorporated into DCN 005.	N/A
	DCN 005 (per SSCD 003178, EFF. 03-02-00 and SSCD 003412, EFF. 05-20-00)	XX-XX-XX

INTERNATIONAL SPACE STATION PROGRAM

MULTI-INCREMENT MANIFEST DOCUMENT

AUGUST 2000

PREFACE

MULTI-INCREMENT MANIFEST DOCUMENT

This document is the Multi-Increment Manifest (MIM) Document.

The contents of this document are to be consistent with the tasks and products prepared by the International Space Station (ISS) Program participants as specified in SSP 50011-01, Concept of Operation and Utilization, Volume 1: Principles and SSP 50200-02, Station Program Implementation Plan, Volume 2: Program Planning and Manifesting. Up to assembly complete plus one year, official deliveries of this document are under control of the Space Station Control Board (SSCB) and any changes or revisions will be jointly agreed to and signed by the National Aeronautics and Space Administration (NASA) and the affected partners, under the provisions of Article 8 of the Memorandum of Understanding (MOU).

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MULTI-INCREMENT MANIFEST DOCUMENT

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MULTI-INCREMENT MANIFEST DOCUMENT

LIST OF CHANGES

JUNE 1999

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

SSCB	Entry Date	Change	Paragraph(s)
SSCD 0362	September 9, 1996	Baseline	All
SSCD 000580R1	September 27, 1997	Revision A	All
SSCD 001334	May 12, 1998	Revision B	All
SSCD 001711R2	December 3, 1998	Revision C	All

[Due to Program direction to align the MIM and Assembly Sequence revision letters, there will be no MIM Revision D released.]

SSCD 002073	June 9, 1999	Revision E	All
SSCD 002073R1	November 29, 1999	Revision E DCN 001	All
SSCD 002677	March 6, 2000	DCN 002	All
SSCD 002677R1	March 20, 2000	DCN 002	All
SSCD 003178, SSCD 003412	June 14, 2000	DCN 005	

TABLE OF CONTENTS

FIGURE

1.0 INTRODUCTION

1.1 PURPOSE

The purpose of this document is to control the International Space Station (ISS) assembly sequence, integrated traffic and crew rotation plans, , and Subelement (SE) numbers. This document provides the coordination and control mechanism to ensure that all Partners have full knowledge of the assembly sequence and all other ISS transportation plans. The Multi-Increment Manifest (MIM) is also responsible for defining the crew rotation plan which specifies the transportation of crewmembers to and from the ISS and the means of transportation used.

This document provides the basis for initial increment manifest, traffic planning, and the planning period definitions for the development of the Planning Period (PP) specific Increment Definition and Requirements Document (IDRD).

1.2 SCOPE

This document provides the basic flight plan, including the assembly sequence, and crew rotation plan required to support the assembly of the ISS. The assembly sequence includes all flights in which ISS system hardware is delivered and installed, including utilization flights. The integrated traffic plan is defined for the five planning periods contained in the Consolidated Operations and Utilization Plan (COUP). This document is normally released four months after the COUP. It shows planning period and increment boundary information; the flight launch dates (month-year); the number of days a vehicle is docked; rendezvous altitudes; Extravehicular Activity (EVA) periods; and ascent and descent manifest information for assembly, utilization, and logistics flights, including the SE numbers that have been defined. Also, this document provides a high level description of the EVA tasks.

The MIM does not specify the quantity and agency of the International Standard Payload Racks (ISPRs) and attached payloads for each flight. ISPRs include Payload stowage racks, Expedite the Processing of Experiments to the Space Station (EXPRESS) racks, and User Refrigerator/Freezers. This information will be documented in the Integrated Payload Mission Model (IPMM).

This release of the MIM will cover the crew rotation plan up to the launch of the eighth ISS crew.

The MIM baselines the assembly sequence with its high level manifests, integrated traffic plan, crew rotation plan, , and SE numbers. The EVA task descriptions documented are for informational purposes only.

1.3 PRECEDENCE

Information contained in this document will be consistent with other International Space Station (ISS) Program documentation. The assembly sequence, integrated traffic plan, crew rotation plan and, flight descriptions depicted in this document take precedence over other documentation with the exception of the planning period specific IDRD. Upon baseline, the planning period specific IDRD will take precedence over the MIM. The MIM shall be used in conjunction with SSP 50261-01, Generic Groundrules, Requirements, and Constraints, Part 1: Strategic and Tactical Planning. Exceptions to the Generic Groundrules, Requirements, and Constraints (GR&C) will be denoted in the MIM.

1.4 DELEGATION OF AUTHORITY

The MIM is prepared by the Assembly and Configuration Team, for approval by the Space Station Control Board (SSCB). At assembly complete plus one year, and under the provisions of Article 8 of the Memorandum of Understanding (MOU), the relevant management mechanisms of the integrated tactical operations organization (itoo) will become the controlling authority. See SSP 50200-01, Station Program Implementation Plan, Volume 1: Station Program Management Plan, for definition of itoo.

1.5 CHANGES

The MIM will be updated, as required, to reflect major changes. In this case, a change to the document will be issued. Any request for changes should be made to the SSCB (itoo after assembly complete plus one year) in accordance with the procedures defined in SSP 41170, Configuration Management Requirements.

2.0 DOCUMENTS

2.1 APPLICABLE DOCUMENTS

The following documents include specifications, models, standards, guidelines, handbooks, and other special publications. The current issue of the following documents is identified in the Program Automated Library System (PALS) (http://issa-www.jsc.nasa.gov/cgi-bin/dsql+/ORAP?-h+palshome). 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 41170	Configuration Management Requirements
SSP 50011-01	Concept of Operation and Utilization, Volume 1: Principles
SSP 50200-02	Station Program Implementation Plan, Volume 2: Program Planning and Manifesting
SSP 50261-01	Generic Groundrules, Requirements, and Constraints Part 1: Strategic and Tactical Planning
No Number	Consolidated Operations and Utilization Plan
No Number	Memorandum of Understanding

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 41000	System Specification for the International Space Station
SSP 50112	Operations Summary Document
SSP 50200-01	Station Program Implementation Plan, Volume 1: Station Program Management Plan
No Number	Consolidated Operations and Utilization Plan

3.0 ASSEMBLY SEQUENCE, INTEGRATED FLIGHT SCHEDULE/CREW ROTATION AND FLIGHT DESCRIPTIONS

3.1 ASSEMBLY SEQUENCE

Figure 3.1-1, Assembly Sequence, Revision Fdenotes the assembly sequence flight schedule. These pages provide the flight order in which the ISS will be assembled. For an integrated flight schedule, which includes other Partners' vehicles, reference Section 3.2, Integrated Flight Schedule/Crew Rotation. Also, a more detailed manifest associated with each assembly flight is captured in Table 3.3-1, Flight Descriptions. This overview and Table 3.3-1 does not reflect the quantity of ISPRs, with the exception to Flights 1J/A.

Seven person crew presence will occur after Flight 16A (Habitation Module delivery). This increase in crew size is dependent on when the logistics is available to support the seventh crewmember.

Launch Date	Flight	Delivered Elements
Nov-98	1A/R	FGB (Launched on PROTON launcher)
Dec-98	2A	Node 1: 1 Stowage rack, ZSRs,PMA1, PMA2; 2 APFRs (Sidewalls)
May-99	2A.1	Spacehab Double Cargo Module; OTD, Strela 1 Components, SHOSS (ICC)
May-00	2A.2A	Spacehab Double Cargo Module; Strela 1 Components, SHOSS (ICC)
Jul-00	1R	Service Module
Sep-00	2A.2B	Spacehab Double Cargo Module; SHOSS(ICC)
Oct-00	3A	Z1 truss: CMGs, Ku-band, S-band Equip.; PMA3, 2 ETSDs (SLP); 2 Z1 DDCUs (Sidewall)
Oct-00	2R	Soyuz -TM (a)
Nov-00	4A	P6: PV Arrays (6 battery sets), EEATCS radiators, S-band Equip.
Jan-01	5A	Lab: Lab System racks, ZSRs; PDGF (Sidewall); SASA (Sidewall)
Feb-01	5A.1	Lab System racks, RSRs, RSPs, ISPR (Lab Outfitting) (MPLM); EAS, PFCS, LCA, RU, ESP (ICC) (c)
Mar-01	4R	Docking Compartment 1 (DC1): Strela 2
Apr-01	6A	RSPs, RSRs, ISPRs (MPLM); DCSU (Sidewall); UHF, SSRMS (SLP) (b)
May-01	7A	Airlock: Stowage Platform, CA Equip Rack, Avionics Rack, External Equip; HP gas (2 O2, 2 N2) (SLDP)
Jun-01	7A.1	RSRs, RSPs, ISPRs (MPLM); SM MMOD Shields, SPP PWP Comp. , OTD, 2 SHOSS, Ext. Att. P/L (ICC); APFR (Sidewalls) (c)
Oct-01	UF1	RSRs, RSPs, ISPR, MELFI (MPLM); WVS (Sidewall) (c)
Jan-02	8A	S0: MT, GPS, Airlock and Node 3 Umbilicals, A/L Spur, PWP
Feb-02	UF2	RSRs, RSPs, ISPRs (MPLM); MBS; PDGF (Sidewall); MDM Radiators (Sidewalls) **<TBD 3-23>**(c)
May-02	9A	S1: 3 TCS Radiators, CETA Cart A, S-band Equip.
Jun-02	ULF1	**<TBD 3-26>** (MPLM); **<TBD 3-26>** (ULC); ESP-2 w/ spares (c)
Oct-02	11A	P1: 3 TCS Radiators, CETA Cart B, UHF
Oct-02	9A.1	Science Power Platform (SPP): 4 solar arrays, ERA, PDGF
Feb-03	12A	P3; P4: PV Arrays (6 battery sets), 2 ULCAS
Mar-03	12A.1	Spacehab Single Cargo Module; **<TBD 3-27>** (ICC);P5; PVRGF (Sidewall) (c)
Jun-03	13A	S3; S4: PV Arrays (6 battery sets), 4 PAS
Jul-03	13A.1	Spacehab Single Cargo Module; **<TBD 3-27>** (ICC); S5; PVRGF (Sidewall)
Oct-03	3R	Universal Docking Module (UDM)
Oct-03	5R	Docking Compartment 2 (DC2)
Oct-03	10A	Node 2: DDCU racks, ZSRs; NTA (CBC)
Jan-04	1J/A	ELM PS: 4 Sys, 3 ISPRs, 1 Stow; 2 SPP SA w/truss, SM MMOD Shields (ULC); NTA (**<TBD 3-28>**); **<TBD 3-32>**ORUs (CBC)
Apr-04	9R	Docking & Stowage Module (DSM)
Apr-04	10A.1	Propulsion Module
May-04	1J	JEM PM: 4 JEM Sys racks, JEM RMS
Aug-04	UF3	RSPs, RSRs, ISPRs, 1 JEM rack (MPLM); Express Pallet; **<TBD 3-32>**ORUs (CBC)
Sep-04	UF4	S3 Attached P/L; ATA **<TBD 3-28>**, SPDM (SLP)
Jan-05	2J/A	JEM EF; ELM-ES: EF Payloads, ICS, SFA w/carrier; Cupola (SLP); ATA (**<TBD 3-28>**)
Feb-05	UF-5	RSPs, RSRs, RSP-2s, ISPRs (MPLM); Express Pallet; **<TBD 3-32>**ORUs (CBC)
May-05	1E	Columbus Module: ZSR, ISPRs; **<TBD 3-32>** ORUs (CBC)
Jun-05	UF6	RSPs, RSRs, RSP-2s, ISPRs (MPLM); Express Pallet; **<TBD 3-32>**ORUs (CBC)
Jul-05	14A	2 SPP SAs w/truss, 4 SM MMOD Wings (ULC); MT/CETA Port & Stbd Rails (SLP) **<TBD 3-33>**, EF P/Ls & Spares (**<TBD 3-29>**)
Sep-05	20A	Node 3: Avionics Racks, ECLSS Racks; **<TBD 3-32>** ORUs (CBC)
Sep-05	16A	Hab: Hab sys racks, ZSRs, 4 Crew Qtrs, ISPR; **<TBD 3-32>** ORUs (CBC)
Nov-05	8R	Research Module 1 (RM-1)
Dec-05	17A	1 Lab Sys, Node 3 System Racks, RSRs, RSPs, RSP-2s, ISPRs (MPLM); CBA (SLP) - (d)
Jan-06	18A	CRV 1
Feb-06	19A	RSPs, RSR, RSP-2s, ISPRs, Hab System Rack, CHeCs Racks (MPLM); **<TBD 3-32>** ORUs (CBC) - (e)
Apr-06	15A	S6: PV Arrays (6 battery sets), PV Module S6 Radiator **<TBR 3-15>**
May-06	UF7	Centrifuge Accommodations Module (CAM): ZSRs
May-06	10R	Research Module 2 (RM-2)

(a) - 3 Person Permanent International Human Presence Capability
(b) - Microgravity Capability
(c) - 3 ISS crew member rotation
(d) - 6 Person USOS ECLSS Capability
(e) - Rack traffic assumes transition to 7 person capability on 19A

FIGURE 3.1-1 ASSEMBLY SEQUENCE, REVISION F OVERVIEW

3.2 INTEGRATED FLIGHT SCHEDULE/CREW ROTATION

Figure 3.2-1, Integrated Flight Schedule, provides a graphical timeline of the planning periods, the increments, the flights, and the crew rotation covered by this document. The Integrated Flight Schedule graphically illustrates these entries using bars to show the duration of each.

The planning periods and increments are shown first. The Russian assembly flights and Russian Segment EVAs (assembly, projected maintenance, and science) are shown next. The Soyuz TM and Soyuz TMA flights are shown in the next row. The initial Soyuz TM flight is designated as Flight 2R. The Orbiter flights and United States On-Orbit Segment (USOS) EVAs (assembly, projected maintenance, and science) are shown next, followed by the ISS crew rotation plan. A bar depicts each crewmember and contains an increment number and a crew designation number, such as “ISS 1-1,” where the first number is the increment number and the second number is the crew designation number. Shaded areas at the ends of the crewmember’s bars indicate handover time between departing and arriving crewmembers. The number of visiting ccrewmembers is identified on the next row. The Logistics flights, Progresses, H-II Transfer Vehicles (HTVs), and Automated Transfer Vehicles (ATVs) are shown in the last row. Note that additional analysis is required to verify the propellant and dry cargo traffic model.