Increment Definition and Requirements Document for Increment 16

International Space Station Program

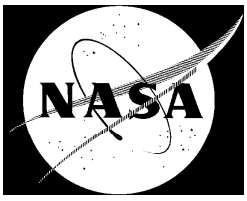
Revision A

Incorporates DCN 002

June 2007

POCKOCMOC

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



REVISION AND HISTORY PAGE

REV.	DESCRIPTION	PUB. DATE
-	Initial Release (Reference per SSCD 010353, EFF. 04-17-07)	
	Early Release	04-19-07
	Program Release	XX-XX-XX
A	Revision A (Reference per SSCD 010493, EFF. 07-20-07)	
	Early Release	07-24-07
	Program Release	XX-XX-XX
	DCN 001 (Reference per SSCD 010647R1, EFF. 10-29-07)	
	Early Release	XX-XX-XX
	Program Release	XX-XX-XX
	DCN 002 (Reference per SSCN 010800. EFF. 11-06-07)	
	Early Release	XX-XX-XX
	Program Release	XX-XX-XX

PREFACE

INCREMENT DEFINITION AND REQUIREMENTS DOCUMENT FOR INCREMENT 16

This document is the Increment Definition and Requirements Document for Increment 16. Official delivery of this document is under control of the Space Station Control Board (SSCB). Any changes or revisions will be jointly agreed to and signed by the National Aeronautics and Space Administration (NASA) and the affected International Partners (IPs).

NASA/ROSCOSMOS

INTERNATIONAL SPACE STATION PROGRAM

INCREMENT DEFINITION AND REQUIREMENTS DOCUMENT FOR INCREMENT 16

JUNE 2007

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INTERNATIONAL SPACE STATION PROGRAM

INCREMENT DEFINITION AND REQUIREMENTS DOCUMENT FOR INCREMENT 16

JUNE 2007

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INTERNATIONAL SPACE STATION PROGRAM

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INTERNATIONAL SPACE STATION PROGRAM

INCREMENT DEFINITION AND REQUIREMENTS DOCUMENT FOR INCREMENT 16

JUNE 2007

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INTERNATIONAL SPACE STATION PROGRAM

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INCREMENT DEFINITION AND REQUIREMENTS DOCUMENT FOR INCREMENT 16

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INCREMENT DEFINITION AND REQUIREMENTS DOCUMENT FOR INCREMENT 16

LIST OF CHANGES

JUNE 2007

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

SSCB	Entry Date	Change	Paragraph(s)
	March 2007	Baseline	All
	July 2007	Revision A	All
	December 2007	DCN 001	
	December 2007	DCN 002	

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APPENDIX

TABLE

FIGURE

1.0 INTRODUCTION

1.1 PURPOSE

This document provides the assignment of flight dates, resources and accommodations, as well as defines the requirements for Increment 16 in Planning Period 7. Requirements are provided for both joint International Space Station (ISS)/mated vehicle operations and ISS-only continuous operations stages of the increment.

The schedule for products (i.e., documentation, reviews, etc.) that must be developed to support Increment 16 is found in the Common Schedule Database (CSD). The requirements contained herein shall be used in the execution of the flight and stage Certification of Flight Readiness (CoFR) processes carried out by each ISS supporting organization.

1.2 SCOPE

This document covers Increment 16, beginning with the launch of the E16 Commander (CDR) and Flight Engineer-1 (FE-1) on Flight 15 Soyuz and ends with their departure on Flight 15 Soyuz.

The E16 Flight Engineer (FE)-2 (10A) is launched on Flight 10A and replaces the previous E15/16 FE-2 (13A). E16 FE-2 (10A) returns on Flight 1E during Increment 16. The E16 FE-2 (1E) is launched on Flight 1E and replaces the E16 FE-2 (10A). E16/17 FE-2 (1J/A) launches on Flight 1J/A, replaces the E16 FE-2 (1E) and returns in the strategic timeframe. Note that the Flight that returns the crew has requirements, including those for crew rotation specified in SSP 54016.

This document defines the capabilities and objectives of Increment 16. This document also controls the following: resource and accommodation allocations between assembly, system, and utilization; requirements and priorities for ISS execution planning; ISS manifest (Increment Definition and Requirements Document for Increment (IDRD) for Increment 16, Annex 1: Station Manifest (SSP 54016-15S **<TBD 1-5>**, SSP 54016-10A, SSP 54016-1E, SSP 54016-27P **<TBD 1-7>**, SSP 54016-28P **<TBD 1-9>,** SSP 54016-1J/A); On-Orbit Maintenance Plan (SSP 54016-ANX 2 **<TBD 1-11>**, Increment Definition and Requirements Document for Increment 16, Annex 2: On-Orbit Maintenance Plan); ISS imagery requirements (SSP 54016-ANX 3 **<TBD 1-12>**, Increment Definition and Requirements Document for Increment 16, Annex 3: Imagery Requirements); medical operations (SSP 54016-ANX 4 **<TBD 1-13>**, Increment Definition and Requirements Document for Increment 16, Annex 4: Medical Operations and Environmental Monitoring); and payloads (SSP 54016-ANX 5, Increment Definition and Requirements Document for Increment 16, Annex 5: Payload Tactical Plan). The above mentioned documents are published as separate documents.

1.3 PRECEDENCE

SSP 54016 will be developed in compliance with the specification documents. Deviations from the specifications are possible only as a result of specific scenarios analysis. If there are any discrepancies between this document and SSP 54100, SSP 54100 takes precedence. If there are any discrepancies between this document, SSP

50110, Multi-Increment Manifest Document, and the Consolidated Operations and Utilization Plan, this document shall take precedence.

The real-time time frame for a flight and its associated stage begins after the applicable Stage Operations Readiness Review (SORR) in accordance with the process in SSP 50200-02, Station Program Implementation Plan (SPIP) Volume 2: Program Planning and Manifesting. The differences between the "as planned" requirements in the IDRD and the "real-time" requirements will be documented in SSP 543XX, Post Increment Evaluation Report for Increment 16 **<TBD 1-15>**.

This document should be used in conjunction with SSP 50261-01, Generic Groundrules, Requirements, and Constraints Part 1: Strategic and Tactical Planning. Deviations to SSP 50261-01 for this increment are documented in Section 3.4.

1.4 DELEGATION OF AUTHORITY

The Space Station Control Board (SSCB) has formal control and approval of this document. All changes to this document shall be processed in accordance with the procedures as specified in SSP 50123, Configuration Management Handbook.

1.5 VERB APPLICATION

The verb "shall" will be used to indicate a requirement. The verb "will" may be used to express a declaration of purpose or in cases where simple future tenses are required but not to articulate a requirement binding on the ISS participants.

1.6 DEVIATION

Any request for deviation from this document shall be made to the Space Station Program Control Board (SSPCB) in accordance with the procedures as specified in SSP 41170, Configuration Management Requirements NASA will maintain this document and process changes per these requirements. IPs should provide any recommended changes to the NASA Mission Integration and Operations Office for processing.

2.0 DOCUMENTS

2.1 APPLICABLE DOCUMENTS

The following documents include specifications, models, standards, guidelines, handbooks, and other special publications. 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.

DOCUMENT	TITLE	TYPE
SSP 41170	Configuration Management Requirements	NASA Internal
SSP 50110	Multi-Increment Manifest Document	Multilateral
SSP 50123	Configuration Management Handbook	Multilateral
SSP 50146	NASA/RSA Bilateral S&MA Process Requirements for International Space Station	Bilateral
SSP 50200-02	Station Program Implementation Plan, Volume 2: Program Planning and Manifesting	Multilateral
SSP 50255	Flight Mechanics - Trajectory	Bilateral
SSP 50260	International Space Station Medical Operations Requirements Document (ISS MORD)	Multilateral
SSP 50261-01	Generic Groundrules, Requirements, and Constraints Part 1: Strategic and Tactical Planning	Multilateral
SSP 50562	ISS Program Off-Nominal Situation Plan	Multilateral
SSP 50585	Facility and Communication Requirements for MCC-H/SSIPC Intercenter Operations (FRIO)	Multilateral
SSP 50699-03	ISS Certification Baseline Volume 3	Multilateral
SSP 54015	Increment Definition and Requirements Document for Increment 15	Multilateral
SSP 54016-15S **<TBD 1-5>**	Increment Definition and Requirements Document for Increment 16, Annex 1: Station Manifest, Flight 15S (Soyuz)	Multilateral

SSP 54016-10A	Increment Definition and Requirements Document for Increment 16, Annex 1: Station Manifest, Flight 10A, STS-120	Multilateral
SSP 54016-1E	Increment Definition and Requirements Document for Increment 16, Annex 1: Station Manifest, Flight 1E, STS- 122	Multilateral
SSP 54016-27P **<TBD 1-7>**	Increment Definition and Requirements Document for Increment 16, Annex 1: Station Manifest, Flight 27P (Progress)	Multilateral
SSP 54016-1J/A	Increment Definition and Requirements Document for Increment 16, Annex 1: Station Manifest, Flight 1J/A, STS-123	Multilateral
SSP 54016-28P **<TBD 1-9>**	Increment Definition and Requirements Document for Increment 16, Annex 1: Station Manifest, Flight 28P (Progress)	Multilateral
SSP 54016-ANX 2 **<TBD 1-11>**	Increment Definition and Requirements Document for Increment 16, Annex 2: On-Orbit Maintenance Plan	Multilateral
SSP 54016-ANX 3 **<TBD 1-12>**	Increment Definition and Requirements Document for Increment 16, Annex 3: Imagery Requirements	Multilateral
SSP 54016-ANX 4 **<TBD 1-13>**	Increment Definition and Requirements Document for Increment 16, Annex 4: Medical Operations and Environmental Monitoring	Multilateral
SSP 54016-ANX 5	Increment Definition and Requirements Document for Increment 16, Annex 5: Payload Tactical Plan	Multilateral
SSP 54017 **<TBD 1-2>**	Increment Definition and Requirements Document for Increment 17	Multilateral
SSP 54100	Increment Definition and Requirements Document Flight Program	Multilateral
NSTS 21396	International Space Station-1E Mission Integration Plan	NASA Internal
NSTS 21433	International Space Station-1J/A Mission Integration Plan	NASA Internal

NSTS 21477	International Space Station-10A Mission Integration Plan	NASA Internal
NAS15-10110	Contract NAS15-10110 between the National Aeronautics and Space Administration of the United States of America and the Russian Space Agency of the Russian Federation for Supplies and Services Relating to MIR-1 and the International Space Station: Phase One and Selected Phase Two Activities	Bilateral
JSC 26557	On-orbit Assembly, Modeling and Mass properties Data Book	NASA Internal
No Number	Consolidated Operations and Utilization Plan	Multilateral

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.

DOCUMENT	TITLE	TYPE
SSP 41000	System Specification for the International Space Station	NASA Internal
SSP 41160	European Space Agency Segment Specification for Columbus	Bilateral
SSP 41162	Segment Specification for the United States On-Orbit	NASA Internal
SSP 41163	Russian Segment Specification	Bilateral
SSP 41165	Segment Specification for the Japanese Experiment Module	Bilateral
SSP 50094	NASA/RSA Joint Specifications Standards Document for the ISS Russian Segment	Bilateral
SSP 50439	ESA Segment Specification for the Automated Transfer Vehicle (ATV)	Bilateral
SSP 50448	Station Development Test Objectives (SDTO) Catalog	Multilateral
SSP 50478	Payload Data Library Requirements Document	NASA Internal
SSP 50621	Generic On-Orbit Stowage Capabilities and Requirements	Multilateral
SSP 50699-03	USOS Certification Baseline Volume III: Flight Attitudes	Multilateral
SSP 543XX	Post Increment Evaluation Report (PIER)	Multilateral
NSTS 12820	Joint Shuttle/ISS Flight Rules Volume C Joint Operations	NASA Internal

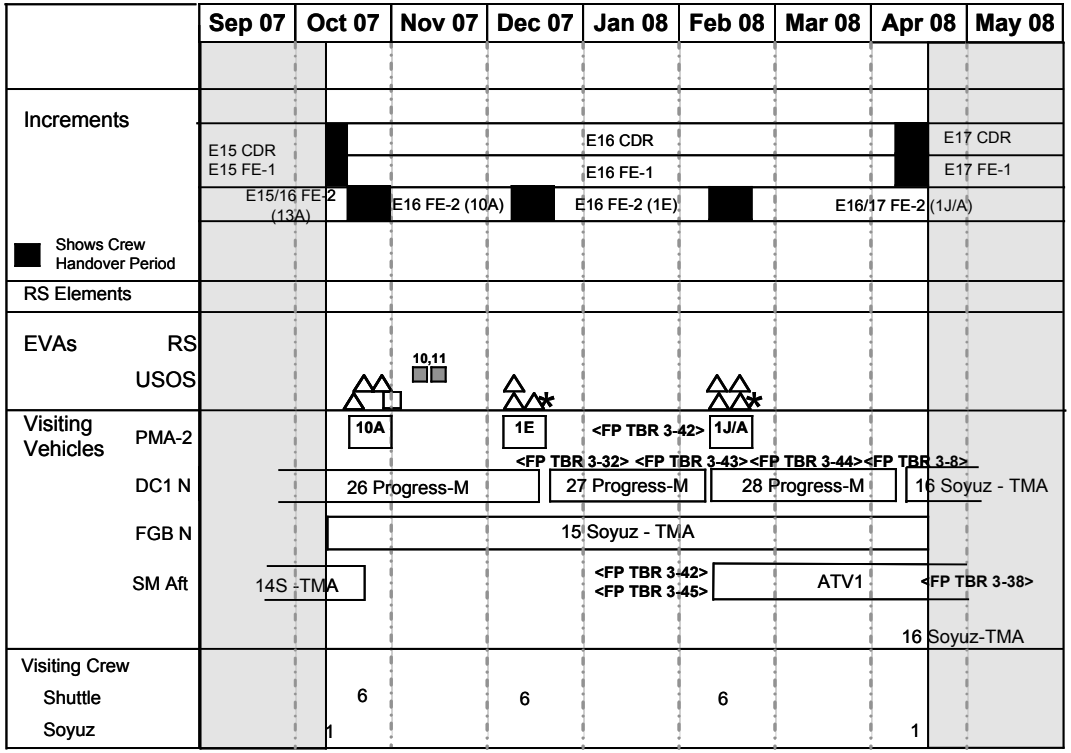
3.0 INCREMENT DEFINITION

This section defines the Increment 16 objectives. The inclusion of objectives in this document provides the ISS Program Office control of major events and emphasis during this time frame.

3.1 INCREMENT OVERVIEW

Figure 3.1-1, Increment 16 Overview, provides a high level graphical overview of the increment. It contains the increment's duration, when and where vehicles are docked to the ISS, planned crew rotations, the number of ISS crew on ISS, and the number of Shuttle and Soyuz (Sz) visiting crews.

The number of planned United States On-orbit Segment (USOS) Joint Airlock and Russian Segment (RS) Docking Compartment Extravehicular Activities (EVAs) are also shown in this figure. The two contingency EVAs specified in SSP 50261-01, Section 4.3.2.10, are not shown in this figure.



Legend:
- Assembly EVA performed by the Shuttle crew
- Assembly EVA performed by the ISS crew while Shuttle docked
- Assembly EVA performed by the ISS crew after Shuttle undock
- Projected maintenance EVA performed by the Shuttle crew
- Projected maintenance EVA performed by the ISS crew while Shuttle docked
- Maintenance EVA performed by the ISS crew after Shuttle undock
- Science EVAs by the Shuttle Crew
- Science EVAs by the ISS crew while Shuttle docked
- Science EVAs by the ISS crew after Shuttle undock
- Shuttle objective EVA performed by the Shuttle Crew
- Contains science EVA activities
- Contains Shuttle objective EVA activities

FIGURE 3.1-1 INCREMENT 16 OVERVIEW

3.2 INCREMENT FLIGHT SUMMARY

Table 3.2-1, Increment Flight Summary, identifies planning data for all flights scheduled to visit the ISS or undock from the ISS during this increment.

The mission duration column lists the planned mission duration of each flight. For Shuttle flights in this column, two numbers are listed:

1. The nominal mission duration.
2. Additional contingency days available to accomplish ISS mission objectives (to cover docking problems, mated operations delays, EVA, etc.).

The docked duration column lists the planned docked duration for each flight. Duration calculations are based on the calendar day difference between events.

All planning docking altitudes presented in this document represent average altitudes unless stated otherwise. Altitudes are defined in accordance with SSP 50255, Flight Mechanics - Trajectory.

For those Shuttle missions identified to be performance critical, the docking altitudes are to be maximum apogee altitude limits. ISS Flight Mechanics will coordinate with Shuttle Flight Design at the start of each increment design cycle to identify performance-critical missions. Modifications to the altitude strategy will be made in the final increment product cycle.

All launch dates in Table 3.2-1 are shown in the time standard selected by the launch vehicle organization. Space Shuttle Program dates correspond to the Kennedy Space Center (KSC) time zone. Russian dates correspond to the Decreed Moscow Time (DMT) zone. Automated Transfer Vehicle (ATV) dates correspond to the Kourou time zone.

Soyuz ascent crew size is denoted in the “Launch Vehicle Crew Size” column in Table 3.2-1, using the following convention: x+y, where x=number of Expedition crew members and y=number of Soyuz crew members. Soyuz descent crew size will be identified with a table note when it differs from ascent crew size.

Shuttle ascent crew size is denoted in the “Launch Vehicle Crew Size” column in Table 3.2-1, using the following convention: w+z, where w=number of Shuttle Transportation System (STS) crew members and z=number of Expedition crew members. Shuttle descent crew size will be identified with a table note when it differs from ascent crew size.

TABLE 3.2-1 INCREMENT FLIGHT SUMMARY

ISS Flight Name	Launch Vehicle Flight Name	Launch Vehicle Crew Size	Planned Launch Date [4]	Mission Duration (days)	Shuttle Docking Altitude (km/nmi)	Planned Docking Date	Docked Duration (days)	Planned Undock Date
14S	Soyuz TMA-10	2+1	[1]	197 **<FP TBR 3-39>**	-	[1]	195 **<FP TBR 3-39>**	21 Oct 07 **<FP TBR 3-39>**
26P	Progress-M	Unmanned	[1]	131		[1]	128	22 Dec 07
15S	Soyuz TMA-11	2+1	10 Oct 07	192	-	12 Oct 07	190	19 Apr 08
10A	STS-120	6+1	23 Oct 07	13+1 [3]	343/185	25 Oct 07	9+1 [3]	03 Nov 07 [3]
1E	STS-122	6+1	06 Dec 07	11+1	343/185	08 Dec 07	7+1	15 Dec 07
27P	Progress-M	Unmanned	23 Dec 07 **<FP TBR 3-32>**	45 **<TBD 3-9>** **<FP TBR 3-43>** **<FP TBR 3-44>**	-	25 Dec 07 **<FP TBR 3-32>**	43 **<TBD 3-9>** **<FP TBR 3-43>** **<FP TBR 3-44>**	06 Feb 08 **<TBD 3-9>** **<FP TBR 3-43>** **<FP TBR 3-44>**
ATV1	Automated Transfer Vehicle	Unmanned	31 Jan 08	180 **<FP TBR 3-38>**	-	14 Feb 08 **<FP TBR 3-42>** **<FP TBR 3-45>** **<FP TBR 3-38>**	166 **<FP TBR 3-42>** **<FP TBR 3-45>** **<FP TBR 3-38>**	29 July 08 **<FP TBR 3-38>**
28P	Progress-M	Unmanned	07 Feb 08 **<FP TBR 3-8>** **<FP TBR 3-43>** **<FP TBR 3-44>**	60 **<FP TBR 3-43>** **<FP TBR 3-44>**		9 Feb 08 **<FP TBR 3-7>** **<FP TBR 3-8>** **<FP TBR 3-43>** **<FP TBR 3-44>**	58 **<FP TBR 3-43>** **<FP TBR 3-44>**	07 Apr 08 **<FP TBR 3-8>**
1J/A	STS-123	6+1	14 Feb 08	15+1	343/185	16 Feb 08	11+1	27 Feb 08
16S	Soyuz TMA-12	2+1	08 Apr 08	[2]	-	10 Apr 08	[2]	[2]

NOTES:

[1] The planned launch and docking dates of this flight will be specified in SSP 54015.

[2] This data is outside the Increment Definition and Requirements Document Flight Program time frame.

[3] SSPTS is available on this vehicle. The 10A duration is under review by the SSP to be increased by two days from 11+1 to 13+1.

[4] Space Shuttle launch date is No Earlier Than (NET) until the mission-specific Space Shuttle Program Flight Readiness Review, which occurs at Launch minus 2 weeks.

3.3 INCREMENT SUMMARY AND OBJECTIVES

The increment definitions and primary objectives for assembly, system, and utilization operations are provided in Table 3.3-1, Increment 16 Summary. The Multilateral Crew Operations Panel (MCOP) defines crew assignments and respective agencies.

TABLE 3.3-1 INCREMENT 16 SUMMARY (PAGE 1 OF 3)

Increment Start	Flight 15 Soyuz Launch (10 Oct 07)	
Increment End	Undocking of Flight 15S (19 April 08)	
Increment Duration (days)	192	
Crew Plan	E16 CDR Peggy A. Whitson	15S (launch/return)
	E16 FE-1 Yuri I. Malenchenko	15S (launch/return)
	E15/16 FE-2 (13A) Clayton C. Anderson	13A (launch) [2] /10A (return)
	E16 FE-2 (10A) Daniel M. Tani	10A (launch) / 1E (return)
	E16 FE-2 (1E) Leopold Eyharts	1E (launch) / 1J/A (return)
	E16/17 FE-2 (1J/A) Garrett E. Reisman	1J/A (launch) / [1]
Crew Days	In Space:	On ISS:
E16 CDR	192	190
E16 FE-1	192	190
	Increment 16/Total	Increment 16/Total
E15/16 FE-2 (13A)	25/143	23/139
E16 FE-2 (10A)	58/58	54/54
E16 FE-2 (1E)	85/85	83/83
E16/17 FE-2 (1J/A)	65/[1]	63/[1]
Flight 15S Assembly/System Objectives	• Rotate Expedition 15 CDR/FE-1 with Expedition 16 CDR/FE-1 • Perform Visiting Crew operations • EVA Prep for Flight 10A EVAs • Undock Flight 14S from SM Aft Nadir • Prepack for Flight 10A	
Flight 15S Utilization Objectives	Conduct ISS on-orbit research program to support all partner utilization requirements as documented in SSP 54016-ANX5.	
Stage 15S Assembly/System Objectives	• Complete sleep shifting • Prepare for Flight 10A docking	
Stage 15S Utilization Objectives	Conduct ISS on-orbit research program to support all partner utilization requirements as documented in SSP 54016-ANX5.	
Flight 10A Assembly/System Objectives	• Rotate E15/16 FE-2 (13A) with E16 FE-2 (10A) • Mate, Install and Activate Node 2 • Relocate P6 from Z1 Truss to P5 • Ingress and Perform Node 2 Outfitting • S1 ETCS Radiator Deploy • Retrieve & Return SASA and BSP • Transfer and Install Node 2 PDGF • Complete PMA2 disconnects (4th EVA) • Transfer MBSU to ESP-2	

TABLE 3.3-1 INCREMENT 16 SUMMARY (PAGE 2 OF 3)

Flight 10A Utilization Objectives	Conduct Shuttle operations to support SDBIs and Sorties as documented in SSP 54016-ANX5. Conduct ISS on-orbit research program to support all partner utilization requirements as documented in SSP 54016-ANX5.
Stage 10A Assembly/System Objectives	• Complete 2 EMU EVAs and SSRMS robotics to relocate and activate Node 2/PMA2 for Flight 1E • P1 ETCS Radiator Deploy • Prepare for Flight 1E docking
Stage 10A Utilization Objectives	Conduct ISS on-orbit research program to support all partner utilization requirements as documented in SSP 54016-ANX5.

Flight 1E Assembly/System Objectives	• Mate, install and activate the Columbus Module on ISS
	• Install, activate and checkout the ESA external payloads
	• Configure Columbus Module, relocate and install Payload Facility Racks:
	  • Fluid Science Laboratory (FSL)
	  • Biological Laboratory (BIOLAB)
	  • European Drawer Rack (EDR)
	  • European Physiology Module (EPM)
	• Initiate Columbus End to End checkout/commissioning activities, including GEOFLOW
	• Remove and replace the P1 NTA with spare launched on 1E
	• Rotate E16 FE-2 (10A) with E16 FE-2 (1E)
	• Return CMG3 from ESP-2

Flight 1E Utilization Objectives	Conduct Shuttle operations to support SDBIs and Sorties as documented in SSP 54016-ANX5. Conduct ISS on-orbit research program to support all partner utilization requirements as documented in SSP 54016-ANX5.
Stage 1E Assembly/System Objectives	• Undock 26P from DC1 Nadir • Dock 27P to DC-1 Nadir • Undock 27P from DC1 Nadir **<FP TBR 3-32>** • Dock 28P to DC1 Nadir **<FP TBR 3-8><FP TBR 3-43><FP TBR 3-44>** • Perform PCS R10 Update 1 transition and MSS 5.0 transition • Perform ATV1 Flight Demonstration Plan • Dock ATV1 **<FP TBR 3-42> <FP TBR 3-43><FP TBR 3-44>** • Complete end to end Columbus checkout and commissioning activities (including GEOFLOW, WAICO, EuTEF, SOLAR, and preparation of PCDF) • Unpack and stow cargo delivered on Flight 1E • Prepare for Flight 1J/A docking
Stage 1E Utilization Objectives	Conduct ISS on-orbit research program to support all partner utilization requirements as documented in SSP 54016-ANX.

TABLE 3.3-1 INCREMENT 16 SUMMARY (PAGE 3 OF 3)

Flight 1J/A Assembly/System Objectives	• Install the JLP on Node 2 Zenith • Install and assemble the SPDM/Dextre • Rotate E16 FE-2 (1E) with E16/17 FE-2 (1J/A) • Perform SPDM/Dextre minimum required checkout • Transfer ER3 and MSG from U.S. Lab to COL • Perform EVA tasks in preparation for Flight 1J • Transfer SSRMS Yaw joint, DCSU (2) • Unpack and stow cargo delivered on Flight 1J/A • Transfer PCDF-PU to EDR; activate PCDF-PU • Install keep alive umbilicals and stow OBSS on ISS
Flight 1J/A Utilization Objectives	Conduct Shuttle operations to support SDBIs and Sorties as documented in SSP 54016-ANX5. Conduct ISS on-orbit research program to support all partner utilization requirements as documented in SSP 54016-ANX5.
Stage 1J/A Assembly/System Objectives	• Prepare for 15S undock and 16S dock
Stage 1J/A Utilization Objectives	Conduct ISS on-orbit research program to support all partner utilization requirements as documented in SSP 54016-ANX5.

NOTE:

[1] Flight **<TBD 1-1>** occurs during Increment 17 and is documented in SSP 54017 **<TBD 1-2>**, which takes precedence over this document for E16/17 (1J/A) FE-2 after 15S undock.

[2] Flight 13A occurs during Increment 15 and is documented in SSP 54015, which takes precedence over this document for E15/16 (13A) FE-2 before 15S dock.

3.4 DEVIATIONS TO THE GENERIC GROUNDRULES, REQUIREMENTS, AND CONSTRAINTS DOCUMENT

The following deviations to SSP 50261-01 have been identified for Increment 16:

A. SSP 50261-01, Section 3.12.3 Visibility and Access to Critical Equipment and Controls (Constraint)

"A clear, unencumbered volume shall remain free at all times of hardware protrusions and non-standard stowage in front of safety critical and/or emergency equipment and controls requiring crew physical or visual access."

Rationale for Deviation: Per NCR-PG1-054 "Node 1 Fire Suppression", the fire ports and lack of partitioning behind the panels in Node 1 were deemed to be inadequate for meeting the fire suppression requirement (which is to reduce oxygen concentration below 10.5% by applying suppression to the fire sources). Part of the acceptance rationale for NCR-PG1-054 was the low likelihood of a fire in Node 1 (no ignition source, use of non-flammable materials, no airflow behind racks, etc.)

Effectivity: Through completion of 1E stage

Refer to Risk Mitigation in NCR-ISS-STO-801-009-1E

B. SSP 50261-01, Section 4.3.1.8 Periodic Sampling

"Periodic in-flight sampling of ISS atmosphere, water, microbiological cultures of surfaces, water, and air, and other return-samples assessing environmental data shall be performed to ensure safety of the crew."

Rationale for Deviation: Although in-flight TOCA analysis is highly desired, the lack of TOCA does not mean that crew health is at risk. Extensive experience with Russian water processor (SRV-K system) gives confidence that water quality is being maintained. Regular change-out of system consumables helps to ensure adequate capacity to handle excessive pollutants. Archive samples returned on Soyuz or Shuttle provide data that verifies system performance.

Effectivity: Increment 16

Refer to Risk Mitigation in Waiver 20032.

Additional deviations to SSP 50261-01 exist within the IDRD Flight Program for Increment 16. The identified deviations are to the Flight Program Plans in Figure 3.1-1 and Table 3.2-1. The resolution of the deviations will continue to be worked through the Flight Program and IDRD for Increment 16 processes.

Violations to SSP 50261-01 groundrules during Increment 16 if identified, are listed on the Increment 16 Management Team website which can be found at the following Uniform Resource Locator (URL): http://iss-www.jsc.nasa.gov/ss/issapt/mio/Inc_16.htm.

4.0 ON-ORBIT RESOURCE ASSUMPTIONS AND ALLOCATIONS

This section defines the allocation of the on-orbit ISS capabilities between systems and utilization across the increment. Allocations are limited to power, crew time, and on-orbit accommodations. Sub-allocations of utilization allocations are provided in SSP 54016-ANX 5, Increment Definition and Requirements Document for Increment 16, Annex 5: Payload Tactical Plan. Any non-standard requirements of resources are also provided in Section 4.5. The allocation guidelines are baselined in the SSP 50261-01. All data contained in this section represent operational requirements.

4.1 POWER BALANCE AND ALLOCATIONS

Table 4.1-1, Power Balance and Allocations, summarizes ISS power capability for each flight/stage in the increment as power is generated by the Electrical Power Systems (EPS) of the USOS, Functional Cargo Block (FGB), and Russian Segment (RS) for the Flight Attitude Plan specified. The table also shows the integrated systems demands and allocations for the 3 ISS EPS groups. The USOS power consumption includes the United States elements, the European Columbus elements, the Japanese JEM elements, and the Canadian robotics elements. The RS supply and distribution group includes the Russian elements of the ISS. The FGB includes only the FGB and, for analysis purposes, is considered to be separate from the RS.

Power consumptions are representative, and are based on assumed operational modes and the Flight Attitude Plan included in this table. The Flight Attitude Plan represents the attitudes for flights and stages approved by the program which satisfy the positive energy balance requirement and optimize power availability for Utilization. Post 12A.1 Flight, it includes only XVV LVLH attitude. This plan does not contain attitudes used for waste-water dumps, proximity operations, stage EVAs, etc. Deviations from planned attitudes and power transfers will be reviewed by the ISS Program, the Operations community, and all affected parties, and will be documented in their respective increment Flight Rules. All calculations in this table represent power availability while the station is in eclipse.

The V symbol in Flight Attitude Plan section of the table refers to the XVV attitude defined as +X axis toward the Velocity Vector with the +Z axis Nadir.

The solar beta angle rates are divided into three categories: low, mid and high. Mid Beta range is defined as 37<=|_|<=52. High Beta range is defined as |_|>52.

Table 4.1-1 also shows power transfer, in kilowatts (kW), between the power supply and distribution systems of the USOS, FGB, and RS for the Flight Attitude Plan specified. A primary purpose of this table is to identify power generation versus systems demand by the USOS, FGB, and RS and to identify the on-orbit time periods when and how much power needs to be transferred. The power transfer allocation values are based on RS and FGB core system power deficits. All values are from the output of the ISS USOS EPS. However, due to inability to limit power transfer via converters to the Russian

segment and FGB, numbers are shown in converter incremental values that reflect the maximum transfer capacity at the converter saturation point.

The RS power margins (allocations to utilization) are a result of USOS power transfers and are calculated as the difference in the total increment value transferred at the output of the ARCUs (American-to-Russian-Converter Unit) and the core systems deficit for the identified time period. During real time operations the Mission Control Center-Houston (MCC-H) may consider cycling the converters to recover power transfer above allocation if needed, and the Mission Control Center-Moscow (MCC-M) will be notified in advance when cycling will be executed. During the pre-mission planning process and real time operations, power transfers will be updated to meet minimum system power requirements as needed. A negative transfer power number represents a transfer in the opposite direction.

The USOS power margin (allocation to utilization) will be managed for allocation to the United States, European, Japanese, and Canadian utilization programs through the Multilateral Payload Control Board (MPCB) and the allocations will be documented in SSP 54016, IDRD for Increment 16 Annex 5.

TABLE 4.1-1 POWER BALANCE AND ALLOCATIONS (PAGE 1 OF 2)

Flight/ Stage	Power Availability (kW) Total Capability [1]			Power Consumption (kW) Allocation to Systems [2] [11]			Flight Attitude Plan			Power Transfer (kW) Allocation to Systems [2]			Power Margin (kW) Alloation to Utilization [3]		
Increment 16															
USOS (NASA, JAXA, ESA, CSA)	**L [4]**	**M [4]**	**H [4]**	**L**	**M**	**H**	**L**	**M**	**H**	**L**	**M**	**H**	**L**	**M**	**H**
R Sz 15S [5]	41.8	42.0	42.0	16.0	16.1	16.1	V	V	V	7.1	8.9	8.9	12.9	13.1	13.1
S 15S [5]	41.8	42.0	42.0	16.0	16.1	16.1	V	V	V	7.1	7.1	7.1	12.9	13.1	13.1
F 10A [5], [9]	41.8	42.0	N/A [7]	30.1	30.1	N/A [7]	V	V	N/A [7]	7.1	7.1	N/A [7]	2.7	2.9	N/A [7]
S 10A [5]	61.7	63.0	57.0	20.1	20.2	20.2	V	V	V	7.1	7.1	7.1	12.9	13.1	13.1
F 1E [5], [10]	61.5	62.7	N/A [7]	25.0	25.0	N/A [7]	V	V	N/A [7]	7.1	7.1	N/A [7]	20.6	21.4	N/A [7]
S 1E [5]	61.5	62.7	57.0	22.5	22.6	22.6	V	V	V	7.1	7.1	7.1	22.4	23.1	19.1
S 1E [6]	61.5	62.7	57.0	22.5	22.6	22.6	V	V	V	7.1	7.1	8.9	22.4	23.1	17.9
F 1J/A [6], [9]	61.0	62.7	N/A [7]	36.6	36.6	N/A [7]	V	V	N/A [7]	7.1	7.1	N/A [7]	12.1	13.3	N/A [7]
S 1J/A [6]	61.0	62.7	57.0	23.4	23.5	23.5	V	V	V	7.1	7.1	8.9	21.4	22.5	17.2
R Sz 16S [5]	61.0	62.7	57.0	23.4	23.5	23.5	V	V	V	7.1	8.9	8.9	21.4	21.2	17.2
FGB	**L [4]**	**M [4]**	**H [4]**	**L**	**M**	**H**	**L**	**M**	**H**	**L**	**M**	**H**	**L**	**M**	**H**
R Sz 15S [5]	0.0	0.0	0.0	1.4	1.4	1.4	V	V	V	-1.7	-1.7	-1.7	0.0	0.0	0.0
S 15S [5]	0.0	0.0	0.0	1.4	1.4	1.4	V	V	V	-1.7	-1.7	-1.7	0.0	0.0	0.0
F 10A [5], [9]	0.0	0.0	N/A [7]	1.4	1.4	N/A [7]	V	V	N/A [7]	-1.7	-1.7	N/A [7]	0.0	0.0	N/A [7]
S 10A [5]	0.0	0.0	0.0	1.4	1.4	1.4	V	V	V	-1.7	-1.7	-1.7	0.0	0.0	0.0
F 1E [5], [10]	0.0	0.0	N/A [7]	1.4	1.4	N/A [7]	V	V	N/A [7]	-1.7	-1.7	N/A [7]	0.0	0.0	N/A [7]
S 1E [5]	0.0	0.0	0.0	1.4	1.4	1.4	V	V	V	-1.7	-1.7	-1.7	0.0	0.0	0.0
S 1E [6]	0.0	0.0	0.0	1.4	1.4	1.4	V	V	V	-1.7	-1.7	-1.7	0.0	0.0	0.0
F 1J/A [6], [9]	0.0	0.0	N/A [7]	1.4	1.4	N/A [7]	V	V	N/A [7]	-1.7	-1.7	N/A [7]	0.0	0.0	N/A [7]
S 1J/A [6]	0.0	0.0	0.0	1.4	1.4	1.4	V	V	V	-1.7	-1.7	-1.7	0.0	0.0	0.0
R Sz 16S [5]	0.0	0.0	0.0	1.4	1.4	1.4	V	V	V	-1.7	-1.7	-1.7	0.0	0.0	0.0
RS [8]	**L [4]**	**M [4]**	**H [4]**	**L**	**M**	**H**	**L**	**M**	**H**	**L**	**M**	**H**	**L**	**M**	**H**
R Sz 15S [5]	1.9	1.6	0.6	6.4	6.4	6.4	V	V	V	-5.4	-7.2	-7.2	0.0	1.2	0.2
S 15S [5]	1.9	1.6	0.6	5.1	5.1	5.1	V	V	V	-5.4	-5.4	-5.4	1.3	1.0	0.0
F 10A [5], [9]	1.9	1.6	N/A [7]	5.1	5.1	N/A [5]	V	V	N/A [7]	-5.4	-5.4	N/A [7]	1.3	1.0	N/A [7]
S 10A [5]	1.9	1.6	0.6	5.1	5.1	5.1	V	V	V	-5.4	-5.4	-5.4	1.3	1.0	0.0
F 1E [5], [10]	1.9	1.6	N/A [7]	5.1	5.1	N/A [7]	V	V	N/A [7]	-5.4	-5.4	N/A [7]	1.3	1.0	N/A [7]
S 1E [5]	1.9	1.6	0.6	5.1	5.1	5.1	V	V	V	-5.4	-5.4	-5.4	1.3	1.0	0.0
S 1E [6]	1.9	1.6	0.6	5.5	5.5	5.5	V	V	V	-5.4	-5.4	-7.2	0.9	0.6	1.1
F 1J/A [6], [9]	1.9	1.6	N/A [7]	5.5	5.5	N/A [7]	V	V	N/A [7]	-5.4	-5.4	N/A [7]	0.9	0.6	N/A [7]

TABLE 4.1-1 POWER BALANCE AND ALLOCATIONS (PAGE 2 OF 2)

Flight/ Stage	Power Availability (kW) Total Capability [1]			Power Consumption (kW) Allocation to Systems [2] [11]			Flight Attitude Plan			Power Transfer (kW) Allocation to Systems [2]			Power Margin (kW) Alloation to Utilization [3]		
Increment 16															
S 1J/A [6]	1.9	1.6	0.6	5.5	5.5	5.5	V	V	V	-5.4	-5.4	-7.2	0.9	0.6	1.1
R Sz 16S [5]	1.9	1.6	0.6	6.4	6.4	6.4	V	V	V	-5.4	-7.2	-7.2	0.0	1.2	0.2

NOTES:

[1] Power Availability limited by rules governing BCDU power output. This limits each channel to 10.5 kW following F 12A.1

[2] Includes power required for assembly and system tasks

[3] Utilization Allocations to each IP based on:
NASA: 100 percent of USOS power
Roscosmos: 100 percent of RS power

[4] Low Beta is defined as ≤ 37 degrees, Mid Beta is defined between 37 and 52 degrees, High Beta is defined as >52 degrees

[5] 1 Progress attached to RSOS

[6] 1 Progress and 1 ATV attached to RSOS

[7] Shuttle mated flight ops are constrained to solar beta angles of less than 60 degrees

[8] RS Loads and Power Generation values provided by Roscosmos, SM solar arrays parked vertical.

[9] Orbiter has SSPTS (10A load = 7.2kW, 1/JA load = 9.6kW)

[10] Orbiter does not have SSPTS

[11] USOS Power Consumption includes the following assumptions for Columbus and JEM system loads @ low ß:
(F 1E - 2188watts, S 1E - 2309watts, F 1J/A - 570.4watts, S 1J/A - 570.4watts)

[12] NASA allocation includes FGB and USOS power.

4.2 CREW TIME

Table 4.2-1, Crew Time Allocations, shows the integrated ISS crew time availability, systems demand, and utilization allocation. The ISS utilization allocation will be managed for allocation to the United States, Russian, European, Japanese, and Canadian utilization programs through the Multilateral Payload Control Board (MPCB). The International Partner utilization crew time allocations will be documented in SSP 54016, IDRD for Increment 16, Annex 5.

TABLE 4.2-1 CREW TIME ALLOCATIONS <TBR 4-1>

Crew Time (hours)	
Total Capability [1]	1895
Systems Requirements [2] [4]	1736
Utilization Requirements [3] **<TBR 4-3>**	159
Total Requirements	1895
Margin (+/-) [5]	0

NOTES:

[1] Includes only ISS-16 crew duty time available during Independent Operations to perform assembly, system, and utilization activities. Includes one hour per crewmember per Saturday or Sunday.

[2] In addition to the crew time allocations for stage operations (assembly and systems tasks including Vehicle Traffic, Assembly/Outfitting, Maintenance, EVA, Routine Operations, Medical, OBT and PAO), additional NASA and Roscosmos systems activities are scheduled during Soyuz and Shuttle docked timeframes per the GGR&C.

[3] Includes ISS-16 crewmember time allocated during Joint Soyuz and Shuttle missions. Refer to section 6 for average weekly crew time allocations.

[4] JAXA requires crew time for JEM assembly and checkout tasks performed by ISS crew as follows:
Stage 1J/A: 5H

[5] Crew time margin is inadequate to satisfy all high priority requirements. Stage specific deficits will be resolved through use of Section 6.0 priorities.

4.3 ACCOMMODATIONS

Table 4.3-1, On-Orbit Accommodation Allocations (Pressurized), shows the pressurized on-orbit accommodation allocations for the increment and when the on-orbit internal configuration changes. The unit of measure is Rack Volume Equivalents (RVEs). Russian accommodations are not shown since they are not allocated to the other Partners.

TABLE 4.3-1 ON-ORBIT ACCOMMODATION ALLOCATIONS (PRESSURIZED)
(PAGE 1 OF 2)

Rack Volume Equivalents [1]	ISS-16			
	15S - 10A	10A - 1E	1E - 1J/A	1J/A - 16S
Total Capability (RVE)	43.7	51.7	67.7	75.7
Node 1	4	4	4	4
Node 2	N/A	8	8	8
U.S. Lab	24	24	24	24
Airlock	4	4	4	4
Columbus	N/A	N/A	16	16
FGB	11.7	11.7	11.7	11.7
JLP	N/A	N/A	N/A	8
NASA Allocation to System/Stowage				
Node 1	4	4	4	4
Node 2	N/A	8	8	8
U.S. Lab [2]	13	13	13	13
Airlock	4	4	4	4
Columbus	N/A	N/A	3	3
FGB	10.9	10.9	10.9	10.9
JLP	N/A	N/A	N/A	0
NASA Allocation to NASA Utilization				
Node 1	0	0	0	0
Node 2	N/A	0	0	0
U.S. Lab [3]	10+3	10+3	10+3	10+3
Airlock	0	0	0	0
Columbus	N/A	N/A	5	5
FGB	0	0	0	0
JLP	N/A	N/A	N/A	0
Total				
Amount subscribed [3]	9+3	9+3	9+3	9+3
Remaining available [5]	1.0	1.0	6.0	6

TABLE 4.3-1 ON-ORBIT ACCOMMODATION ALLOCATIONS (PRESSURIZED) (PAGE 2 OF 2)

Rack Volume Equivalents [1]	ISS-16			
	15S - 10A	10A - 1E	1E - 1J/A	1J/A- 16S
Roscosmos Allocation				
FGB System/Stowage [4]	.8	.8	.8	.8
FGB Utilization	0	0	0	0
ESA Allocation				
Columbus System/Stowage	N/A	N/A	3	3
Columbus Utilization	N/A	N/A	5	5
JAXA Allocation				
JLP System/Stowage	N/A	N/A	N/A	6
JLP Utilization	N/A	N/A	N/A	2

NOTES:

[1] RVEs can be equated to rack locations in the Node 1, Node 2, U.S. Lab, Columbus, JLP, JPM, and Airlock. The FGB has 11.7 m^3 of stowage volume before installation of new stowage enclosures, which is approximately equal to 11.7 RVEs.

[2] During Increment 16, System will use two of the rack locations in the U.S. Lab allocated to Utilization for pre-positioning of system racks TeSS and OGS.

[3] Utilization items belonging to the utilization passive stowage RVE allocation might not be physically stowed in the U.S. Lab.

[4] Includes 0.8 m^3 for stowage provided by FGB enclosures per January 2003 protocol (Ref. OC-03-003).

[5] One unsubscribed RVE is positioned in front of LAB window.

4.4 <RESERVED>

4.5 ADDITIONAL RESOURCE REQUIREMENT

Table 4.5-1, Additional Resource Requirement, provides the tactical agreements on using non-standard requirements of on-orbit resources (i.e. consumables: water, Oxygen (O_2), Nitrogen (N_2), propellant, etc.) that is not specified in Sections 4.1 - 4.4 but whose consumption can result in errors of important on board consumables management if not tracked and recorded.

Table 4.5-1 provides the total amount of a resource needed for a specific increment or stage. When the resource is used on-orbit, the resource may be recovered back into the resource or emitted in the ISS environment. If the requirement has a closed-loop system, then, the percentage recovered and emitted is not applicable. The utilization allocations will be documented in SSP 54016, IDRD for Increment 16, Annex 5.

TABLE 4.5-1 ADDITIONAL RESOURCE REQUIREMENT

User [1]	Resource	Total Amount of Usage
INCREMENT 16		
EMCS	N2	0.2 kg
ESA (BIOLAB)	GN2	5 liters
ESA (WAICO)	GN2	10 liters

[1] User is a particular International Partner using the resource

5.0 ASCENT/DESCENT CARGO ALLOCATIONS AND MANIFEST SUMMARY

Table 5.0-1, Ascent/Descent Allocations and Manifest Summary, contains the cargo delivery and return allocations, and the manifest summary for each flight in the increment. The table includes major cargo to the rack or Orbital Replacement Unit (ORU) level. This table controls program-level allocations. Detailed ISS manifest items are documented in the appropriate SSP 54016-Annex 1. The cargo allocations are for the Partner that provides the transportation vehicle unless stated otherwise.

The allocations are based on the Consolidated Operations and Utilization Plan, and then refined based on current capability and ISS requirements. Volume data shown is for pressurized stowage areas only and is listed as rack equivalents for full racks in the Multi-Purpose Logistics Module (MPLM), Middeck Locker Equivalents (MLEs) for stowage on the middeck, and Cargo Transfer Bag Equivalents (CTBEs) for passive stowage in the MPLM and SpaceHab, and RVEs for ATV. Progress and Soyuz data are described in terms of volume (in m^3) and mass (in kgs and lbs). The maintenance allocation includes pre-positioned spares and planned maintenance equipment. It does not include items that are considered urgent need spares. Water transfer listed under allocations represents the transfer target for Shuttle water generated on-orbit that is transferred to the ISS. Water transfer listed under International Partner vehicles is water transported up in the International Partner vehicle.

All allocations need to include packing factor and trash. Each owner is responsible for including packing factor and trash.

Soyuz Transportation Modified Anthropometric (TMA) vehicles provide transportation for the Soyuz crew, Expedition crew rotation and will provide the capability for ISS crew rescue return (up to three). The Soyuz TMA has minimal capability to deliver cargo.

TABLE 5.0-1 ASCENT/DESCENT ALLOCATIONS AND MANIFEST SUMMARY (PAGE 1 OF 5)

Flight	Manifest Item Category	Mass (kg/lb)	Volume
15S	**ASCENT**		
	Manifest Summary		
	Soyuz TMA-11		
	Allocations		
	Dry Cargo	**<TBD 5-2>**	**<TBD 5-2>**
	Roscosmos	**<TBD 5-2>**	**<TBD 5-2>**
	NASA	16.67 kg	746.74 m_
	Candidates	**<TBD 5-2>**	**<TBD 5-2>**
	Total	**<TBD 5-2>**	**<TBD 5-2>**
	Total with Candidates	**<TBD 5-2>**	**<TBD 5-2>**
14S	**DESCENT**		
	Manifest Summary		
	Soyuz TMA-10		
	Allocations		
	Dry Cargo	**<TBD 5-2>**	**<TBD 5-2>**
	Roscosmos	**<TBD 5-2>**	**<TBD 5-2>**
	NASA	0.0	0.0
	Candidates	**<TBD 5-2>**	**<TBD 5-2>**
	Total	**<TBD 5-2>**	**<TBD 5-2>**
	Total with Candidates	**<TBD 5-2>**	**<TBD 5-2>**
10A	**ASCENT**		
	Manifest Summary Node 2: 2 RSR, 4 Avionics, 2 ZSR Sidewall Carrier - PDGF: OTD Sidewall Carrier MBSU Middeck ISS content, Shuttle Integration H/W		
	Allocations		
	Russian (IELK)	36.18/80	0 MLE
	Maintenance		
	- Middeck	1.58 lbs	0.02 MLE
	- Node 2 RSR	0.6 lbs	0.01 MLE
	Crew Provisions		
	- Middeck	13.0 lbs	0.64 MLE
	- Node 2 RSR	109.35 lbs	2.33 MLE
	Utilization		
	- Middeck	37.6 lbs	1.06 MLE
	- Node 2 RSR	87.8 lbs	3.02 MLE
	STS O_2 for EVA prebreathe	5.4/12	
	O_2 transfer to ISS A/L HPGTs	25 lbs	
	N_2 transfer to ISS A/L HPGTs	**<TBD 5-4>**	
	(Water transfer to ISS) 8 CWCs	344/758	344 liters

TABLE 5.0-1 ASCENT/DESCENT ALLOCATIONS AND MANIFEST SUMMARY (PAGE 2 OF 5)

10A (cont.)	**DESCENT**		
	Manifest Summary Sidewall Carrier SASA: Middeck ISS content, Shuttle Integration H/W		
	Allocations		
	Russian (IELK)	36/80	0 MLE
	Maintenance		
	- Middeck	4.75 lbs	0.07 MLE
	Crew Provisions		
	- Middeck	33.0 lbs	1.38 MLE
	Utilization		
	- Middeck	332.92 lbs	13.29 MLE
ATV1	**ASCENT**		
	ATV1		
	Propellant		
	Demonstration Mission	3492.0/7682.4	N/A
	Reboost/Control [7]	1500/2640	N/A
	Additional Propellant for Contingencies	723/1590.6	N/A
	Refuel [6]	860/1892	3 Tanks
	Gas [6] - 2 tanks **<TBD 5-1>** gas - 1 tank **<TBD 5-1>** gas	20/44 [2]	Up to 3 Tanks
	Water Loaded in ATV before launch [6] (Russian Grade)	280/617[5]	1 Tank [4]
	Expected On-orbit Water Transfer	22/48[5]	1 EDV [4]
	Racks (quantity 6)	1416/2938	
	Rack Tare	548/1028	N/A
	Accommodation and Outfitting Hardware	868/1910	N/A
	Total Dry Cargo Capability [9]	1188/2614	
	Planned Dry Cargo Ascent		
	- ESA Planned:	190/418	1 RVE [8]
	• Non-Utilization	**<TBD 5-4>**	**<TBD 5-4>**
	• Utilization	**<TBD 5-4>**	**<TBD 5-4>**
	- NASA Planned:	998/2196	5 RVE
	• Non-Utilization	1005/2211	
	• Utilization	0/0	
	- Unsubscribed	0	0 RVE
	Total Dry Cargo	1188/2614	6 RVE [7]
1E	**ASCENT**		
	Manifest Summary Columbus: 3 Systems Racks, 5 ISPRs (BioLab, EPM, FSL, EDR. ETC), 2 ZSRs, PDGF on Sidewall Carrier ICC-Lite, NTA, EuTEF, SOLAR Middeck ISS content (including WAICO), Shuttle Integration H/W		

TABLE 5.0-1 ASCENT/DESCENT ALLOCATIONS AND MANIFEST SUMMARY (PAGE 3 OF 5)

1E (cont.)	**Allocations**		
	Russian (IELK)	36.3/80	4.86 MLE
	ESA	226.8kg/500lb	10 MLE
	Maintenance	241.9/533.3	
	- Middeck	8.3/18.3	.3 MLE
	Crew Provisions	46.3/102	3.4 MLE
	- Middeck	46.3/102	3.4 MLE
	Utilization		
	- Middeck	13.7/30.23	.6 MLE
	STS O_2 for EVA prebreathe	5.5/12	
	O_2 transfer to ISS A/L HPGTs	0 lbm	
	N_2 transfer to ISS A/L HPGTs	0 lbm	
	(Water transfer to ISS)	559/1232	559 liters
	13 CWCs		
	DESCENT		
	Manifest Summary ICC-Lite: - NTA, CMG Middeck ISS content, Shuttle Integration H/W		
	Allocations		
	Russian (IELK)	36/80	4.8 MLE
	ESA	0	0
	Maintenance	205.8/453.7	X MLE
	- Middeck	18.7/41.3	.7 MLE
	Crew Provisions	46.3/102	3.4 MLE
	- Middeck	46.3/102	3.4 MLE
	Utilization		
	- Middeck	40.4/89.07	2 MLE
26P	**DESCENT**		
	Nonrecoverable	**<TBD 5-4>**	Xm^3
27P	**ASCENT**		
	Progress-M1		
	Propellant	950.0/2094.4	**<TBD 5-2>**
	Gas	50.0/110.2	**<TBD 5-2>**
	Water	0/0	**<TBD 5-2>**
	Dry Cargo	1574.85/3471.95	**<TBD 5-2>**
	Roscosmos	**<TBD 5-2>**	**<TBD 5-2>**
	NASA	385 kg	**<TBD 5-2>**
	Utilization	**<TBD 5-2>**	**<TBD 5-2>**
	Utilization		
	- Middeck	**<TBD 5-2>**	X CTBE
	(Water transfer to ISS)		X-X liters

TABLE 5.0-1 ASCENT/DESCENT ALLOCATIONS AND MANIFEST SUMMARY (PAGE 4 OF 5)

	DESCENT		
	Nonrecoverable	**<TBD 5-4>**	Xm^3
28P	**ASCENT**		
	Progress-M1		
	Propellant	950.0/2094.4	**<TBD 5-2>**
	Gas	50.0/110.2	**<TBD 5-2>**
	Water	0/0	**<TBD 5-2>**
	Dry Cargo	1416.68/3123.25	**<TBD 5-2>**
	Roscosmos	**<TBD 5-2>**	**<TBD 5-2>**
	NASA	**<TBD 5-2>**	**<TBD 5-2>**
	Utilization	**<TBD 5-2>**	**<TBD 5-2>**
1J/A	**ASCENT**		
	Manifest Summary JLP: 5 Systems Racks: JEM -DMS1, JEM-RMS, JEM-EPS1, JEM WS, JEM-ICS/PROX, 2 ISPRs: RYUTAI, SAIBO, 1 JRSR SLP-D1: SPDM /"Dextre" Sidewall Carriers (7): MISSE-6 A/B, LWAPA, RIGEX, SSRMS yaw joint ORU, DCSU (2) Middeck ISS content (including PCDF-PU), Shuttle Integration H/W (including SSPTS and OBSS)		
	Allocations		
	Russian (IELK)	36/80	4.86 MLE
	JAXA	24.5/54	1 MLE
	Maintenance - Middeck	0	0MLE
	Crew Provisions - Middeck	5.9/13	0.5 MLE
	Utilization - Middeck	66/145.2	3 MLE
	STS O_2 for EVA prebreathe	7.26/16	
	O_2 transfer to ISS A/L HPGTs	11.36/25	
	N_2 transfer to ISS A/L HPGTs	22.72/50	
	(Water transfer to ISS)	473/1043	473 liters
	11 CWCs		

TABLE 5.0-1 ASCENT/DESCENT ALLOCATIONS AND MANIFEST SUMMARY (PAGE 5 OF 5)

	DESCENT		
	Manifest Summary SLP-D1: Sidewall Carrier: RIGEX Middeck ISS content (including WAICO-ECDS), Shuttle Integration H/W (including SSPTS)		
	Allocations		
	Russian (IELK)	36/80	4.86 MLE
	ESA	0	0
	JAXA	0	0
1J/A (cont.)	Maintenance - Middeck	0	0
	Crew Provisions - Middeck	10/22	1 MLE
	Utilization - Middeck	66/145.5	3 MLE

Table 5.0-1A, Ascent/On-Orbit/Descent Power Allocation for Utilization (Watts), contains power availability for each flight in the increment.

TABLE 5.0-1A ASCENT/ON-ORBIT/DESCENT POWER ALLOCATION FOR UTILIZATION (WATTS)

Flight	Ascent	On-Orbit	Descent
15S	0	0	0
10A	0	0	0
1E	0	0	0
1J/A	300 W	300 W	160 W

6.0 REQUIREMENTS

This section defines all of the unique programmatic requirements for the increment's flight and stage intervals necessary to ensure successful completion of planned assembly, maintenance, operations, and utilization of the ISS during the increment. Generic requirements and constraints are documented in SSP 50261-01.

The section 6.0 stages and flights section also include generic groupings of tasks in section 6.x.2 and contingency tasks in sections 6.x.4. These generic groupings of tasks include the integrated Roscosmos, NASA, CSA, European Space Agency (ESA), and JAXA requirements that are to be performed within the assigned allocation of crew time (in terms of average weekly crew hours). Crew times are not usually assigned to contingency tasks. The groups include maintenance, medical, payload (utilization), On-Board Training (OBT), and Public Affairs Office (PAO) task requirements. The integrated Roscosmos, NASA, CSA, ESA, and JAXA requirements are managed within the identified ISS Program documentation. Each group may also be distributed into high, medium, and low (or remaining) priorities.

6.1 <RESERVED>

6.2 INCREMENT 16 SPECIFIC REQUIREMENTS

This section identifies requirements applicable during Increment 16. Detailed multilateral requirements and agreements for Payloads/Utilization are specified in SSP 54016-ANX5.

In addition, this section defines ISS requirements for Flight 15S, Stage 15S, Flight 10A, Stage 10A, Flight 1E, Stage 1E, Flight 1J/A and Stage 1J/A. Detailed requirements and agreements between ISS Program and the Space Shuttle (SSP) for Flight 10A are specified in NSTS 21477, International Space Station (ISS) 10A Mission Integration Plan (MIP), in NSTS 21396 for 1E MIP, and in NSTS 21433 for ISS 1J/A MIP.

6.2.1 RUSSIAN UTILIZATION EXPERIMENTS

Russian science experiments to be conducted during Increment 16 shall consist of the following:

Bio-medical Research

A. Kardio-ODNT

B. Akvarium

C. Pilot

D. Biorisk

E. Dykhaniye

F. Rasteniya

G. Statokonia

H. Regeneratsiya

I. Prognoz
J. Matryeshka-R
K. Profilaktika
L. Pnevmokard
M. BIMS

Bio-technical Research

A. Glikoproteid
B. Mimetik-K
C. KAF
D. Vaktsina-K
E. Interleukin-K
F. Konyugatsiya
G. Biodegradatsia
H. Bioekologiya
I. Biotrek
J. Antigen
K. Bioemulsiya
L. ARIL
M. Astrovaktsina
N. Laktolen
O. MATI-75

Technical Studies

A. Infrazvuk-M (SDTO 15001-R)
B. Vektor-T (SDTO 12002-R)
C. Izgib (SDTO 13002-R)
D. Plazmennyi Kristall
E. Identifikatsiya (SDTO 13001-R)
F. Ten-Mayak
G. Sreda

Geophysical

A. Relaksatsiya

B. Uragan

C. Vsplesk

Technical and Material Science

A. SHS

B. Kristallizator

Earth Science

A. Diotomea

Complex Analysis, Effectiveness Estimation

A. Ekon

B. Plazma-ISS

C. Bar

Commercial

A. GCF-JAXA

B. 3DPC-JAXA

C. BTN - Neutron

6.2.2 VISITING CREW UTILIZATION EXPERIMENTS

Visiting crew utilization experiments to be performed for increment 16 shall consist of the following:

Bio-medical Research

A. ETD-M

B. MOP-M

C. MUSCLE-M

D. FIS

Bio-technical Research

A. CIS

B. MIS

C. PCS

Educational Research

A. TOP

6.2.3 LOCAL VERTICAL LOCAL HORIZONTAL (LVLH) ATTITUDE REQUIREMENT

Attitude requirements for the Solar and European Technology Exposure Facility (EuTEF), activated in Stage 1E, are found in SSP 50699-03, USOS Certification Baseline Volume III: Flight Attitudes and SSP 54016-ANX5.

6.3 FLIGHT 15S REQUIREMENTS

This section identifies ISS requirements during Flight 15 Soyuz-TMA.

6.3.1 <RESERVED>

6.3.2 FLIGHT 15S TASKS (IN DESCENDING PRIORITIZED ORDER)

These tasks, listed in order of ISS Program priority, are to be executed during this flight. The order of execution for these tasks in the nominal plan may vary, depending on timeline efficiencies. The Flight 15S Task Priorities have been prepared so that, in the event of a shortened mission, task execution order can be modified such that all mandatory tasks will be completed. The following numbered tasks shall be accomplished for successful completion of this flight.

1. Dock Flight 15 Soyuz TMA to FGB Nadir port and perform mandatory crew safety briefing for all crew members. **[Intravehicular Activity (IVA)] [Imagery]**
2. Rotate Expedition 15 Commander and FE-1 crewmember with Expedition 16 Commander and FE-1 crewmember, transfer mandatory crew rotation cargo, perform mandatory tasks including Sokol suit checkout. Transfer and install or swap the Visiting Crew's and FE-2's seat liner in the appropriate Soyuz as required. **[IVA]**
3. Perform ISS high priority maintenance activities. **[IVA]**
4. Perform minimum crew handover of 12 hours per rotating crewmember, which includes crew safety handover. **[IVA] [Robotics]**
5. Transfer and stow critical items. **[IVA]**
6. Undock 14 Soyuz-TMA from SM Aft port. **[IVA] [Imagery]**
7. Perform high priority medical operations (average of 10 crew hours per week). **[IVA] [Imagery]**

   A. Install Radiation Areas Monitors (RAMs)
8. Conduct visiting crew operations. **[IVA] [Imagery]**

   The following activities are 15 Soyuz visiting crew activities (not listed in priority order). All operations are to be conducted using only RS resources unless specified otherwise in Appendix K.

   A. Conduct photo/video imagery.

   B. Conduct VC Utilization activities as described in Section 6.2.2.

   C. Conduct RS public affairs activities and commemorative activities.

   D. Conduct transfer activities.

      1) Soyuz Unloading.

      2) Equipment return.

E. Conduct Communications.

1) Russian Mission Control Center (Soyuz and ISS).

2) Sessions using the Sputnik-Service Module (SM) ham radio.

F. Conduct Soyuz systems maintenance.

G. Conduct Soyuz handover.

H. Conduct RS crew life support activities onboard the ISS.

9. Perform proficiency training OBT for imagery of Orbiter (Flight 10A) RPM. **<TBR 6-34> [Imagery]**

10. Perform Extravehicular Activity (EVA) preparation for USOS Flight 10A EVAs. **<TBR 6-34> [IVA]**

A. Perform METOX regeneration.

B. Configure and checkout Extravehicular Mobility Units (EMUs) and EVA equipment.

C. Perform EVA tool preparation for Flight 10A not completed during Increment 15. **[IVA]**

11. Perform ISS payload research operations tasks. **[IVA]**

- Perform daily ISS payload status checks as required.

12. Complete 10A prepack for mandatory items not completed during Increment 15. **<TBR 6-34> [IVA]**

13. Perform additional 4 hours per rotating crewmember of ISS crew handover (16 hours per crewmember total). **[IVA]**

14. Transfer remaining items from 15S TMA to ISS. **[IVA]**

15. Perform SDTO 13004-U, Russian Vehicle Docking/Undocking Loads on ISS, for 14S undocking from SM Aft port (IWIS required). **[IVA] [Ground]**

16. Complete Flight 10A Flight plan and EVA timeline reviews. **[IVA]**

17. Perform SDTO 14001-U, Solar Array Shunt Test (if not performed in previous stage). **[Ground]**

18. Perform CPSD Load for CDR and FE-1. **[Ground]**

6.3.3 ISS/VEHICLE ORBITAL AND CONFIGURATION REQUIREMENTS

6.3.3.1 Flight 15 Soyuz TMA shall dock to the FGB Nadir port.

6.3.3.2 Flight 14 Soyuz TMA shall undock from SM Aft port.

6.3.3.3 The ISS shall be in Control Moment Gyroscope (CMG) control with all thrusters inhibited for the following activities:

None Identified.

6.3.3.4 The ISS shall be in a free drift configuration with the CMGs not controlling and with all thrusters inhibited for the following activities:

None Identified.

6.3.4 CONTINGENCY REQUIREMENTS

6.3.4.1 MCC-H and MCC-M shall build procedures, contingency timelines, and conduct training for the following non-EVA tasks (The items listed below are for unique tasks or first implementation of new tasks. For contingency tasks not listed below, products/planning are already in place from previous flights/stages, or the ISS Program has determined that resources will not be applied to develop products/planning until the contingency is invoked.):

A. ISS critical maintenance tasks as follows:

None Identified.

6.3.4.2 MCC-H and MCC-M shall build procedures, contingency timelines, and provide pre-flight training for the EVA tasks to sufficient maturity to provide for the EVA response times designated.

A. Class 1: All procedures, timelines and training are developed and certified to support an EVA response within 24 hours.

None Identified.

B. Class 2: For contingencies occurring during the docked timeframe an EVA response is available on a subsequent EVA based on re-prioritization of the mission tasks. Published procedures and timelines are developed, but may require real time updates to match the flight specific failure.

None identified.

C. Class 3: For contingencies related to first flights hardware that are not time critical, skeleton EVA procedures will be developed preflight to support a Class 3 EVA. The EVA response time can be greater than two weeks and can be deferred to the stage or next available mission. The ISS Program has determined that additional resources will not be applied to further refine the training and integrated planning until the failure occurs. Subsequent flight listings for these hardware items will be contained in the Generic Groundrules, Requirements, and Constraints (GGR&C).

None Identified.

6.3.5 JETTISON REQUIREMENTS

Planning and product development, including safety and data packages, will be performed to support jettison of the following items during EVA. This will include trajectory analysis to ensure acceptable low risk of recontact with ISS and of damage or injury following re-entry, procedures and training for the crew including worksite identification and desired jettison direction and velocity, and related hazard

assessments, including joint safety review in accordance with SSP 50146, NASA/RSA Bilateral S&MA Process Requirements for International Space Station.

6.3.5.1 Planned Jettison

The following items are planned for jettison during EVA in this flight:

A. USOS:

None identified.

B. RS DC EVAs

None identified.

6.3.5.2 Contingency Jettison

The following items may require jettison if they cannot be configured safely to allow vehicle dockings or maneuvers or if their continued operation poses a hazard to the EVA crew.

A. USOS JAL EVAs:

None identified.

B. RS DC EVAs:

None identified.

6.3.6 GROUND SYSTEMS REQUIREMENTS

A. Ground support is required to operate Space Acceleration Measurement System (SAMS)-II, SDMS, and Microgravity Acceleration Measurement System (MAMS) sensors for SDTO 13004-U. (SAMS and MAMS availability will be assessed real time.)

B. Ground support is desired to operate Russian Optical Linear Accelerometers [ALO] for SDTO 13004-U during the 14S undock.

6.4 FLIGHT 14S UNDOCK TO FLIGHT 10A REQUIREMENTS (STAGE 15S)

This section identifies ISS requirements applicable from Flight 14 Soyuz undock to Flight 10A dock.

6.4.1 <RESERVED>

6.4.2 STAGE 15S TASKS (IN DESCENDING PRIORITIZED ORDER)

These tasks, listed in order of ISS Program priority, are to be executed during this stage. The order of execution for these tasks in the nominal plan may vary depending on timeline efficiencies. An ONS plan **<TBD J-1>** (see Appendix J) shall be prepared preflight. The following numbered tasks shall be accomplished for successful completion of this interval.

1. Perform ISS high priority maintenance and Shuttle Launch Commit Criteria for the next Shuttle Flight. **[IVA] [Imagery]**
2. Perform the following high priority, mandatory medical operations tasks. **[IVA]**

   None Identified
3. Perform the following mandatory OBT. **[IVA]**

   A. Emergency depress, fire and egress drills.
4. Perform Shuttle Tile Photography during Shuttle approach. **[IVA] [Imagery]**
5. Configure and checkout EMUs and EVA equipment not completed during Flight 15S. **[IVA]**
6. Perform ISS high priority research operations tasks which can not be performed during Flight15S or 10A.

6.4.3 ISS/VEHICLE ORBITAL AND CONFIGURATION REQUIREMENTS

6.4.3.1 The ISS shall be in CMG control without ISS thrusters firing for the following activities:

None Identified

6.4.3.2 The ISS shall be in free drift configuration with the CMGs not controlling and without ISS thrusters firing for the following activities:

None Identified.

6.4.4 CONTINGENCY REQUIREMENTS

6.4.4.1 MCC-H and MCC-M shall build procedures, contingency timelines, and conduct training to allow the crew to perform the following non-EVA tasks (The items listed below are for unique tasks or first implementation of new tasks. For contingency tasks not listed below, products/planning are already in place from previous flights/stages, or the ISS Program has determined that resources will not be applied to develop products/planning until the contingency is invoked.):

A. ISS critical maintenance tasks as follows:

None identified.

B. Complete critical unfinished 15 Soyuz assembly tasks as follows:

None Identified.

C. Remove/replace critical spares as follows:

None identified.

6.4.4.2 MCC-H and MCC-M shall build task specific procedures, contingency timelines, and conduct training to a high level sufficient to meet the following objectives:

The readiness of these tasks will be based upon the generic development of the task procedures and timelines to a level that can be validated against a set of criteria defined in GGR&C 3.9.1. For contingency tasks not listed below, the ISS program has determined that until the contingency is invoked, resources will not be applied to develop products or plans and the feasibility to perform those tasks on this flight/increment will be undetermined.

None Identified

6.4.5 JETTISON REQUIREMENTS

Planning and product development, including safety and data packages, will be performed to support jettison of the following items during EVA. This will include trajectory analysis to ensure acceptable low risk of recontact with ISS and of damage or injury following re-entry, procedures and training for the crew including worksite identification and desired jettison direction and velocity, and related hazard assessments, including joint safety review in accordance with SSP 50146.

6.4.5.1 Planned Jettison

The following items are planned for jettison during EVA in this flight/stage:

A. U.S.:

None identified.

B. Russian:

None identified.

6.4.5.2 Contingency Jettison

The following items may require jettison if they cannot be configured safely to allow vehicle dockings or maneuvers or if their continued operation poses a hazard to the EVA crew.

A. U.S.:

None identified.

B. Russian:

None identified.

6.4.6 GROUND SYSTEMS REQUIREMENTS

6.5 FLIGHT 10A REQUIREMENTS

This section identifies ISS requirements during Flight 10A. Detailed requirements and agreements between the ISS Program and the SSP are specified in NSTS 21477, International Space Station-10A Mission Integration Plan.

6.5.1 <RESERVED>

6.5.2 FLIGHT 10A TASKS (IN DESCENDING PRIORITIZED ORDER)

These tasks, listed in order of ISS Program priority, are to be executed during this flight. The order of execution for these tasks in the nominal plan may vary, depending on timeline efficiencies. The Flight 10A Task Priorities have been prepared so that, in the event of a shortened mission, task execution order can be modified such that all mandatory tasks will be completed. The following numbered tasks, which include 4 Station-based EVAs, with three to be performed by the Shuttle crew and one to be performed by the ISS crew, shall be accomplished for successful completion of this flight.

1. Dock Shuttle Flight 10A to Pressurized Mating Adapter (PMA)-2 port and perform mandatory crew safety briefing for all crew members. **[IVA] [Imagery]**
2. Perform high level inspection of Node 1 Port CBM; install Node 2 to Node 1 Port CBM using SSRMS and activate Node 2 shell heaters. **[EVA] [Robotics] [Imagery] [IVA]**
3. Rotate E15/16 FE-2 (13A) crew member with E16 FE-2 (10A) crew member, transfer mandatory crew rotation equipment per 10A TPL in Appendix I and perform mandatory tasks consisting of IELK install and Sokol suit checkout. **[IVA] [Imagery]**
4. Transfer water of mandatory quantities from Orbiter to ISS per Flight 10A TPL in Appendix I. **[IVA]**
5. Transfer and stow critical items per Flight 10A TPL in Appendix I. **[IVA]**
6. Relocate P6 from Zenith (Z) 1 to P5 using SRMS and SSRMS. **[IVA] [EVA] [Imagery] [Robotics]**
   A. Install P6 aft radiator shroud
   B. Install Sequential Shunt Unit (SSU) covers prior to beginning P6 relocation
   C. Disconnect Z1 / P6 utility tray power umbilicals, 1553 command and data buses, and fluid cables
   D. Remove P6 from Z1 and install P6 to P5
   E. Connect P5/P6 utility tray power umbilicals and 1553 command and data buses
   F. Configure MBSU jumpers to support P6 start-up on P5

7. Transfer Node 2 PDGF to ISS. **[EVA]**
8. Retrieve/return SASA using SSRMS. **[EVA] [Robotics]**
9. Install Main Bus Switching Unit (MBSU) to ESP2. **[EVA] [Robotics] [Imagery]**
10. Perform minimum crew handover of 12 hours per rotating crewmember which includes crew safety handover. **[IVA]**
11. Transfer remaining cargo items per Flight 10A TPL in Appendix I. **[IVA]**
12. Install Node 2 PDGF and Node 2 PDGF terminator/cover (N_2 relocation/1E preparatory task). **[EVA] [Imagery]**
13. Install four Node 2 trunnion and one keel pin covers. **[EVA] [Imagery]**
14. Perform P6 Activation.
    A. Remove P6 Single Point Grounding Plugs and cap P6 jacks **[EVA]**
    B. Release P6 forward radiator cinches, deploy and activate P6 PVR. **[IVA] [EVA] [Imagery]**
    C. Configure P6 Elements for power generation and deploy P6 (Channel 2B and 4B) Solar Array Wing (SAW). **[IVA] [Imagery]**
    D. Activate P6. **[Ground]**
    E. Recondition P6 batteries. **[Ground]**
    F. Remove SSU covers after installation is complete. **[EVA]**
15. Perform PMA2 relocation readiness tasks **[EVA]**
    A. Demate PMA2/lab umbilicals
    B. Remove Node 2 Active Common Berthing Mechanism (ACBM) cover (shower cap). **[Imagery]**
    C. Perform Node 2 forward ACBM sealing surface inspection. **[Imagery]**
    D. Demate and temp stow PMA2/Lab Station/Shuttle Power Transfer System (SSPTS) cables. **[Imagery]**
16. Prep for stage EVA relocation of Node 2 Fluid Umbilical Trays and avionics connections **[EVA]**:
    A. Demate and temp stow Node 2 avionics tray cables
    B. Install Node 2 external outfitting hardware including the installation of Node 2 handrails (up to 11) and gap spanners (2) **[Imagery]**
    C. Remove Node 2 avionics caps (18 aft and 8 forward)
17. Mate S0/N1 SM power cable, configure PMA1/FGB H-jumpers (power reconfiguration for ATV docking) **[EVA] [Imagery]**
18. Deploy S1 Radiator Outer Panels: **[IVA] [Imagery]**
    A. Connect Squib Firing Units (SFUs). **[EVA]**

B. Release cinches.

C. Deploy S1 radiator outer panels.

D. Disconnect the SFUs harness and reposition to the radiator beam line heaters, and activate S1 fluid line secondary heaters. **[EVA]**

19. Ready the P1 Radiator Outer Panels for Deploy: **[Imagery]**

    A. Connect Squib Firing Units (SFUs). **[EVA]**

20. Remove/replace S0 4BC Remote Power Control Mechanism (RPCM). **[EVA] [Imagery]**

21. Perform DTO 848 TPS repair techniques (TRAD/STS-54 demonstration) **<TBD 6-34> [EVA]**

22. Perform Internal Thermal Control System (ITCS) remediation (antimicrobial assembly canister (AMIA), run, remove AMIA, take ITCS sample, return). **[IVA]**

23. Perform USOS/RS daily ISS payload status checks as required. **[IVA]**

24. Retrieve/return Z1 Baseband Signal Processor (BSP). **[EVA]**

25. Perform Node 2 Zenith ACBM petal capture and checkout (Note: Node 2 Zenith is only radial port powered while Node 2 is attached to Node 1). **[Ground]**

26. The following tasks are deemed to fit within the existing EVA timelines; however, may be deferred if the EVA is behind schedule. The EVA will not be extended to complete these tasks. **[EVA] [Imagery]**

    A. Install Lab gap spanners (4) and preposition tools for stage EVAs.

    B. Remove U.S. Lab CETA light, stanchion, and bring inside.

    C. Install Node 2 Worksite Interfaces (WIFs) (up to 3).

    D. Release Node 2 zenith ACBM petal restraints.

    E. Remove Node 2 starboard, zenith, port and nadir hatch latch pins (listed in priority order).

    F. Open Node 2 Nadir Centerline Berthing Camera System (CBCS) Center Disk Cover flap.

27. Perform daily middeck activities to support payloads (includes cases where Shuttle crew also performs payloads on the ISS). **[IVA]**

28. Node 1 Port/Node 2 Vestibule pressurization and Gross leak check.

29. Node 1 Port/Node 2 Vestibule Configuration for ingress.

30. After Node 2 ingress, perform outfitting tasks, including the following (in priority order): **[IVA] [Imagery]**

    A. Install Node 2 Forward CBCS in preparation for PMA 2 Relocate.

    B. Install temporary Inter-module Ventilation (IMV) ducts.

C. Portable Fire Extinguisher (PFE)/ Portable Breathing Apparatus (PBA) Installation (1 each).

D. Stbd/Port Positive Pressure Relief Valve (PPRV) Cap Install.

E. Negative Pressure Relief Valve (NPRV) inspection (Port Aft/Port Fwd).

F. Remove Aft port NPRV and install IMV.

G. Avionics racks outfitting (four racks) including:

1) Release rack launch restraints, install Knee Brace Attachment Replacements (K-BARs) and Pivot Fittings

2) DDCU Parallel Connector installation for each set of parallel DDCUs

3) Install ITCS sample tool and Install ITCS protective plate in deck Direct Current-to-Direct Current Converter Unit (DDCU) rack.

H. Zero-gravity Stowage Rack (ZSR) Deploy (2) at NOD2O5 and NOD2D5.

I. Install Resupply Stowage Rack (RSR) KBARs.

J. Remove closeout panel launch bolt (>700 bolts).

K. Install hatch latch handle guide assemblies (2) (Node 2 Aft and Node 1 port).

L. Remove Node 2 Common Cabin Air Assembly (CCAA) Anti-Vibration Module (AVM) launch brackets (4).

31. Perform USOS/Russian ISS payload research operations tasks. **[IVA]**

32. Reboost the ISS with the Orbiter if mission resources allow and are consistent with ISS trajectory analysis and planning. **[IVA]**

33. Perform Program-approved EVA get-ahead tasks. The following EVA get ahead tasks do not fit in the existing EVA timelines; however the EVA team will be trained and ready to perform should the opportunity arise. EVA/Mission Operations Directorate (MOD) has the flexibility to select the tasks to be completed based on efficiencies gained in performing the already scheduled required tasks. **[EVA] [Imagery]**

A. Install protective caps on Open lab receptacles after PMA 2 umbilical release.

B. Break Torque on P1 Nitrogen Tank Assembly (NTA) bolts.

C. Install Lab MMOD Shield.

34. Reinstall Laboratory (Lab) forward ACBM controller hardware (x4 Control Panel Assemblies (CPA)s and Multi Layer Insulation (MLI) covers), disconnect O_2/N_2 lines between Lab and PMA-2, disconnect ventilation lines between Lab and PMA 2, install PMA-2 CBCS target and install U.S. Lab forward outer hatch window hyzod cover (Required prior to final U.S. Lab forward hatch closure and PMA-2 relocation). **[IVA]**

35. Perform DTO-853 Carbon Dioxide Monitor to evaluate CO_2 pockets in the Orbiter. **[IVA]**

36. Perform imagery survey of the ISS exterior during Orbiter fly around after undock. **[IVA] [Imagery]**
37. Transfer N_2 from the Orbiter to the ISS Airlock High Pressure Gas Tanks (HPGTs) as consumables margins permit. **[IVA]**
38. Perform an additional 4 hours per rotating crewmember of ISS crew handover (16 hours per crew member total). **[IVA]**
39. Perform RAM Burn Observations (RAMBO) and MAUI (payload of opportunity - not required during docked operations (ops)). **[Ground]**
40. Perform ISS Wireless Instrumentation System (IWIS) SDTOs. **[IVA] [Ground]**
    A. Perform SDTO 15003-U, Microgravity Environment Definition, for Orbiter Ergometer Exercise (IWIS). **[Imagery]**
    B. Perform SDTO 13005-U, ISS Structural Life Validation and Extension, for Node 2 Berthing (IWIS).
    C. Perform SDTO 13005-U, ISS Structural Life Validation and Extension, for P6 Relocation (IWIS).
    D. Perform SDTO 13005-U, ISS Structural Life Validation and Extension for Dedicated Thruster Firing (IWIS required). **[Imagery]**
41. Perform one (possibly two) ESA HAM radio education contacts. **[IVA]**
42. Perform SDTO 17010-J/A, Multi-Protocol Converter, for live High Definition Television (HDTV) downlink with MPC and incorporation into HDTV system. **[Imagery] [IVA]**
43. Perform the following tasks if time permits. **[IVA] [Imagery]**
    A. Install ITCS sample tool, edge router and ITCS protective plate in overhead DDCU rack.
    B. Fill Node 2 ZSRs with cargo.
    C. Install hatch latch handle guide assemblies(x6) (Node 1 stbd, fwd, aft; Airlock (A/L) IV; Lab aft, fwd).

6.5.3 ISS/VEHICLE ORBITAL AND CONFIGURATION REQUIREMENTS

6.5.3.1 The maximum rendezvous altitude for Flight 10A shall be 325.6 km (185 nmi).

6.5.3.2 The Orbiter shall dock at PMA-2.

6.5.3.3 During P6 removal from Z1, the ISS Ku-Band Antenna shall be parked at an Elevation of +114 degrees and a Cross Elevation of +65 degrees to allow for clearance between the SSRMS and the antenna.

6.5.3.4 P6 will be placed in an overnight parked position on the SRMS after removal from the Z1 Truss and positioned to maintain the passive thermal requirements.

6.5.3.5 The ISS with Shuttle docked shall be in CMG control without ISS thrusters firing as well as the Shuttle Reaction Control System (RCS) inhibited for the following activities:

A. Unberthing Node 2 from Payload Bay, SSRMS manipulation of Node 2 (i.e., SSRMS in Motion), and berthing Node 2 to Node 1.

B. During SRMS and/or SSRMS operations involving P6/Z1 RTAS release, P6 removal, P6 maneuvers, and P6 berthing to P5 until capture and secure with at least three of four bolts. CMG control is not required during overnight park.

C. During P6 SAW or PVR retract and deploy or during S1 radiator deploy.

6.5.3.6 The ISS with Shuttle docked shall be in a free drift configuration with the CMGs not controlling, Shuttle RCS inhibited and without ISS thrusters firing for the following activities:

None identified.

6.5.3.7 Solar Array Position for Critical Operations

- For all planned, critical operations (including Orbiter Prox Ops, Obiter Mated Mission activities, RS Prox Ops, etc.) VIPER produces a nominal array plan with, in some cases, multiple array positioning/management options for each event. This array plan, referred to as the "Solar Array Constraints Matrix" is produced prior to each shuttle mission and extends through the subsequent Stage. This Matrix is delivered to MOD for incorporation into planned timelines via a the CHIT system at approximately L-2 weeks for specific vehicle launch.

6.5.4 CONTINGENCY REQUIREMENTS

6.5.4.1 Mission Control Center - Houston (MCC-H) and Mission Control Center - Moscow (MCC-M) shall build procedures, contingency timelines, and conduct training for the following non-EVA tasks (The items listed below are for unique tasks or first implementation of new tasks. For contingency tasks not listed below, products/planning are already in place from previous flights/stages, or the ISS Program has determined that resources will not be applied to develop products/planning until the contingency is invoked.):

A. USOS and/or RS critical maintenance tasks as follows:

None identified.

B. Contingency Orbiter separation from the ISS and re-rendezvous.

C. Perform focused Orbiter TPS inspection using SRMS (and SSRMS as required for OBSS handoff) and downlink data.

6.5.4.2 MCC-H and MCC-M shall build procedures, contingency timelines, and provide pre-flight training for the EVA tasks to sufficient maturity to provide for the EVA response times designated. Examples below are not in prioritized order, but are to show what type of activities could be included.

A. Class 1: All procedures, timelines and training are developed and certified to support an EVA response within 24 hours.
    1. Manually override the PV radiator deploy/retract motor.
    2. Contingency power cable routing for stranded MT.
B. Class 2: For contingencies occurring during the docked time frame an EVA response is available on a subsequent EVA based on re-prioritization of the mission tasks. Published procedures and timelines are developed, but may require real time updates to match the flight specific failure.
    1. EVA release of SSRMS Latching End Effector (LEE) from Node 2 Grapple Fixture
    2. Open/close Payload Release Latch Assembly (PRLA)
    3. Manually deploy and retract the P6 Solar Array Wings
    4. Using PRDs to bring the P5/P6 truss segments together in the event of gapping due to SSAS capture latch failure
    5. Complete RTAS mating using EVA contingency bolts
    6. Contingency release of P6 RTAS from Z1
    7. Manually release Z1 capture latch
    8. EVA release of SRMS end effector from P6 Grapple Fixture
    9. EVA Release of SSRMS Latching End Effector (LEE) from P6 Grapple Fixture
    10. Manually deploy or retract the P6 PVR
    11. Manually deploy an S1 radiator
    12. Re-cinch of P6 PVR
    13. Manually uncinch S1 radiator
    14. Re-spool Solar Array Tension/Guide Wires
    15. EVA Assisted Deployment/Retraction of P6 SAWs
    16. Manually override the Beta Gimbal anti-rotation latch
    17. Perform SARJ Drive Lock Assembly (DLA) Back-off
    18. Remove and replace P6 PVR PFCS
    19. Remove and replace P6 PV DDCU

20. Position any P6 BGA to the SAW orientation to support docking/undocking loads if SAWs already deployed
21. Remove and replace Electronics Control Unit (ECU) on any P6 module
22. Remove and replace DCSU on P6
23. Orbiter TPS inspection/repair
24. BCDU Backout
25. Remove and Replace MBSU
26. Manual override to unlatch/latch (tension) Solar Array Blanket Box (SABB)
27. SAW jettison **<TBR 6-31>**
28. Remove/replace CBM controller panel assembly
29. Clear/restrain CBM capture latch
30. Remove and replace BMRRM
31. Remove and replace SSRMS ACU, MCU
32. Remove and replace CRPCM
33. R&R CBM petal
34. Remove CBM ready to latch
35. CBM capture latch R&R

C. Class 3: For contingencies related to first flights hardware that are not time critical, skeleton EVA procedures will be developed preflight to support a Class 3 EVA. The EVA response time can be greater than two weeks and can be deferred to the stage or next available mission. The ISS Program has determined that additional resources will not be applied to further refine the training and integrated planning until the failure occurs. Subsequent flight listings for these hardware items will be contained in the GGR&C.

None identified.

6.5.5 JETTISON REQUIREMENTS

Planning and product development, including safety and data packages, will be performed to support jettison of the following items during EVA. This will include trajectory analysis to ensure acceptable low risk of recontact with ISS and of damage or injury following re-entry, procedures and training for the crew including worksite identification and desired jettison direction and velocity, and related hazard assessments, including joint safety review in accordance with SSP 50146.

6.5.5.1 Planned Jettison

The following items are planned for jettison during EVA in this flight:

A. U.S: None identified

B. Russian: None identified.

6.5.5.2 Contingency Jettison

The following items may require jettison if they cannot be configured safely to allow vehicle dockings or maneuvers or if their continued operation poses a hazard to the EVA crew.

A. U.S.:

- P6 SAW or Photovoltaic (PV) Radiator **<TBR 6-31>**

B. Russian: None identified.

6.5.6 GROUND SYSTEMS REQUIREMENTS

A. Cycle Node 2 heaters while Node 2 is berthed to Node 1.

6.5.7 ISS REQUIREMENTS ON SHUTTLE DURING NON-DOCKED TIME FRAME

A. Integrated Immune

B. MAUI

C. Midodrine

D. Promethazine (PMZ)

E. Sleep Short

6.6 FLIGHT 10A UNDOCK TO FLIGHT 1E REQUIREMENTS (STAGE 10A)

This section identifies ISS requirements applicable from Flight 10A undock to Flight 1E dock.

6.6.1 <RESERVED>

6.6.2 STAGE 10A TASKS (IN DESCENDING PRIORITIZED ORDER)

These tasks, listed in order of ISS Program priority, are to be executed during this stage. The order of execution for these tasks in the nominal plan may vary depending on timeline efficiencies. An ONS plan **<TBD J-1>** (see Appendix J) shall be prepared preflight. The following numbered tasks, which include two Station-based EMU EVAs, shall be accomplished for successful completion of this interval. Consumables will provide the capability to perform a 3rd EVA if required to complete mandatory Node 2 Activation for Columbus Activation.

1. Perform ISS high priority maintenance and Shuttle Launch Commit Criteria for the next Shuttle Flight. **[IVA] [Imagery]**
2. Perform ISS medical operations (average of 6 crew hours per week for crew of 3) for minimum stage duration or average of 10 hrs/week for crew of 3 if time permits during Stage 10A. **[IVA]**
3. Perform high-priority Onboard Training (OBT) (total of 20 crew hours for stage) substituting planned SSRMS tasks as OBT when appropriate if a minimum stage duration or an average of 4 hrs/wk if time permits. **[IVA] [Robotics]**
4. Unberth Pressurized Mating Adapter (PMA)-2 from U.S. Lab and install on Node 2 forward port.
   A. Perform Lab Fwd ACBM demate C/O. **[Ground]**
   B. Perform Node 2 Fwd ACBM mate C/O. **[Ground]**
   C. Ingress Node 2 and install Centerline Berthing Camera System (CBCS) at Node 2 forward port window via drag through from Node 1, if not performed during Flight 10A. **[IVA] [Imagery]**
   D. Remove PMA-2 from U.S. Lab and install on Node 2 forward port using the SSRMS. **[Robotics] [Imagery] [IVA]**
   E. Perform PMA-2 PCBM sealing surface inspection. **[Robotics] [Imagery]**
   F. Remove Node 2 Stbd/Port PPRV caps, if installed during Flight 10A. **[IVA]**
5. Unberth Node 2/PMA-2 from Node 1 and berth to U.S. Lab forward port.
   A. Perform N1 Port ACBM demate C/O. **[Ground]**
   B. Perform Lab forward ACBM mate C/O. **[Ground]**
   C. Remove CBCS from Node 2 forward port and install at U.S. Lab forward port window. **[IVA]**
   D. Install Moisture Removal Kits (MRK) inside Node 2. **[IVA] [Imagery]**

E. Deactivate Node 2 heaters and remove jumpers between Node 1 and Node 2. **[IVA]**

F. Perform Lab forward ACBM sealing surface inspection. **[Ground] [Imagery] [Robotics]**

G. Close Node 2 Hatch, Node 2 Gross Leak check. **[IVA] [Ground]**

H. Close Node 1 Port Hatch, N1P/N_2 Vestibule Depress and Gross Leak check. **[IVA] [Ground]**

I. Unberth Node 2/PMA-2 from Node 1, inspect Node 2 Aft PCBM, and berth to U.S. Lab forward port using SSRMS. **[Robotics] [Imagery] [IVA]**

6. Configure Node 2 for activation.

A. Complete LAB1 to Node 2 Vestibule Outfitting Part 1 including: Removal of LAB forward hatch thermal cover and Node 2 aft MLI cover. Installation of ground straps and 6 avionics jumpers. Reconfigure the LAB endcone connector. Activate Node 2 heaters. **[IVA] [Imagery] [Ground]**

B. Release, vent, and stow S0 port/starboard NH3 shunt jumpers. **[EVA]**

C. Deploy Node 2 port and starboard fluid umbilical trays. **[EVA] [Imagery]**

D. Connect/install S0/Node 2 rigid avionics pigtails, Ammonia (NH3) umbilicals, port and starboard fluid umbilical tray Spool Positioning Devices (SPDs) (12) and internal utilities. **[EVA] [Imagery] [IVA]**

E. LAB/ Node 2 Vestibule Pressurization and Gross Leak Check. **[IVA] [Ground]**

7. Connect Node 2/PMA2 umbilicals. **[EVA] [Imagery]**

8. Complete LAB1 to Node 2 Vestibule Outfitting Part 2, including: 8 Avionics Jumpers, 2 IMV Ducts, Waste Water, Fuel Cell, and ARS Vestibule Jumpers. **[IVA] [Imagery]**

9. Complete LAB1 to Node 2 Vestibule Outfitting Part 3, including: 2 Oxygen and 2 Nitrogen Vestibule Jumpers. **[IVA] [Imagery]**

10. Install 1 Portable Fire Extinguisher (PFE) and 2 Portable Breathing Apparatus (PBA) in Node 2. **[IVA] [Imagery]**

11. Remove 4 U.S. Lab forward ACBM controller assemblies and pre-position for return on 1J/A. **[IVA] [Imagery]**

12. Activate and checkout Node 2 systems, if not performed during Flight 10A. **[IVA] [Ground]**

A. Install Stbd/Port PPRV caps.

B. NPRV inspection (Port Aft/Port Fwd/Aft Port/Aft Starboard)

C. Remove Aft Port/Aft Starboard NPRVs and replace with IMVs

D. Enable Emergency Lighting Power Supply (ELPS)

E. Avionics rack outfitting (four racks) including:

1) Release rack launch restraints, install Knee Brace Attachment Replacements (K-BARs) and Pivot Fittings

2) DDCU Parallel Connector installation for each set of parallel DDCUs

F. Remove Aft PPRV and replace with MPEV

G. Install Node 2 ISL Router

H. Deploy (1) Station Support Computer (SSC) in Node 2 (includes installing hardware and power supply).

13. Perform checkout and preparation tasks for Flight 1E

A. Perform Mobile Servicing System (MSS) prelaunch checkout, including Node 2 PDGF connectivity checkout, SSRMS walkoff to Node 2 Power Data Grapple Fixture (PDGF), in preparation for Flight 1E. **[IVA] [Robotics]**

B. Perform Node 2 starboard ACBM petal capture and C/O. **[Ground]**

C. Perform prepack for Flight 1E. **[IVA]**

D. Connect O_2/N_2 lines between Node 2 and PMA-2. **[IVA] [Imagery]**

E. Remove 4 Node 2 forward ACBM controller assemblies and pre-position for return on 1E. **[IVA] [Imagery]**

F. Release Node 2 Starboard CBM petal cover launch restraints. **[EVA] [Imagery]**

G. Install and configure CBCS at Node 2 starboard Common Berthing Mechanism (CBM). **[IVA][Ground] [Imagery]**

H. Configure and checkout Joint Airlock, EVA equipment and tools for Flight 1E. **[IVA]**

I. Conduct ISS/Shuttle crew pre-mission coordination. **[IVA]**

J. Perform Flight plan and EVA timeline reviews. **[IVA]**

K. Perform imagery of Orbiter Thermal Protection System (TPS) during rendezvous Rbar Pitch Maneuver (RPM) and downlink the data. **[IVA] [Imagery]**

a. Perform proficiency training for imagery of Orbiter during RPM.

L. Prepare SSC for deployment in Columbus. **[IVA] [Ground]**

M. Relocation of items in support of Columbus Outfitting, including power strips for a portable fan, the vacuum cleaner, 2 SSCs and a Portable Computer Cystem (PCS).**[IVA]**

14. Perform the following Node 2 outfitting tasks, if not performed during Flight 10A:
    A. Install Lab/Node 2 gap spanner. **[EVA] [Imagery]**
    B. Remove CCAA Anti-Vibration Module (AVM) Launch Brackets (4). Remove MTL/LTL Pump Package Assembly (PPA) Launch Brackets (3 each).Measure sound levels before and after PPA launch bracket removal. **[IVA][Imagery]**
    C. Install Node 2 Inner hatch window hyzod covers (6) and Node 2 aft external hatch window hyzod cover. **[IVA]**
15. Deploy P1 Radiator Outer Panels:
    A. Release cinches and deploy P1 radiator outer panels. **[IVA] [Imagery] [Ground]**
    B. Disconnect the harness for SFUs and reposition to the radiator beam line heaters, and activate P1 fluid line secondary heaters. **[EVA] [IVA] [Imagery]**
16. Fill one of two ammonia flow paths in S1 and P1 inboard and outboard radiator panels. **[Ground]**
    A. For S1 radiator beam: open Radiator Beam Valve Modules (RBVMs) S1-1-1 and S1-3-2.
    B. For P1 radiator beam: open Radiator Beam Valve Modules (RBVMs) P1-1-1 and P1-3-2.
17. Perform high priority ISS payload operations (total of 34.5 total combined for USOS and Russian crew hours for stage) if a minimum stage duration or an average of 6.4 hrs/wk if time permits. **[IVA]**
18. Perform high priority Public Affairs Office (PAO) events (total of 5 crew hours for stage) if a minimum stage duration or an average of 4.5 hrs/wk if time permits. **[IVA] [Imagery]**
19. Perform medium priority ISS maintenance. **[IVA] [Imagery]**
20. Reconfigure stowage to reduce exceedances. **[IVA]**
    A. Partially load two ZSRs in Node 2.
    B. Load Node 2 DDCU racks (2) with stowage.
    C. Rebuild water wall in Node 1.
21. Resupply the SM ____ by adding system power panel ___-31 to the ____ components in order to expand the capability to connect housekeeping and science equipment, if not completed during Increment 15 and if crew time permits. **[IVA]**
22. Install the noise suppression filter for current stabilizer [__-64] of the Elektron-VM system (support preparation for flight ATV1) if not completed during Increment 15. The equipment is located on board. **[IVA]**
23. Assemble the electrical circuit and conduct test activations of atmosphere purification filter [_2] with the noise suppression filter (support preparation for flight

ATV1), if not completed during Increment 15. The equipment is located on board. **[IVA]**

24. Install hatch latch handle guide assemblies(x6) (Node 1 stbd, fwd, aft; A/L IV; Lab aft, fwd). **[IVA]**
25. Perform medium priority ISS payload operations. **[IVA]**
26. The following EVA tasks are deemed to fit within the existing EVA timelines; however, may be deferred if the EVA is behind schedule. The EVA will not be extended to complete these tasks. **[IVA] [EVA] [Imagery]**
    - Install fluid tray thermal blanket.
27. Deploy 2nd SSC in Node 2 (includes installing hardware and power supply). **[IVA]**
28. Deploy new OCA Router Rev 2 on A31p Docking Station. **[IVA]**
29. Perform Node 2 port ACBM petal capture and C/O. **[Ground]**
30. Perform Node 2 nadir ACBM petal capture and C/O. **[Ground]**
31. Perform Program-approved EVA get-ahead tasks. The following EVA get ahead tasks do not fit in the existing EVA timelines; however the EVA team will be trained and ready to perform should the opportunity arise. EVA/Mission Operations Directorate (MOD) has the flexibility to select the tasks to be completed based on efficiencies gained in performing the already scheduled required tasks. **[IVA] [EVA] [Imagery]**
    A. Connect SSPTS cables.
    B. Release Node 2 Port CBM petal cover launch restraints.
    C. Release Node 2 Nadir CBM petal cover launch restraints.
    D. Install protective caps on Open lab receptacles after PMA 2 umbilical release.
    E. Install Lab CETA light.
32. Perform SDTO 13005-U ISS Structural Life Validation and Extension for 1E Orbiter docking. (IWIS required) **[IVA] [Ground] [Imagery]**
33. Perform SDTO 17010-J/A, Multi-Protocol Converter, for live HDTV downlink with MPC and incorporation into HDTV system. **[Imagery] [IVA]**
34. Install IWIS sensor in NODE2 in support of SDTO 13005-U ISS Structural Life Validation and Extension. **[IVA] [Imagery]**
35. Perform SDTO 13005-U, ISS Structural Life Validation and Extension for Dedicated Thruster Firing (IWIS required). **[IVA] [Ground] [Imagery]**
36. Perform low priority OBT substituting planned SSRMS tasks as OBT when appropriate **<TBR 4-1>**. **[IVA] [Robotics]**
37. Perform low priority PAO activities. **[IVA] [Imagery]**
38. Perform remaining maintenance (if crew time permits). **[IVA]**

39. Remove Closeout panel launch bolts (>700 bolts)(if not completed during Flight 10A). **[IVA] [Ground]**
40. Perform remaining ISS payload operations (if crew time permits) **<TBR 4-1>. [IVA]**
41. Perform SSRMS/Mobile Remote Servicer (MRS) Base System (MBS) On-board Checkout Requirements (OCRs) per the priorities in Appendix H. **[IVA] [Robotics] [Imagery] [Ground]**
42. Perform SDTO 13005-U, ISS Structural Life Validation and Extension, for ISS alone reboost (IWIS required). **[IVA] [Imagery] [Ground]**

6.6.3 ISS/VEHICLE ORBITAL AND CONFIGURATION REQUIREMENTS

6.6.3.1 The following constraints are required to avoid U.S. Lab forward endcone condensation during the time between PMA-2 demate (from the U.S. Lab) to Node 2/PMA-2 mate (to the U.S. Lab):

A. If the operation takes place between 70° > Beta Angle > 35°, then the required flight attitude is +XVV with yaw constraints ≤ -11°. If the operation takes place at Beta Angle < -35°, then the required flight attitude is -XVV with yaw constraints ≤ 167°. If the operation takes place between -35° ≤ Beta Angle ≤ 35°, then either flight attitude is acceptable. The operation cannot take place when Beta ≥ 70°.

B. Control Panel Assembly (CPA) Multi Layer Insulation (MLI) covers installed and CPA powered to standby mode.

C. Cabin dew point ≤ 48 degrees.

6.6.3.2 The ISS shall be in CMG control without ISS thrusters firing for the following activities:

A. PMA-2 demating from U.S. Lab.

B. PMA-2 mating to Node 2.

C. Node 2/PMA-2 demating from Node 1.

D. SSRMS manipulation of Node 2/PMA-2 (i.e., SSRMS in Motion).

E. Node 2/PMA-2 berthing to U.S. Lab.

6.6.3.3 The ISS shall be in free drift configuration with the CMGs not controlling and without ISS thrusters firing for the following activities:

6.6.4 CONTINGENCY REQUIREMENTS

6.6.4.1 MCC-H and MCC-M shall build procedures, contingency timelines, and conduct training to allow the crew to perform the following non-EVA tasks (The items listed below are for unique tasks or first implementation of new tasks. For contingency tasks not listed below, products/planning are already in place from previous flights/stages, or the ISS Program has determined that resources will not be applied to develop products/planning until the contingency is invoked.):

A. ISS critical maintenance tasks as follows:

None identified.

B. Complete critical unfinished Flight 10A or 15 Soyuz assembly tasks as follows:

1. Deploy and activate P6 Photovoltaic Radiator (PVR).
2. Configure P6 Elements for power generation and deploy P6 (Channel 2B and 4B) SAW **[IVA] [Imagery]**

C. Remove/replace critical spares as follows:

None identified.

6.6.4.2 MCC-H and MCC-M shall build task specific procedures, contingency timelines, and conduct training to a high level sufficient to meet the following objectives:

The readiness of these tasks will be based upon the generic development of the task procedures and timelines to a level that can be validated against a set of criteria defined in GGR&C 3.9.1, “Process for EVA Readiness”. For contingency tasks not listed below, the ISS Program has determined that until the contingency is invoked, resources will not be applied to develop products or plans and the feasibility to perform those tasks on this flight/increment will be undetermined.

A. ISS critical maintenance tasks as follows. This list is not in order of priority. The criteria for tasks being added to this list are that the failure of the function provided by the ORU causes a situation placing the ISS in a configuration that is zero tolerant, or effectively zero fault tolerant, to survival.

1. Sequential Shunting Unit (SSU) R&R
2. Direct Current Switch Unit (DCSU) R&R
3. Direct Current-to-Direct Current Converter Unit - External (DDCU-E) (all S0, P1, S1, and Integrated Equipment Assembly (IEA)) R&R
4. SAW manual positioning
5. Pump Flow Control Subassembly (PFCS) R&R
6. NH_3 Leak Repair (Fluid Line Anchor Patch (FLAP) and launch-on-need of, and Fluid Leak Detector) **<TBR 6-4>**
7. Photovoltaic Control Unit (PVCU) Multiplexer-Demultiplexer (MDM) R&R
8. External thermal Control System (ETCS) Pump Module Assembly R&R
9. Main Bus Switching Unit (MBSU) R&R
10. Interface Heat Exchanger (IFHX) R&R
11. Battery Charge/Discharge Unit (BCDU) Remove and Tie-down
12. External (EXT) MDM R&R
13. Flex Hose Rotary Coupler (FHRC) R&R

B. Complete critical unfinished Flight 10A assembly tasks as follows:

1. Install Node 2 external outfitting hardware including the installation of Node 2 handrails (up to 11), and Worksite Inter Faces (WIFs) (up to 3) using SSRMS. **[Robotics] [Imagery] [EVA]**
2. Release P6 forward radiator cinches. **[EVA]**

C. Complete critical unfinished Stage 10A assembly tasks as follows:

1. Release P1 cinches. **[EVA]**

D. Remove/replace critical spares as follows:

CBM Contingencies to restore 1 fault tolerance:

1. Clear/Restrain CBM Capture Latch
2. Manually Open/Close CBM Petal
3. Remove/Replace Center Disk Cover
4. Remove/Replace CBM Capture Latch
5. Remove/Replace CBM Controller Panel Assembly (CPA)
6. Remove/Replace CBM Petal
7. Removal of RTL **<TBD 6-9>**

6.6.5 JETTISON REQUIREMENTS

Planning and product development, including safety and data packages, will be performed to support jettison of the following items during EVA. This will include trajectory analysis to ensure acceptable low risk of recontact with ISS and of damage or injury following re-entry, procedures and training for the crew including worksite identification and desired jettison direction and velocity, and related hazard assessments, including joint safety review in accordance with SSP 50146.

6.6.5.1 Planned Jettison

The following items are planned for jettison during EVA in this flight/stage:

A. U.S.:

None identified.

B. Russian:

None identified.

6.6.5.2 Contingency Jettison

The following items may require jettison if they cannot be configured safely to allow vehicle dockings or maneuvers or if their continued operation poses a hazard to the EVA crew.

A. U.S.:

None identified.

B. Russian:

None identified.

6.6.6 GROUND SYSTEMS REQUIREMENTS

A. Ground Support is required to operate SDMS, IWIS and External Wireless Instrumentation System (EWIS) for SDTOs 13004-U and 13005-U.

B. Ground support is highly desired to operate SAMS-II, MAMS and Russian ALO sensors for SDTOs 13004-U and 13005-U. (SAMS and MAMS availability will be assessed real time.)

C. Ground support is required to perform SSRMS/MBS prelaunch checkout.

6.7 FLIGHT 1E REQUIREMENTS

This section identifies ISS Program requirements during Flight 1E. Detailed requirements and agreements between the ISS Program and the Space Shuttle Program (SSP) are specified in NSTS 21396, International Space Station 1E Mission Integration Plan.

6.7.1 <RESERVED>

6.7.2 FLIGHT 1E TASKS (IN DESCENDING PRIORITIZED ORDER)

These tasks, listed in order of ISS Program priority, are to be executed during this flight. The order of execution for these tasks in the nominal plan may vary, depending on timeline efficiencies. The Flight 1E Task Priorities have been prepared so that, in the event of a shortened mission, task execution order can be modified such that all mandatory tasks will be completed. The following numbered tasks, which include three Station-based Extravehicular Activity (EVAs) to be performed by the Orbiter crew, shall be accomplished for the successful completion of this flight.

1. Dock Flight 1E to PMA-2 port and perform mandatory safety briefing for all crew members. **[Intravehicular Activity (IVA)] [Imagery]**
2. Rotate E15/16 FE-2 (10A) with E16 FE-2 (1E), transfer mandatory crew rotation cargo per Flight 1E Transfer Priority List (TPL) in Appendix I and perform mandatory tasks consisting of Individual Equipment Liner Kit (IELK) install and sokol suit check.
3. Configure, mate and safe Columbus Module to Node 2 starboard location using SSRMS. **[IVA] [EVA] [Robotics] [Imagery]**
   A. Remove PDGF from sidewall carrier and install on Columbus. **[EVA]**
   B. Remove Columbus CBM protection cover segments and demate Launch to Activation (LTA) heater cable and install connector cap. **[EVA]**
   C. Perform Node 2 Starboard ACBM sealing surface inspection. **[Imagery]**
   D. Perform Columbus PCBM sealing surface inspection. **[Imagery]**
   E. Open Node 2 Starboard CBCS Center Disk Cover flap. **[EVA]**
4. Transfer water of mandatory quantities from the Orbiter to the ISS per 1E Transfer Priority List (TPL). **[IVA]**
5. Perform minimum crew handover of 12 hours per rotating crewmember which includes crew safety handover. **[IVA]**
6. Remove and replace the P1 Nitrogen Tank Assembly (NTA). **[EVA] [Robotics] [Imagery]**
7. Complete purge of Node 2 O_2 system. **[IVA]**
8. Install and perform mandatory activation of the Columbus SOLAR external payload on the External Payload Facility (EPF). **[IVA] [EVA] [Robotics] [Imagery]**

9. Return failed CMG from ESP-2. **[EVA] [Robotics] [Imagery]**
10. Install and perform mandatory activation of Columbus European Technology Facility (EuTEF) on the Columbus EPF. **[EVA] [IVA] [Robotics] [Imagery]**
11. Transfer mandatory items per Flight 1E TPL. **[IVA]**
12. Activate Columbus Module systems required for sustained crew presence including: **[IVA] [Imagery]**
    A. Remove NPRVs **[IVA] [Imagery]**
    B. Install IMV valves **[IVA] [Imagery]**
    C. Remove 4 Node 2 starboard ACBM controller assemblies for return on 1E **[IVA] [Imagery]**
    D. Checkout Columbus subsystems required for payload commissioning as per Appendix H <ESA-1 through 3, 37 and 38> **[IVA]**
13. Perform requested public affairs event with top level European Government leader as soon after the initial ingress into Columbus module and activation as practical. **[IVA]**
14. Install trunnion and keel thermal covers. **[EVA] [Imagery]**
15. Activate and initiate Checkout/Commissioning Activities for SOLAR and EuTEF payloads and the External Payload Facility (EPF) per Appendix H. <ESA - 32, 33, 34, 35 and 36> **[IVA] [Ground**]
16. Transfer remaining items per Flight 1E TPL. **[IVA]**
17. Mechanical set-up, initial activation and minimum interface checkout of the Columbus International Standard Payload Racks (ISPR) per Appendix H, in the following priority order: (Note: Racks A, C, and D need to be transferred from launch to on-orbit location prior to activation.) **[GROUND] [IVA] [Imagery]**
    A. Biological Laboratory (BIOLAB) Appendix H <ESA - 21>
    B. Fluid Science Laboratory (FSL) Appendix H <ESA - 14>
    C. European Drawer Rack (EDR) Appendix H <ESA - 25>
    D. European Physiology Module (EPM) Appendix H <ESA - 29>
    E. Temporarily relocate ZSR equipment to allow ISPR moves.
18. Perform ISS daily payload status checks as required **[IVA]**
19. Perform ISS science payload research operations tasks: Nutrition (NASA), Integrated Immune (NASA), MOP-M (ESA), MUS-M (ESA), MUS (ESA). **[IVA]**
20. Perform ISPR interface, functional testing of FSL, BIOLAB, EDR and EPM per Appendix H. (in support of payload to USOC end to end tests) **[IVA] [Ground]**
    A. BIOLAB Appendix H <ESA - 22, 23>
    B. FSL Appendix H <ESA - 15, 16, 17>

C. EDR Appendix H <ESA - 26, 27>

D. EPM Appendix H <ESA - 30, 31>

21. Route and connect SSPTS cables. **[EVA] [Imagery]**
22. Perform remaining approved ISS and middeck utilization (including Russian) activities referenced in Annex 5. **[IVA]**
23. Reboost ISS with the Orbiter if mission resources allow and are consistent with ISS trajectory analysis and planning. **[IVA]**
24. Transfer O_2 from Orbiter to the ISS Joint A/L HPGTs if available. **[IVA]**
25. Transfer N_2 from Orbiter to the ISS Joint A/L HPGTs if available. **[IVA]**
26. Install hatch latch handle guide assemblies (x3)(Node 2 fwd, stbd; Columbus port). **[IVA]**
27. Perform SDTO 13005-U, ISS Structural Life Validation and Extension, during Columbus installation. **[Ground] [Imagery]**
28. Perform SDTO 13005-U, ISS Structural Life Validation and Extension, during Shuttle mated Reboost. (ISS Wireless Instrumentation System (IWIS) only if crew time available). **[IVA] [Ground] [Imagery]**
29. Perform DTO 853 - In-flight evaluation for areas of CO_2 concentration, if crew time permits. **[IVA]**
30. Perform imagery survey of the ISS exterior during Orbiter flyaround after undock. **[IVA] [Imagery]**
31. Perform an additional 4 hours per rotating crewmember of ISS crew handover (16 hours per crewmember total). **[IVA]**
32. Install Node 2 starboard hatch cover. **[IVA]**
33. Complete Columbus Check-out tasks as per Appendix H <ESA 4 through 13> (includes vacuum venting checkout). **[IVA] [Ground]**
34. The following tasks are deemed to fit within the existing EVA timelines; however, may be deferred if the EVA is behind schedule. The EVA will not be extended to complete these tasks. **[IVA] [EVA] [Imagery] [Robotics]**

    A. Install Columbus EVA aids. **[EVA] [Imagery]**

35. Perform program approved EVA get-ahead tasks. The following EVA get ahead tasks do not fit in the existing EVA timelines; however, the EVA team will be trained and ready to perform should the opportunity arise. EVA/Mission Operations Directorate (MOD) has the flexibility to select the tasks to be completed based on efficiencies gained in performing the already scheduled required tasks. **[IVA] [EVA] [Imagery]**

    A. Stow OTSD.

    B. Relocate EVA aids for subsequent flights.

36. Perform program approved Intravehicular Activity (IVA) get-ahead tasks. Reference Appendix H. The following IVA get ahead tasks do not fit in the existing IVA timelines; however, the IVA team will be trained and ready to perform should the opportunity arise, such as the achievement of the energy dependent day. **[IVA] [Imagery]**

    - Columbus commissioning tasks (Reference Appendix H-5). At least 7 hours of Columbus commissioning is required to complete all activities. If an energy dependent day is achieved the following Columbus Commissioning tasks will be added real time.

37. Perform SDTO 13005-U, ISS Structural Life Validation and Extension, during 1E Orbiter Undocking (IWIS highly desired, but not required) (only if crew time available). **[Ground] [IVA] [Imagery]**

38. Perform SDTO 13005-U, ISS Structural Life Validation and Extension for Dedicated Thruster Firing (IWIS required). **[IVA] [Ground] [Imagery]**

6.7.3 ISS/VEHICLE ORBITAL AND CONFIGURATION REQUIREMENTS

6.7.3.1 The maximum rendezvous altitude for Flight 1E shall be 342.6 km (185 nmi).

6.7.3.2 Shuttle orbital attitude should be chosen to take into account thermal behavior of the external payloads.

6.7.3.3 The Shuttle shall dock at PMA-2.

6.7.3.4 The ISS with Shuttle docked shall be in CMG control without ISS thrusters firing as well as the Shuttle Reaction Control System (RCS) inhibited for the following activities:

A. Unberth of Columbus from the Orbiter Payload Bay (PLB) to berthing of Columbus to Node 2.

6.7.3.5 The ISS with Shuttle docked shall be in free drift configuration with the CMGs not controlling, Shuttle RCS inhibited and without ISS thrusters firing for the following activities:

None identified.

6.7.3.6 The SSRMS shall be located at Node 2 PDGF at the beginning of Flight 1E.

6.7.3.7 For all planned, critical operations (including Orbiter Prox Ops, Obiter Mated Mission activities, RS Prox Ops, etc.) VIPER produces a nominal array plan with, in some cases, multiple array positioning/management options for each event. This array plan, referred to as the "Solar Array Constraints Matrix" is produced prior to each shuttle mission and extends through the subsequent Stage. This Matrix is delivered to MOD for incorporation into planned timelines via a the CHIT system at approximately L-2 weeks for specific vehicle launch.

6.7.4 CONTINGENCY REQUIREMENTS

6.7.4.1 MCC-H, MCC-M and ESA shall build procedures, contingency timelines and conduct training for any of the following non-EVA tasks: (The items listed below are for unique tasks or first implementation of new tasks. For contingency tasks not listed below, products/planning are already in place from previous flights/stages, or the ISS Program has determined that resources will not be applied to develop products/planning until the contingency is invoked).

A. ISS critical maintenance tasks as follows:

   None identified.

B. Contingency Orbiter separation from the ISS and re-rendezvous.

C. Perform focused Orbiter TPS inspection using SRMS (and SSRMS as required for OBSS handoff) and downlink data. **[IVA] [Robotics]**

D. Provide heater power to Columbus via the Power Data Grapple Fixture (PDGF) as required to maintain Columbus in a safe configuration.

E. Provide cooling to Columbus within the determined thermal constraints.

6.7.4.2 MCC-H, MCC-M and ESA shall build procedures, contingency timelines, and provide pre-flight training for the EVA tasks to sufficient maturity to provide for the EVA response times designated.

A. Class 1: All procedures, timelines, and training are developed and certified to support an EVA response within 24 hours. When listing Class 1 items, a parenthetical should be added to denote the location of the ORU spare, or if prepositioning is required.

   1. Orbiter TPS inspection.
   2. Manual release of the Payload Retention Latch Assembly (PLRA).
   3. Manual release the SSRMS from the Columbus PDGF.
   4. CBM Contingencies:
      a. Clear/Restrain CBM Capture Latch
      b. Manually Open/Close CBM Petal
      c. Remove/Replace Center Disk Cover
      d. Remove/Replace CBM Capture Latch
      e. Remove/Replace CBM Controller Panel Assembly (CPA)
      f. Remove/Replace CBM Petal

B. Class 2: For contingencies occurring during the docked time frame an EVA response is based on re-prioritization of the mission tasks. Published

procedures and timelines are developed, but may require real-time updates to match the flight specific failure.

None Identified

C. Class 3: For contingencies related to first flights hardware that are not time critical, skeleton EVA procedures will be developed preflight to support a Class 3 EVA. The EVA response time can be greater than two weeks and can be deferred to the stage or next available mission. The ISS Program has determined that additional resources will not be applied to further refine the training and integrated planning until the failure occurs. Subsequent flight listings for these hardware items will be contained in the GGR&C.

None Identified

6.7.4.3 The Columbus or External Payload cargo element will be returned for the following conditions:

A. Unable to meet the structural attach requirements for standard orbit operations such as docking/undocking, attitude control, reboost, etc.

6.7.5 JETTISON REQUIREMENTS

Planning and product development, including safety and data packages, will be performed to support jettison of the following items during EVA. This will include trajectory analysis to ensure acceptable low risk of recontact with ISS and of damage or injury following re-entry, procedures and training for the crew including worksite identification and desired jettison direction and velocity, and related hazard assessments, including joint safety review in accordance with SSP 50146.

6.7.5.1 Planned Jettison

The following items are planned for jettison during EVA in this flight:

A. USOS JAL EVAs

None Identified.

B. RS DC EVAs

None Identified.

6.7.5.2 Contingency Jettison

The following items may require jettison if they cannot be configured safely to allow vehicle dockings or maneuvers or if their continued operation poses a hazard to the EVA crew.

A. USOS JAL EVAs

None identified.

B. RS DC EVAs

None identified.

6.7.6 GROUND SYSTEMS REQUIREMENTS

A. Ground Support is required to operate Space Acceleration Measurement System - II (SAMS-II), SDMS and Microgravity Acceleration Measurement System (MAMS) sensors for SDTOs: 13005-U **<TBR 6-9>**.

B. Ground support is desired to operate Russian Optical Linear Accelerometers [ALO] for SDTOs: 13005-U **<TBR 6-9>**.

C. The Columbus Control Center (Col-CC), supported by the Engineering Support Center and the ESA personnel at the MCC-H, i.e. in the Mission Evaluation Room (MER), the Customer Support Room (CSR), and the ISS Management Center (IMC) will monitor the Columbus assembly and activation.

D. As soon as the Col-CC is able to command and monitor the Columbus Systems, i.e. as soon as the Columbus Vital Telemetry and Command Controller (VTC) is activated, the Col-CC takes responsibility for the activation and check-out of the Columbus Systems, supported by the User Support Operations Centers (USOCs) for any responsibility related to Columbus ESA payloads (P/L).

E. Accommodation and Services to be provided by NASA are based on the ESA requirements defined in the Facility and Communication Requirements for MCC-H/Col-CC Intercenter Operations (FRIO) (SSP 50688, not published, but signed.)

6.7.7 FLIGHT 1E ISS REQUIREMENTS ON SHUTTLE DURING NON-DOCKED TIME FRAME

A. Shuttle crew to activate the Assembly Power Converter Unit- (APCU) to supply electrical power to Columbus as required to operate Columbus external shell heaters (120 V dc) within two hours of payload bay door opening. **[IVA]**

B. Provide power to Integrated Cargo Carrier (ICC)-L external payloads within one hour of payload bay door opening to allow for operation of SOLAR and EuTEF LTA heaters (28 V dc). **[IVA]**

C. The STS heater power must be continuously available (for at least 30 hours) until immediately prior to the removal from the unpressurized carrier. **[IVA]**

D. Perform visual inspection of Columbus Module and ICC Lite and its cargo. **[IVA] [Imagery]**

E. Perform middeck payload operations.

F. Perform MAUI.

6.8 FLIGHT 1E UNDOCK TO FLIGHT 1 J/A DOCK REQUIREMENTS (STAGE 1E)

This section identifies requirements applicable from Flight 1E undock to Flight 1J/A dock including requirements associated with ATV1 Flight Demonstration Program and ATV1 docking.

6.8.1 <RESERVED>

6.8.2 STAGE 1E TASKS (IN DESCENDING PRIORITIZED ORDER)

These tasks, listed in order of ISS Program priority, are to be executed during this stage. The order of execution for these tasks in the nominal plan may vary depending on timeline efficiencies. An ONS plan **<TBD J-1>** (see Appendix J) shall be prepared preflight. The following numbered tasks, which include no Station-based EVAs, shall be accomplished for successful completion of this interval.

1. Perform high priority ISS maintenance and Shuttle Launch Commit Criteria for the next Shuttle Flight. **[IVA] [Imagery]**
2. Undock 26 Progress-M from DC1 Nadir docking port. **[IVA]**
3. Dock 27 Progress-M to DC1 Nadir docking port and perform cargo and propellant transfer. **<FP TBR 3-32> [IVA]**
4. Undock 27 Progress-M from DC1 Nadir docking port. **<FP TBR 3-43> <FP TBR 3-44> [IVA]**
5. Dock 28 Progress-M to DC1 Nadir docking port and perform cargo and propellant transfer. **<FP TBR 3-8> <FP TBR 3-43><FP TBR 3-44> [IVA]**
6. Perform ISS medical operations (average of 10 crew hours per week for crew of 3). **[IVA]**
7. Perform high-priority OBT (average of 4.0 **<TBR 4-1>** crew hours per week) substituting planned SSRMS tasks as OBT when appropriate. **[IVA] [Robotics]**
8. Perform checkout and preparation tasks for Flight 1J/A. **[IVA]**
   A. Position MT at WS6 for Flight 1J/A joint operations. **[Robotics] [Ground]**
   B. Invoke embedded patch to transition PCS R10 to PCS R10 Update 1. **[Ground]**
   C. Perform transition to MSS 5.0 software in support of SSRMS and SPDM on flight 1J/A. **[Ground]**
   D. Perform SSRMS pre-launch checkout at Node 2 PDGF. **[Robotics] [Ground]**
   E. Perform POA checkout. See Appendix H, Table H-2. **[Robotics] [IVA] [Ground]**
   F. Perform SPDM Display Control Panel (DCP) checkout (switches). See Appendix H, Table H-4.A. **[Robotics] [IVA]**
   G. Unstow and configure Joint Airlock.
   H. Complete Flight 1J/A pre-pack.

I. Configure and check out EVA equipment.

J. Perform training and preparation for joint operations.

K. Complete Flight plan and EVA timeline reviews.

L. Perform tool preparation.

M. Perform transfer tag-up.

N. Install, configure and checkout CBCS at Node 2 Zenith ACBM.

O. Perform imagery of Orbiter Thermal Protection System (TPS) during rendezvous Rbar Pitch Maneuver (RPM) and downlink the data. **[Imagery]**

- Perform proficiency training for imagery of Orbiter during RPM.

9. Perform ATV1 Flight Demonstration Program as follows (major ISS Program objective): **[IVA] [Imagery]**

A. Install ATV Control Panel and ATV Proximity Communication Equipment (PCE) in SM.

B. Confirm ATV PCE to Ground signal (required 5 days prior to ATV1 launch).

C. Prepare two USOS cameras to visually monitor the approach of the ATV from a distance of 1 kilometer (km) until arrival at point S3.

D. Confirm SIMVOL/ISS-RS cameras are operating prior to ATV launch.

E. Demonstration Mission Rendezvous Day 1 - verify Escape commands issued by ATV-CC after approach to point S2.

F. Demonstration Mission Rendezvous Day 2 - verify Hold, Resume and Retreat commands after S3 issued by ATV-CC, and Retreat and Escape commands issued by the ISS crew after ATV retreat to point S4. This activity requires visual crew monitoring and crew commanding of the ATV.

10. Dock ATV1 to SM aft port. **<FP TBR 3-42><TBD 6-33> [IVA] [Imagery]**

A. Demonstration Mission Rendezvous Day 3 - verify nominal automated docking of ATV1 to ISS. This activity requires visual crew monitoring of the ATV rendezvous and docking activity.

B. Perform SDTO 13007-U, ATV Docking/Undocking Loads on ISS, for ATV docking (IWIS Required). **<TBD 6-3> [IVA] [Ground]**

C. Remove and stow ATV Control Panel and ATV Proximity Communication Equipment in SM.

11. Perform demonstration checkouts of normal ATV1 docked operations: **<FP TBR 3-42> <TBD 6-33> [IVA]**

A. Perform Attitude Control Demonstration and operations.

B. Perform ISS Reboost Demonstration and operations (including debris avoidance).

12. Complete the end to end Columbus system checkout/commissioning activities not completed during Flight 1E per Appendix H.
    A. Perform stand alone Columbus system/checkout activities(includes vacuum venting checkout). Appendix H <ESA - 4 through 13>. **[Ground]**
    B. Perform FSL checkout and performance tests including Geoflow. Appendix H <ESA - 15, 16, 17> **[IVA] [Imagery] [Ground]**
    C. Perform BIOLAB checkout and performance tests, including WAICO. Appendix H <ESA - 23, 24> **[IVA] [Imagery] [Ground]**
    D. Perform EDR checkout in preparation for PCDF-PU on Flight 1JA. Appendix H <ESA - 27> **[IVA] [Imagery] [Ground]**
    E. Complete EUTEF checkout. Appendix H <ESA - 35> **[Ground]**
    F. Complete SOLAR checkout. Appendix H <ESA - 36> **[Imagery] [Ground]**
13. Perform high priority ISS payload operations: Nutrition (NASA), Journals (NASA) **[IVA]**
14. Complete the end to end Columbus system checkout/commissioning activities not completed during Flight 1E per Appendix H.
    A. Perform EPM checkout and performance tests. Appendix H <ESA - 30>. **[IVA] [Imagery] [Ground]**
15. Perform remaining high priority ISS payload operations (average of 8.5 crew hours per week). **[IVA]**
16. Perform high priority ISS PAO events (3.5 crew hours per week). **[IVA]**
17. Perform medium priority ISS maintenance. **[IVA] [Imagery]**
    - Monitor, inspect and photograph condition of ISS RS window glass. **[IVA] [Imagery]**
18. Clear Node 1 fire ports of stowage. **[IVA]**
19. Perform ATV1 demonstration of Transfer Operations. **<FP TBR 3-42> <TBD 6-33> [IVA] [Imagery]**
    A. Perform ATV1 Ingress and critical Dry Cargo Transfer (if any) operations.
20. Perform Node 2 fine leak check**. [IVA] [Ground]**
21. Deploy two (2) Columbus ZSRs in COL103 and COL104. **[IVA]**
22. Partially load Columbus ZSRs. **[IVA]**
23. Perform Columbus fine leak check. **[IVA][Ground]**
24. Complete remaining Columbus checkout activities per Appendix H. **[IVA] [Imagery]**
    A. Perform FSL checkout and performance tests. Appendix H <ESA - 20 and 19> **[IVA] [Imagery] [Ground]**

B. Perform EPM checkout and performance tests. Appendix H <ESA - 31> **[IVA] [Imagery] [Ground]**

25. Perform SDTO 13005-U, ISS Structural Life Validation and Extension for Dedicated Thruster Firing (IWIS required). **[IVA] [Ground] [Imagery]**
26. Upgrade the [ACN] interface network: connecting onboard equipment control system (____) devices with new cables. Delivery of the set of cables is scheduled for 27P **(TBD 6- XX)**
27. Change the software version in Laptop RSE1, RSK1, RSS1, RSS2, RSE-Med**. <TBD 6-30>**
28. Change out ROM __114_ (subassembly _: primary and backup) of the SM ____2-12 system. Delivery of the equipment is scheduled on 27P . **<TBD 6-30>**
29. Modify the bracket for conducting autonomous testing of the Vozdukh system vacuum pumps and check whether pressure gauge [__-316_] is connected. Delivery is for this equipment is to be determined.
30. Exchange dampers made from US materials for dampers made from Russian materials for fan [__2__.] The equipment is located on board.
31. Perform medium priority ISS payload operations (average of 2.5 **<TBR 4-1>** crew hours per week). **[IVA]**
32. Remove the motion control system (___) equipment in preparation for delivery of FGB enclosures. **[IVA]**
33. Reboost ISS with SM Aft, 28P, or ATV1 Thrusters as required. **[Ground]**
34. Perform low priority OBT substituting planned SSRMS tasks as OBT when appropriate. **<TBR 4-1> [IVA] [Robotics]**
35. Perform ARISS contact for E16 FE-2 (1E). **[IVA]**
36. Perform remaining ISS PAO events (average 1.0 **<TBR 4-1>** hours per week). **[IVA] [Imagery]**
37. Perform remaining ISS maintenance. **[IVA] [Imagery]**
38. Perform remaining ISS payload operations. **[IVA]**
39. Perform SDTO 12007-U, Radio Frequency Identification (RFID) to augment consumables tracking. **<TBD 6-28> [Ground] [IVA]**
    - Reload PDA software, if required for RFID SDTO.
40. Perform SDTO 13005-U, ISS Structural Life Validation and Extension, for ISS alone reboost (IWIS required). **[IVA] [Imagery] [Ground]**
41. Perform SDTO 13004-U, Russian Vehicle Docking/Undocking Loads on ISS, for 27P docking to DC1 Nadir port. (IWIS Required) **[IVA] [Ground]**
42. Perform SDTO 13004-U, Russian Vehicle Docking/Undocking Loads on ISS, for 28P docking to DC1 Nadir port. (IWIS Required) **[IVA] [Ground]**

43. Perform SDTO 17011-U/R Validation of On-Orbit Methodology for the Assessment of Cardiac Function and Changes in the Circulating Volume Using Ultrasound and "Braslet-M" Occlusion Cuffs. **<TBD 6-28> [IVA]**
44. Deploy SSC in COL. **[IVA]**
45. Relocate ESA Hardware from Node 2 to Columbus. **[IVA]**
46. Test Turbo Reload for Increment 17. **[Ground] [IVA]**
47. Move Plug in Items and SSCs from Node 1 to Node 2. **[IVA]**

6.8.3 ISS/VEHICLE ORBITAL AND CONFIGURATION REQUIREMENTS

6.8.3.1 The 26 Progress shall undock from the DC1 Nadir port.

6.8.3.2 The 27 Progress shall dock to the DC1 Nadir port.

6.8.3.3 The 27 Progress shall undock from the DC1 Nadir port.

6.8.3.4 The 28 Progress shall dock to the DC1 Nadir port.

6.8.3.5 The ATV1 shall dock to the SM Aft docking port.

6.8.3.6 The ISS shall be controlled by the RS GN&C in Thrusters Only mode:

6.8.3.7 The ISS shall be in CMG control without ISS thrusters firing for the following activities:

A. For ATV1 Docking -from docking contact until ATV and SM interface latch closure.

6.8.3.8 The ISS shall be in free drift configuration with the CMGs not controlling and without ISS thrusters firing for the following activities:

None identified.

6.8.3.9 SSRMS walkoff to Node 2 PDGF and MT at WS#6.

6.8.3.10 The ISS ATV1 docking attitude shall be Local Vertical Local Horizontal (LVLH) (0,0,0).

6.8.3.11 ATV1 Docking Constraints.

A. The USOS P4, S4 and P6 solar arrays must be configured to avoid Relative Global Positioning System (RGPS) interference during ATV1 rendezvous and docking from arrival at point $S_{-1/2}$ until soft docking point when mechanical capture of ATV to the ISS is complete.

   The specific USOS solar arrays positions are as follows:

   1. The SARJ shall be positioned at 0^{o} prior to arrival at $S_{-1/2}$ to avoid RGPS interference.

B. The The USOS P4, S4 and P6 solar arrays must be configured to minimize their plume impingement from SM thrusters during the attitude hold prior to the

maneuver to TEA (0,0,0) until the maneuver of the ISS back to nominal stage TEA is complete.

1. See stage-specific Matrix for detailed P4, S4, and P6 BGA angles and time durations.

C. The USOS P4, S4 and P6 solar arrays, SM solar arrays, FGB solar arrays, and USOS radiators must be configured to minimize the interference with KURS short range antennas.

1. No additional constraints on P4, S4, and P6 BGA angles when SARJs are at 0.

2. If not already retracted by this stage, the FGB arrays are allowed to rotate as long as normal of solar arrays remains outside of KOZ defined as +/- 20 deg w/respect to ISS X-axis from 12 minutes prior to KURS activation until 3 minutes prior to S3 departure. From 3 minutes prior to S3 departure thru docking, FGB arrays shall be parked outside of defined KOZ.

3. From 12 minutes prior to KURS activation until3 minutes prior to S3 departure, the SM arrays are allowed to rotate as long as normal of solar arrays remains outside of KOZ defined as +/- 20 deg w/respect to ISS X-axis. From 3 minutes prior to S3 departure thru docking, the SM arrays shall be parked outside of defined KOZ.

4. The USOS radiators shall be in a fixed position 3 minutes prior to departure from S3 thru capture.

D. The USOS P4, S4 and P6 solar arrays, the SM solar arrays, and FGB solar arrays must be configured to sustain docking operations (loads and plume impingement) prior to S3 until hard docking of the ATV to the ISS is complete. (mechanical latches are fully closed)

1. See stage-specific Matrix for detailed P4, S4, and P6 BGA angles and time durations.

2. The FGB arrays shall be retracted or feathered if not already retracted by this stage.

3. The Service Module (SM) arrays shall be positioned such that the normal of the array is outside of KOZ defined as +/- 20 degrees with respect to ISS axis.

E. The USOS P4, S4 and P6 solar arrays must be configured to avoid longeron shadowing hazard prior to the maneuver to TEA (0,0,0) until the maneuver of the ISS back to nominal stage TEA is complete.

1. See stage-specific Matrix for detailed P4, S4, and P6 BGA angles and time durations.

6.8.4 CONTINGENCY REQUIREMENTS

6.8.4.1 MCC-H, COL-CC, ATV-CC and MCC-M shall build procedures, contingency timelines, and conduct training to allow the crew to perform the following non-EVA tasks (The items listed below are for unique tasks or first implementation of new tasks. For

contingency tasks not listed below, products/planning are already in place from previous flights/stages, or the ISS Program has determined that resources will not be applied to develop products/planning until the contingency is invoked.):

A. ISS critical maintenance tasks as follows:

   None identified.

B. Complete critical unfinished Flight 1E assembly tasks as follows:

   None identified.

C. Remove/replace critical spares as follows:

   None identified.

D. Complete critical unfinished Flight ATV1 tasks as follows:

   - Calculation of ATV1 cargo mass and center of gravity in the event of a contingency requiring the rapid closure of the ATV1 hatch and subsequent departure of the ATV1 from the ISS.

E. The ISS shall accommodate an extended period of free drift for up to 110 minutes after ATV1 capture.

6.8.4.2 MCC-H, COL-CC and MCC-M shall build task specific procedures, contingency timelines, and conduct training to a high level sufficient to meet the following objectives:

<TBD 6-13>

The readiness of these tasks will be based upon the generic development of the task procedures and timelines to a level that can be validated against a set of criteria defined in GGR&C 3.9.1, “Process for EVA Readiness”. For contingency tasks not listed below, the ISS Program has determined that until the contingency is invoked, resources will not be applied to develop products or plans and the feasibility to perform those tasks on this flight/increment will be undetermined.

A. ISS critical maintenance tasks as follows. This list is not in order of priority. The criteria for tasks being added to this list are that the failure of the function provided by the ORU causes a situation placing the ISS in a configuration that is zero tolerant, or effectively zero fault tolerant, to survival.

   The tasks listed in Paragraph 6.6.4.2 are still applicable.

B. Remove/replace critical spares as follows:

   The tasks listed in Paragraph 6.6.4.2 C are still applicable.

C. Complete critical unfinished Stage 10A assembly tasks as follows:

   - Install SSPTS Cables. **[EVA] [Imagery]**

6.8.5 JETTISON REQUIREMENTS

Planning and product development, including safety and data packages, will be performed to support jettison of the following items during EVA. This will include trajectory analysis to ensure acceptable low risk of recontact with ISS and of damage or

injury following re-entry, procedures and training for the crew including worksite identification and desired jettison direction and velocity, and related hazard assessments, including joint safety review in accordance with SSP 50146.

6.8.5.1 Planned Jettison

The following items are planned for jettison during EVA in this stage:

A. USOS JAL EVAs

None Identified.

B. RS DC EVAs

None Identified.

6.8.5.2 Contingency Jettison

The following items may require jettison if they cannot be configured safely to allow vehicle dockings or maneuvers or if their continued operation poses a hazard to the EVA crew.

A. USOS JAL EVAs

None Identified.

B. RS DC EVAs

None Identified.

6.8.6 GROUND SYSTEMS REQUIREMENTS

A. European Space Agency (ESA) Columbus Control Center (Col-CC) Ground Segment begins continuous ISS real-time operations, supported by the User Support Operations Centers (USOCs) for any responsibility related to Columbus ESA payloads.

B. Docking of ATV1 shall be planned to occur on Daily Orbits (DO) 16 (or 15 for those without a DO 16), 1, 2, or 3. **[Imagery]**

C. ISS video from the SM camera, telecommand, voice, and RS docking hardware telemetry shall be available via USOS link and provided to MCC-M during the critical period of ATV docking to the ISS. Telemetry, telecommand, and voice comm shall be provided from 16 minutes prior to time of docking contact until 20 minutes after docking contact. ISS video shall be provided from 16 minutes prior to docking contact until 5 minutes after docking. **[Imagery]**

6.9 FLIGHT 1J/A REQUIREMENTS

This section identifies ISS requirements during Flight 1J/A. Detailed requirements and agreements between the ISS Program and the Space Shuttle Program are specified in NSTS 21433, International Space Station-1J/A Mission Integration Plan.

6.9.1 <RESERVED>

6.9.2 FLIGHT 1J/A TASKS (IN DESCENDING PRIORITIZED ORDER)

These tasks, listed in order of ISS Program priority, are to be executed during this flight. The order of execution for these tasks in the nominal plan may vary, depending on timeline efficiencies. The Flight 1J/A Task Priorities have been prepared so that, in the event of a shortened mission, task execution order can be modified such that all mandatory tasks will be completed. The following numbered tasks, which include four Station-based Extravehicular Activities (EVAs) to be performed by the Orbiter crew, shall be accomplished for the successful completion of this flight.

1. Dock Flight 1J/A to PMA-2 port and perform mandatory safety briefing for all crew members. **[IVA] [Imagery]**
2. Rotate E16 FE-2 (1E) with E16/17 FE-2 (1J/A), transfer mandatory crew rotation cargo per Flight 1J/A Transfer Priority List (TPL) in Appendix I, and perform mandatory tasks consisting of Individual Equipment Liner Kit (IELK) install, and Sokol suit checkout. **[IVA]**
3. Transfer remaining items per flight ballasting plan in Appendix I. **[IVA]**
4. Install Japan Aerospace Exploration Agency (JAXA) Japanese Experiment Module Experiment Logistics Module-Pressurized Section (JLP) to Node 2 zenith port using SRMS. **[IVA]**
   A. Demate Launch to Activation (LTA) heater cables and remove JLP PCBM thermal/seal cover. **[EVA]**
   B. Perform Node 2 zenith ACBM sealing surface inspection. **[Imagery] [Robotics] [EVA]**
   C. Perform JLP PCBM sealing surface inspection. **[Imagery] [EVA] [Robotics]**
   D. Open Node 2 zenith hatch window flap to allow Centerline Berthing Camera System operations for JLP mate. **[EVA] [Imagery]**
   E. Mate JLP to Node 2 zenith ACBM. **[Robotics] [Imagery]**
   F. Perform Node 2 zenith ACBM prep for mate C/O. **[Ground]**
5. Perform JLP critical activation.
   A. Mate JLP power utility connections and Activate JLP heaters. **[IVA] [Imagery]**
   B. Monitor JLP heater systems using minimum keep alive kit (MKAK) **[IVA]**
6. Use SSRMS to unberth Spacelab Pallet-Deployable (SLP-D1) with Special Purpose Dexterous Manipulator (SPDM/Dextre) from PLB and install SLP-D1 with

SPDM/Dextre on the Mobile Remote Servicer Base System (MBS) Payload and ORU Accommodation (POA), apply keep alive power. **[IVA][Robotics] [Imagery]**

7. Perform SPDM Appendix H OCRs that are mandatory prior to Orbiter departure to keep the SPDM in a single fault tolerant keep alive state. **[Ground] [Robotics]**
8. Install and route Keep Alive Umbilical and stow OBSS on ISS. **<TBR 6-28>[EVA] [Robotics] [Imagery]**
9. Transfer water of mandatory quantities between Orbiter and ISS per Flight 1J/A Table 5.0-1. **[IVA]**
10. Transfer critical items per Flight 1J/A TPL in Appendix I. **[IVA]**
11. Assemble and deploy SPDM/Dextre. **[EVA] [Imagery] [Robotics]**
    A. Install ORU Tool Change-out Mechanism (OTCM) to SPDM Arms and attach arms to SPDM body. Remove Orbital Support Equipment (OSE) thermal blankets from: Electronics Platform (EP-1), EP-2, Arms, OTCMs, and Camera/Light Assembly (CLA).
    B. Relocate SPDM/Dextre to clear MT translation path and apply keep alive power. **[Ground]**
    C. Install Tool Holster Assembly (THA) and ORU/Temporary Platform (OTP).
12. Use SSRMS to berth SLP-D1 in PLB for return. **[Robotics] [Imagery][IVA]**
13. Transfer SSRMS Yaw joint from shuttle to ESP-2 Flight Releasable Attach Mechanism (FRAM) Site 5. **[EVA] [Robotics] [Imagery]**
14. Transfer DCSU from Shuttle to ESP-2 FRAM Site 2 or 3. **[EVA] [Robotics] [Imagery]**
15. Transfer second DCSU from Shuttle to ESP-2 FRAM Site 2 or 3. **[EVA] [Robotics] [Imagery]**
16. Perform JLP ingress and initial outfitting.
    A. Remove CPAS (4) and ingress JLP. **[IVA] [Imagery]**
    B. Establish IMV; Activate ELPS, ventilation fan, and General Luminaire Assembly (GLA)s Install PPRV caps, perform NPRV checkout, and configure PFES/PBA. **[IVA] [Imagery]**
    C. Inspect JLP racks for cooling water leakage and verify handrails and rack front stowage are secure. **[IVA]**
17. Perform minimum crew handover of 12 hours per rotating crewmember which includes crew safety handover. **[IVA]**
18. Deploy Materials International Space Station Experiment (MISSE) 6 experiment and lightweight Adapter Plate Assembly (LWAPA) on Columbus Exposed Payload Facility Starboard Deck Nadir Site. **[EVA] [Robotics] [Imagery]**
19. Swap WAICO sample runs #1 and #2 between BIOLAB and Shuttle MERLIN. **<TBR 6-35> [IVA]**

20. Transfer Protein Crystallization Diagnostic Facility (PCDF) Process Unit (PU) from Shuttle to Columbus EDR rack and activate. Appendix H <ESA - 28> **[IVA] [Ground] [Imagery]**
21. Pack double coldbag with HRP nutrition samples and transfer to middeck. **[IVA]**
22. Pack double coldbag with HRP Nutrition and IMMUNO samples and transfer to middeck. **[IVA]**
23. Transfer remaining cargo items per Flight 1J/A TPL in Appendix I. **[IVA]**
24. Transfer N_2 from the Orbiter to the ISS Airlock (A/L) High Pressure Gas Tanks (HPGTs) per Table 5.0-1. **[IVA]**
25. Transfer O_2 from the Orbiter to the ISS A/L HPGTs per Table 5.0-1. **[IVA]**
26. Install JLP trunnion covers **[EVA] [Imagery]**
27. Install Camera/Light/Pan-Tilt Assemblies on SPDM. **[EVA] [Imagery]**
28. Perform JLP prep for 1J. **[IVA] [Imagery]**
    A. Configure racks for on-orbit operations and prep racks for 1J transfer.
    B. Unload and stow JLP rack front launched items.
    C. Assemble hard dummy panels (2).
    D. Retrieve JTVE booms.
    E. Configure workstation monitor on workstation rack and assemble Systems Laptop Table (SLT).
    F. Gather and package items for 1J transfer.
    G. Remove EPS 1 and DMS 1 rack stowage door launch lock bolts.
29. Perform SPDM OCRs to complete the nominal deploy sequence per Appendix H, Table H-4.A. **<TBR 6-33> [IVA] [Imagery] [Robotics] [Ground]**
30. Perform ISS daily payload status checks as required. **[IVA]**
31. Perform daily middeck activities to support payloads (includes cases where shuttle crew also performs payloads on the ISS). **[IVA]**
    A. Short Duration Bioastronautics Investigation (SDBI) 1900, Integrated Immune
    B. SDBI 1634, Sleep Short
    C. Human Research Facility (HRF) Midodrine (ACES)
    D. Daily status check of PCDF-PU
    E. Daily status check of MERLIN **<TBR 6-34>**

32. Perform ISS payload research operations tasks. [IVA]
    A. Journals
    B. Integrated Immune
    C. Sleep Long
33. Perform Rigidizable Inflatable Get-away-special Experiment (RIGEX). **[IVA]**
34. Relocate Express Rack #3 from LAB1O3 to COL1A1 and install new jumpers. **<TBD 6-32> [IVA] [Imagery]**
35. Clean Microgravity Science Glovebox (MSG) filter and relocate MSG from LAB1S3 to COL1F2 **[IVA] [Imagery]**
36. Install Node 2 Zenith EVA hatch window cover. **[IVA]**
37. Install hatch latch handle guide assemblies (x2) (Node 2 Zenith; JLP Nadir **[IVA]**
38. The following tasks are deemed to fit within the existing EVA timelines; however, may be deferred if the EVA is behind schedule. The EVA will not be extended to complete these tasks.
    - Release Node 2 Port ACBM petal cover restraint.
39. Reboost ISS with the Orbiter if mission resources allow and are consistent with ISS trajectory analysis and planning. **[IVA]**
40. Perform imagery survey of the ISS exterior during Orbiter flyaround after undock, if propellant is available. **[IVA] [Imagery]**
41. Perform Maui Analysis of Upper Atmospheric Injections (MAUI) (payload of opportunity) if propellant available. **[IVA] [Ground]**
42. Perform an additional 4 hours per rotating crewmember of ISS crew handover (16 hours per crewmember total). **[IVA]**
43. Perform SDTO 13005-U, ISS Structural Life Validation and Extension, during JLP installation. **[Ground]**
44. Perform SDTO 13005-U, ISS Structural Life Validation and Extension, during 1J/A Orbiter Undocking. **[Ground]**
45. Relocate CBCS from Node 2 Zenith to port ACBM. **[IVA]**
46. Unpack remaining flight 1J/A cargo. **[IVA]**
47. Perform periodic ISS maintenance. **[IVA]**
48. Perform Program-approved EVA get-ahead tasks. The following EVA get ahead tasks do not fit in the existing EVA timelines; however, the EVA team will be trained and ready to perform should the opportunity arise. EVA/MOD has the

flexibility to select the tasks to be completed based on efficiencies gained in performing the already scheduled required tasks.

A. R&R S0 2B-D RPCM and patch panel reconfiguration to restore CMG 2 nominal power string.

B. Global Positioning System (GPS) Antennas # 2 & 4 installation

C. Repair Lab C2-03 MMOD Dzus Fasteners and Reinstall Shield

D. Install Node 1 C2-02 MMOD Shield

E. EuTEF photos [Imagery]

F. Release Node 2 Nadir ACBM petal cover restraints.

6.9.3 ISS/VEHICLE ORBITAL AND CONFIGURATION REQUIREMENTS

6.9.3.1 The maximum rendezvous altitude for Flight 1J/A shall be 342.6 km (185 nmi).

6.9.3.2 The Orbiter shall dock at PMA-2.

6.9.3.3 The ISS with Shuttle docked shall be in Control Moment Gyroscope (CMG) control without ISS thrusters firing as well as the Shuttle Reaction Control System (RCS) inhibited for the following activities:

A. SRMS unberthing of JLP until installation on Node 2 Zenith.

B. SSRMS unberthing of SLP-D1 until installation on MBS POA.

C. MT translation for SPDM assembly.

D. MT translation for SLP-D1 re-berth in Shuttle.

E. SSRMS removal of SLP-D1 from MBS POA until re-berth in shuttle.

6.9.3.4 The ISS with Shuttle docked shall be in a free drift configuration with the CMGs not controlling, Shuttle RCS inhibited and without ISS thrusters firing for the following activities:

None identified.

6.9.3.5 The Space Station Remote Manipulator System (SSRMS) shall be located on the Node 2 with the Mobile Transporter (MT) at worksite #6 at the beginning of Flight 1J/A.

6.9.4 CONTINGENCY REQUIREMENTS

6.9.4.1 MCC-H and Space Station Integration and Promotion Center (SSIPC) shall build procedures, contingency timelines and conduct training for any of the following non-EVA tasks: (The items listed below are for unique tasks or first implementation of new tasks. For contingency tasks not listed below, products/planning are already in

place from previous flights/stages, or the ISS Program has determined that resources will not be applied to develop products/planning until the contingency is invoked).

A. ISS critical maintenance tasks as follows:

None identified.

B. Contingency Orbiter separation from the ISS and re-rendezvous.

6.9.4.2 MCC-H shall build procedures, contingency timelines, and provide pre-flight training for the EVA tasks to sufficient maturity to provide for the EVA response times designated.

A. Class 1: All procedures, timelines, and training are developed and certified to support an EVA response within 24 hours. When listing Class 1 items, a parenthetical should be added to denote the location of the ORU spare, or if prepositioning is required.

1. Orbiter TPS inspection.
2. CBM Contingencies:
   a. Clear/Restrain CBM Capture Latch
   b. Manually Open/Close CBM Petal
   c. Remove/Replace CBM Capture Latch
   d. Remove/Replace CBM Controller Panel Assembly (CPA)
   e. Remove/Replace CBM Petal
3. Contingency power cable routing for stranded MT.
4. Manual release of the Payload Retention Latch Assembly (PLRA) for JLP or SLP-D1 deploy.
5. Manual release of the SRMS LEE from the JLP Flight Releasable Grapple Fixture (FRGF) or OBSS EFGF.
6. Manual release of the SSRMS LEE from the SLP-D1 or OBSS FRGF, SPDM PDGF, or Node 2 PDGF.
7. Manual release of SPDM from the SLP-D1 PDGF.
8. SSRMS Manual Joint Drive.
9. SPDM Manual Joint Drive.
10. TUS Cable Disconnect from IUA.
11. ORUs upstream of CP4 for OBSS: RPCM, DDCU and MBSU.

B. Class 2: For contingencies occurring during the docked time frame an EVA response is based on re-prioritization of the mission tasks. Published procedures and timelines are developed, but may require real-time updates to match the flight specific failure.

None Identified.

C. Class 3: For contingencies related to first flights hardware that are not time critical, skeleton EVA procedures will be developed preflight to support a Class 3 EVA. The EVA response time can be greater than two weeks and can be deferred to the stage or next available mission. The ISS Program has determined that additional resources will not be applied to further refine the training and integrated planning until the failure occurs. Subsequent flight listings for these hardware items will be contained in the GGR&C.

None Identified.

6.9.4.3 The JLP cargo element will be returned for the following conditions:

A. Unable to meet the structural attach requirements for standard orbit operations such as docking/undocking, attitude control, reboost, etc.

6.9.5 JETTISON REQUIREMENTS

Planning and product development, including safety and data packages, will be performed to support jettison of the following items during EVA. This will include trajectory analysis to ensure acceptable low risk of recontact with ISS and of damage or injury following re-entry, procedures and training for the crew including worksite identification and desired jettison direction and velocity, and related hazard assessments, including joint safety review in accordance with SSP 50146.

6.9.5.1 Planned Jettison

The following items are planned for jettison during EVA in this flight:

A. USOS JAL EVAs

None identified.

B. RS DC EVAs

None identified.

6.9.5.2 Contingency Jettison

The following items may require jettison if they cannot be configured safely to allow vehicle dockings or maneuvers or if their continued operation poses a hazard to the EVA crew.

A. USOS JAL EVAs

None identified.

B. RS DC EVAs

None identified.

6.9.6 GROUND SYSTEMS REQUIREMENTS

A. Ground Support is required to operate SDMS, IWIS and EWIS for SDTO: 13005-U.

B. The JEM Flight Control Team (JFCT) at the SSIPC, supported by the JEM Engineering Team (JET), and JAXA personnel at MCC-H, i.e. in ISS Management Center (IMC), International Partner Operations Center (IPOC) and Mission Evaluation Room (MER) will monitor the JLP installation, activation and ingress. Accommodation and Services to be provided by NASA are based on the JAXA requirements defined in the Facility and Communication Requirements for MCC-H/SSIPC Intercenter Operations (FRIO) (SSP 50585), Program Management Operations Interface Procedure (PMOIP) Annex A (SSP 50650-ANX A) and ISS Sustaining Engineering Interface Procedure (SEIP) (SSP 50745).

C. Ground support is highly desired to operate SAMS-II, MAMS and Russian ALO sensors for SDTO: 13005-U. SAMS and MAMS availability will be assessed real time.

6.9.7 ISS REQUIREMENTS ON SHUTTLE DURING NON-DOCKED TIME FRAME

A. Activate the Assembly Power Converter Unit (APCU) in charge within 2 hours after the payload bay doors open to supply electrical power to JLP Launch to Activation (LTA) heaters. **[IVA] [Imagery]**

B. Perform visual inspection of JLP. **[IVA] [Imagery]**

6.10 FLIGHT 1J/A UNDOCK TO FLIGHT 16S REQUIREMENTS (STAGE 1J/A)

This section identifies requirements applicable from Flight 1J/A undock to Flight 16S dock.

6.10.1 <RESERVED>

6.10.2 STAGE 1J/A TASKS (IN DESCENDING PRIORITIZED ORDER)

These tasks, listed in order of ISS Program priority, are to be executed during this stage. The order of execution for these tasks in the nominal plan may vary, depending on timeline efficiencies. An ONS plan **<TBD J-1>** (see Appendix J) shall be prepared preflight. The following numbered tasks shall be accomplished for successful completion of this interval.

1. Perform high priority ISS maintenance and Shuttle Launch Commit Criteria for the next Shuttle Flight. **[IVA] [Imagery]**
2. Undock 28 Progress-M from DC1 Nadir docking port. **<FP TBR 3-8> [IVA]**
3. Perform ISS medical operations (average of 10 crew hours per week for crew of 3). **[IVA]**
4. Perform high-priority OBT (average of 6.4 crew hours per week) substituting planned SSRMS tasks as OBT when appropriate. **[IVA] [Robotics]**
5. Perform checkout and preparation tasks for Flight 16 Soyuz-TMA arrival and Flight 15 Soyuz-TMA return. **[IVA]**
   A. Complete pre-pack.
   B. Perform training and preparation joint operations.
   C. Complete Flight plan reviews.
   D. Perform tool preparation.
   E. Perform transfer tag-up.
6. Perform checkout and preparation tasks for Flight 1J. **[IVA]**
   A. Position MT at WS #4 for Flight 1J joint operations. **[Robotics] [Ground]**
   B. Perform SSRMS pre-launch checkout at Node 2 PDGF. **[Robotics] [Ground]**
   C. Complete Flight 1J pre-pack.
   D. Unstow and configure Joint Airlock.
   E. Perform tool preparation.
   F. Configure and check out EVA tool equipment.
   G. Unpacking of JPM outfitting items in the JLP, if not completed during Flight 1 J/A. **[IVA]**
   H. Prepare JPM systems racks in JLP for transportation, if not completed during Flight 1 J/A. **[IVA]**

I. Remove two sets of rack dummy panels (hard type) from JLP standoff, assemble and stow them, if not completed during Flight 1 J/A. **[IVA]**

J. Configure and checkout CBCS at Node 2 Port ACBM. **[IVA]**

K. Assemble JEM Television Equipment (JTVE) booms.

7. Perform high priority ISS payload operations (total average of 8.5 hours per week). **[IVA]**

8. Perform high priority ISS PAO events (average 2 crew hours per week). **[IVA]**

9. Perform medium priority ISS maintenance **[IVA]**

A. Weekly monitoring of JLP heater systems using Minimum Keep Alive Monitor (MKAM) software on System Laptop Terminal (SLT).

10. Perform ATV1 demonstration of Propellant Transfer and operations. **[IVA] [Imagery]**

11. Perform ATV1 demonstration of Transfer Operations. **[IVA] [Imagery]**

A. Perform Atmospheric Repress operations of a minimum quantity of 20 kg of gas.

B. Perform Water Transfer operations of a minimum of one (1) EDV (22 kg) of water and collect archival sample.

12. Perform medium-priority ISS payloads operations (average of 2.5 crew hours per week). **[IVA]**

13. Perform low priority OBT substituting planned SSRMS tasks as OBT when appropriate. **[IVA] [Robotics]**

14. Perform activation/checkout of SPDM per Appendix H (if not completed during Flight 1J/A). **[Robotics] [Ground]**

15. Assemble and install the cargo containers in the FGB if crew time permits. Delivery of the cargo containers is planned for the ATV1 vehicle. **[IVA]**

16. Perform remaining ISS PAO events (average of 2.5 crew hours per week). **[IVA] [Imagery]**

17. Perform remaining Flight 1J/A cargo stowage. **[IVA]**

18. Perform ISS remaining maintenance. **[IVA]**

19. Perform remaining ISS payload operations (total average of 2.5 **<TBR 4-1>** crew hours per week). **[IVA]**

20. Reboost ISS with ATV1 Thrusters as required. **[Ground]**

21. Install high priority FGB enclosures (Zones 16 & 19, 10 &12) delivered on ATV1. **[IVA] [Imagery]**

22. Perform SDTO 15008-U, Solid State Lighting Module (SSLM) for GLA removal and SSLM installation/removal then GLA reinstallation. **<TBD 6-28> [IVA] [Ground]**

23. Perform SDTO 13004-U, Russian Vehicle Docking/Undocking Loads on ISS, for 28P undocking (IWIS required). **[IVA] [Ground]**
24. Install the sediment trap insert in the condensate water processor [___-_2_]. Delivery of the equipment is scheduled on 28P. **[IVA]**
25. Perform SDTO 13005-U ISS Structural Life Validation and Extension, for ISS alone reboost (IWIS required). **[IVA] [Imagery] [Ground]**
26. Load 1 SSC with software for JEM use. **[IVA]**
27. Install low priority FGB enclosures (Zones 5, 8 & 9, 21, 36, 26, 23A, 28_, 23_, 48, 42A) delivered on ATV1. **[IVA] [Imagery]**
28. Transfer remaining FGB Enclosures from ATV1 prior to ATV undock, if not completed during Stage 1E. **[IVA]**
29. Install additional FGB Enclosures, if time permits and not completed during Stage 1E. **[IVA]**

6.10.3 ISS/VEHICLE ORBITAL AND CONFIGURATION REQUIREMENTS

6.10.3.1 The ATV1 shall undock from the SM Aft port. **<FP TBR 3-38>**

6.10.3.2 The 28 Progress-M shall undock from the DC1 Nadir docking port. **<FP TBR 3-8>**

6.10.3.3 The ISS shall be in CMG control without ISS thrusters firing for the following activities:

A. ISS shall mode to free drift before physical separation of ATV1. The free drift time should be sufficient for the MCC-M assessment of the mode execution; ATV1 commanding of hooks opening and physical completion of hooks opening, but not exceed 7 minutes and 10 seconds.

6.10.3.4 The ISS attitude for ATV1 undocking shall be LVLH (0,0,0).

6.10.3.5 The USOS solar arrays must be feathered to angle for minutes prior to undocking of the ATV1.

6.10.3.6 The ISS shall be in free drift configuration with the CMGs not controlling and without ISS thrusters firing for the following activities:

None identified.

6.10.3.7 ATV1 Docking Constraints.

A. The USOS P4, S4 and P6 solar arrays must be configured to avoid Relative Global Positioning System (RGPS) interference during ATV1 rendezvous and docking from arrival at point $S_{-1/2}$ until soft docking point when mechanical capture of ATV to the ISS was accomplished.

   The specific USOS and RS solar array and radiator positions are as follows:

   1. The SARJ shall be feathered at 0^{o} starting prior to arrival at $S_{-1/2}$ to avoid RGPS interference.
   2. The radiator positions shall be **<TBD 6-3>**.

B. The The USOS P4, S4 and P6 solar arrays must be configured to minimize their plume impingement from SM and ATV thrusters during the attitude hold prior to the maneuver to TEA (0,0,0) until the maneuver of the ISS back to nominal stage TEA is complete.

   1. Detailed P4, S4, and P6 BGA angles and time durations are **<TBD 6-29>.**

C. The USOS P4, S4 and P6 solar arrays, SM and FGB arrays must be configured to minimize the interference with KURS short range antennas prior to S2 until soft docking point when mechanical capture of ATV to the ISS was accomplished.

   1. No additional constraints on P4, S4, and P6 BGA angles if SARJs are at 0.
   2. The FGB arrays should be retracted or feathered if not retracted.
   3. The Service Module (SM) arrays shall be positioned at **<TBD 6-7>**.

D. The USOS P4, S4 and P6 solar arrays must be configured to sustain docking operations (loads and plum impingement) prior to S3 until hard docking of the ATV to the ISS was performed (mechanical latches are fully closed).

   1. Detailed P4, S4, and P6 BGA angles and time durations are **<TBD 6-29>.**
   2. The FGB arrays should be retracted or feathered if not retracted.
   3. The Service Module (SM) arrays shall be positioned at **<TBD 6-7>**.
   4. The radiator positions shall be **<TBD 6-3>**.

E. The USOS P4, S4 and P6 solar arrays must be configured to avoid longeron shadowing hazard prior to the maneuver to TEA (0,0,0) until the maneuver of the ISS back to nominal stage TEA is complete.

   1. Detailed P4, S4, and P6 BGA angles and time durations are **<TBD 6-29>.**

6.10.4 CONTINGENCY REQUIREMENTS

6.10.4.1 MCC-H and MCC-M shall build procedures, contingency timelines, and conduct training to allow the crew to perform the following non-EVA tasks (The items listed below are for unique tasks or first implementation of new tasks. For contingency tasks not listed below, products/planning are already in place from previous

flights/stages, or the ISS Program has determined that resources will not be applied to develop products/planning until the contingency is invoked.):

A. ISS critical maintenance tasks as follows:

   None identified.

B. Complete critical unfinished Flight 1J/A assembly tasks as follows:

   None Identified.

C. Remove/replace critical spares as follows:

   None identified.

6.10.4.2 MCC-H and MCC-M shall build task specific procedures, contingency timelines, and conduct training to a high level sufficient to meet the following objectives:

<TBD 6-13>

The readiness of these tasks will be based upon the generic development of the task procedures and timelines to a level that can be validated against a set of criteria defined in GGR&C 3.9.1, “Process for EVA Readiness”. For contingency tasks not listed below, the ISS Program has determined that until the contingency is invoked, resources will not be applied to develop products or plans and the feasibility to perform those tasks on this flight/increment will be undetermined.

A. ISS critical maintenance tasks as follows. This list is not in order of priority. The criteria for tasks being added to this list are that the failure of the function provided by the ORU causes a situation placing the ISS in a configuration that is zero tolerant, or effectively zero fault tolerant, to survival.

   The tasks listed in Paragraph 6.6.4.2 are still applicable.

B. Complete critical unfinished Flight 1J/A assembly tasks as follows:

   1. Assembly and activation of SPDM to allow MT translation.

C. Remove/replace critical spares as follows:

   The tasks listed in Paragraph 6.4.4.2 C are still applicable.

6.10.5 JETTISON REQUIREMENTS

Planning and product development, including safety and data packages, will be performed to support jettison of the following items during EVA. This will include trajectory analysis to ensure acceptable low risk of recontact with ISS and of damage or injury following re-entry, procedures and training for the crew including worksite identification and desired jettison direction and velocity, and related hazard assessments, including joint safety review in accordance with SSP 50146.

6.10.5.1 Planned Jettison

The following items are planned for jettison during EVA in this stage:

A. USOS JAL EVAs

None identified.

B. RS DC EVAs

None identified.

6.10.5.2 Contingency Jettison

The following items may require jettison if they cannot be configured safely to allow vehicle dockings or maneuvers or if their continued operation poses a hazard to the EVA crew.

A. USOS JAL EVAs

None identified.

B. RS DC EVAs

None identified.

6.10.6 GROUND SYSTEMS REQUIREMENTS

<TBD 6-15>

APPENDIX A - ACRONYMS AND ABBREVIATIONS

A/L	Airlock
ACBM	Active Common Berthing Mechanism
Aft	at the back of a craft
ALO	Optical Linear Accelerometers
ANX	Annex
APCU	Assembly Power Converter Unit
APM	**<TBD A-1>**
APPC	Arm Pitch Plane Change
AR	**<TBD A-1>**
ARCU	American-to-Russian Converter Unit
ARISS	Amateur Radio on International Space Station
ARS	Air Revitalization System
Assy	Assembly
ATCS	**<TBD A-1>**
ATV	Automated Transfer Vehicle
AVCO	Air Velocity Closeout
AVM	Anti-Vibration Mount
BCDU	Battery Charge/Discharge Unit
BGA	Beta Gimbal Assembly
BIOLAB	Biological Laboratory
CBCS	Centerline Berthing Camera System
CBM	Common Berthing Mechanism
CCAA	Common Cabin Air Assembly
CD	Compact Disk
CDR	Commander
CD-ROM	Compact Disk - Read Only Memory
CETA	Crew and Equipment Translation Aid
CEVIS	Cycle Ergometer with Vibration Isolation and Stabilization System
CGBQ	Commercial Generic Bioprocessing Apparatus
CHeCS	Crew Health Care System
CLA	Capture Latch Assembly
CLPA	Camera Light Pan Tilt Assembly
CMG	Control Moment Gyroscope
CMS	**<TBD A-1>**
CO	Carbon Monoxide
CO_2	Carbon Dioxide
CoFR	Certification of Flight Readiness
Col-CC	Columbus Control Center
CPA	Control Panel Assembly
CR	Change Request
CSA	Canadian Space Agency
CSD	Common Schedule Database
CSRD	Current Stage Requirement Document

CTB	Cargo Transfer Bag
CTBE	Cargo Transfer Bag Equivalent
DC	Docking Compartment
DCSU	Direct Current Switching Unit
DDCU	Direct Current-to-Direct Current Converter Unit
DDCU-E	Direct Current-to-Direct Current Converter Unit - External
Deg	degree
DLA	Drive Lock Assembly
DMT	Decreed Moscow Time
DO	Daily Orbits
DQA	Document Quality Assurance
DTO	Development Test Objective
DVD	**<TBD A-1>**
EarthKAM	Earth Knowledge Acquired by Middle School
EATCS	External Active Thermal Control System
ECLS	Environmental Control and Life Support
ECLSS	Environmental Control and Life Support System
ECU	Electronics Control Unit
EDMS	Electronic Document Management System
EDR	European Drawer Rack
EDV	**<TBD A-1>**
EF	Exposed Facility
EFBM	Exposed Facility Berthing Mechanism
EHS	**<TBD A-1>**
ELM-PS	Experiment Logistics Module - Pressurized Section
ELPS	Emergency Lighting Power Supply
EMCS	European Modular Cultivation System
EMU	Extravehicular Mobility Unit
EPF	External Payload Facility
EPM	European Physiology Module
EPO	**<TBD A-1>**
EPS	Electrical Power System
ESA	European Space Agency
ESEL	EVA Support Equipment List
ESP	External Stowage Platform
ETC	European Transportation Carrier
ETCS	External Thermal Control System
EuTEF	European Technology Exposure Facility
EV	Extravehicular
EVA	Extravehicular Activity
EVP	**<TBD A-1>**
EWIS	External Wireless Instrumentation System
EXPRESS	EXpedite the PRocessing of Experiments to the Space Station
EXT	External

FE	Flight Engineer
FEL	First Element Launch
FGB	Functional Cargo Block
FHRC	Flex Hose Rotary Coupler
FLAP	Fluid Line Anchor Patch
FMA	Force/Moment Accommodation
FMS	Force Moment Sensor
FOV	Field of View
FP	Flight Program
FRAM	Flight Releasable Attach Mechanism
FRGF	Flight Releasable Grapple Fixture
FSE	Flight Support Equipment
FSL	Fluid Science Laboratory
ft	feet
ft	foot
Fwd	Forward
GAP	**<TBD A-1>**
GB	**<TBD A-1>**
GC	Ground Control
GCF	Granada Crystallization Facility
GGR&C	Generic Groundrules, Requirements, and Constraints
GLA	General Luminaire Assembly
GN&C	Guidance, Navigation, and Control
GN_2	gaseous nitrogen
H	High Beta Angle
H/W	Hardware
H_2	Hydrogen
HDTV	High Definition Television
HMS	**<TBD A-1>**
HPGT	High Pressure Gas Tank
HRD	High Rate Dosimeter
HRF	Human Research Facility
HRP	**<TBD A-1>**
hrs	hours
HTV	**<TBD A-1>**
I-	Increment minus
IBM	International Business Machines
ICC	Integrated Cargo Carrier
ICEPAC	ISS Cold Enclosure PCM Augmenting Capsule
IDRD	Increment Definition and Requirements Document
IEA	Integrated Equipment Assembly
IELK	Individual Equipment Liner Kit
IFHX	Interface Heat Exchanger
IMC	ISS Management Center

IMS	Inventory Management System
IMV	Intra-Module Ventilation
in	Inch
IP	International Partner
IRED	Interim Resistive Exercise Device
ISPR	International Standard Payload Rack
ISS	International Space Station
ISS MORD	International Space Station Medical Operations Requirements Documents
ITCS	Internal Thermal Control System
IV	Intravehicular
IVA	Intravehicular Activity
IWIS	ISS Wireless Instrumentation System
JAL	Joint Airlock (see AL)
JAXA	Japan Aerospace Exploration Agency
JEM	Japanese Experiment Module
JET	JEM Engineering Team
JFCT	JEM Flight Control Team
JLP	JEM Experiment Logistics Module - Pressured Section
JPM	JEM Pressurized Module
JRSR	JEM Resupply Stowage Rack
JSC	Johnson Space Center
JTVE	**<TBD A-1>**
KAU	Keep Alive Umbilical
KBAR	Knee Brace Assembly Replacement
kg	kilogram
km	kilometer
KOZ	Keep-Out Zone
KSC	Kennedy Space Center
KURS	**<TBD A-1>**
kW	kilowatt
L	Low Beta Angle
L-	Launch minus
Lab	Laboratory
LADA	**<TBD A-1>**
LAN	Local Area Network
lb	pound
lbm	Pounds Mass
LCVG	**<TBD A-1>**
LEE	Latching End Effector
LPM	Launch Package Manager
LTA	Launch To Activation
LTL	Low Temperature Loop

LVLH	Local Vertical Local Horizontal
M	Medium Beta Angle
m3	cubic meter
MAMS	Microgravity Acceleration Measurement System
MAUI	Maui Analysis of Upper Atmospheric Injections
Max	Maximum
Med	**<TBD A-1>**
MBS	MRS Base System
MBSU	Main Bus Switching Unit
MCC	Mission Control Center
MCC-H	Mission Control Center - Houston
MCC-M	Mission Control Center - Moscow
MCD	Molecular Column Density
MCOP	Multilateral Crew Operations Panel
MDM	Multiplexer/Demultiplexer
MER	Mission Evaluation Room
METOX	Metal Oxide
MIC	Mission Integration Contract
min	Minute
MIP	Mission Integration Plan
MIR	Mission Integration Review
MIS	**<TBD A-1>**
MISSE	Materials International Space Station Experiment
MKAK	Minimum Keep Alive Kit
MKAM	Minimum Keep Alive Monitor
MLB	MSS Local Bus
MLE	Middeck Locker Equivalent
MLI	Multi-Layer Insulation
MMOD	Micro meteoroid orbital debris
MOD	Mission Operations Directorate
MOP	**<TBD A-1>**
MPCB	Multilateral Payloads Control Board
MPESS	Multi-Purpose Experiment Support Structure
MPEV	Manual Pressure Equalization Valve
MPLM	Multi-Purpose Logistics Module
MRS	Mobile Remote Servicer
MSG	Microgravity Science Glovebox
MSS	Mobile Servicing System
MT	Mobile Transporter
MTL	**<TBD A-1>**
MUS	Mass Storage Device Utilization Service
MWS	**<TBD A-1>**
N/A	Not Applicable
N_2	Nitrogen

NASA	National Aeronautics and Space Administration
NCR	Non-Compliance Report
NET	No Earlier Than
NH_3	Ammonia
NLT	No Later Than
nmi	nautical mile
NPRV	Negative Pressure Relief Valve
NSTS	National Space Transportation System
NTA	Nitrogen Tank Assembly
O	Overhead
O_2	Oxygen
OBSS	Orbiter Boom Sensor System
OBT	Onboard Training
OCA	Orbiter Communication Adapter
OCR	On-orbit Checkout Requirement
ODF	Operations Data File
OGS	Oxygen Generating System
OMI	**<TBD A-1>**
ONS	Off-Nominal Situation
Ops	Operations
ORG	Organization
ORU	Orbital Replacement Unit
OSE	Orbital Support Equipment
OTCM	ORU Tool Change-out Mechanism
OTSD	**<TBD A-1>**
ORZS	Optimization of Root Zone Substrates
P	Progress
P/L	Payload
PAO	Public Affairs Office
PBA	Portable Breathing Apparatus
PCBA	Portable Clinical Blood Analyzer
PCDF-PU	**<TBD A-1>**
PCE	Proximity Communication Equipment
PCMCIA	**<TBD A-1>**
PCS	Portable Computer System
PDB	Power Distribution Box
PDGF	Payload Data Grapple Fixture
PDGF	Power Data Grapple Fixture
PDU	**<TBD A-1>**
PFCS	Pump Flow Control Subassembly
PFE	Portable Fire Extinguisher
PGCS	**<TBD A-1>**
PIER	Post Increment Evaluation Report
PL	Payload

PLB	Payload Bay
PM	Pressurized Module
PMA	Pressurized Mating Adapter
PMZ	Promethazine
POA	Payload ORU Accommodation
POR	Point of Resolution
PPA	Pump Package Assembly
PPRV	Positive Pressure Relief Valve
PRD	Payload Retention Device
Prep	Preparation
PRLA	Payload Retention Latch Assembly
PSU	Power Switching Unit
PU	Process Unit
PV	Photovoltaic
PVCU	Photovoltaic Controller Unit
PVR	Photovoltaic Radiator
PWR	Portable Water Reservoir
QD	Quick disconnect
R	Russian
R Sz	Soyuz Rotation
R&R	Remove and Replace
RACU	Russian-to-American Converter Unit
RAM	Radiation Area Monitor
RAMBO	RAM Burn Observations
RCS	Reaction Control System
Ref	Reference
RGPS	Relative Global Positioning System
RIGEX	Rigidizable Inflatable Get-away-special Experiment
RMS	Remote Manipulator System
RPCM	Remote Power Controller Module
RPM	Rbar Pitchover Maneuver
RS	Russian Segment
RSA	Russian Space Agency
RSC-E	Rocket Space Corporation - Energia
RSR	Resupply Stowage Rack
RTAS	Rocketdyne Truss Attachment System
RTL	Ready To Latch
RVE	Rack Volume Equivalent
RWS	Robotic Workstation
S&MA	Safety and Mission Assurance
SAB	Space Applications Board
SACU	SPDM Arm Control Unit
SAFER	Simplified Aid for EVA Rescue
SAMS	Space Acceleration Measurement System

SAMS-II	Space Acceleration Measurement System - II
SARJ	Solar Alpha Rotary Joint
SASA	S-Band Antenna and Support Assembly
SAW	Solar Array Wing
S-Band	1550 to 5200 Megahertz
SDBI	Short Duration Bioastronautics Investigation
SDMS	Structural Dynamic Measurement System
SDTO	Station Development Test Objective
SE	Subelement
SEED	Space Enviroment Exposure Device
SFU	Squibb Firing Unit
SLP	Space Lab Pallet
SLP-D1	Space Lab Pallet - Deployable 1
SM	Service Module
SMDP	Service Module Debris Panels
SOLAR	**<TBD A-1>**
SORR	Stage Operations Readiness Review
SPD	Spool Positioning Device
SPDM	Special Purpose Dexterous Manipulator
SPHERES	Synchronized Position Hold Engage Reorient Experimental Satellites
SPIP	Station Program Implementation Plan
SRMS	Shuttle Remote Manipulator System
SRT	Safing Remote Terminal
SRV-K	Russian water processor
SSC	Station Support Computer
SSCB	Space Station Control Board
SSCD	Space Station Change Directive
SSCN	Space Station Change Notice
SSCN	Space Station Change Number
SSIPC	Space Station Integration and Promotion Center
SSP	Space Shuttle Program
SSP	Space Station Program
SSPCB	Space Station Program Control Board
SSPTS	Station/Shuttle Power Transfer System
SSRMS	Space Station Remote Manipulator System
SSU	Sequential Shunt Unit
Stbd	starboard
STS	Space Transportation System
SWAB	Surface, Water, Air Biocharacterization
Sz	Soyuz
TBD	To Be Determined
TBR	To Be Resolved
TCS	Thermal Control System
TEA	**<TBD A-1>**
temp	temporary

TeSS	Temporary Sleep Station
THA	Tool Holster Assembly
TMA	Transportation Modified Anthropometric
TO	Target Object
TOCA	Total Organic Carbon Analyzer
TPL	Transfer Priority List
TPS	Thermal Protection System
TRAD	**<TBD A-1>**
TV	Television
TVIS	Treadmill with Vibration Isolation System
U	Ultrasound
U.S.	United States
U.S. Lab	United States Laboratory
UIRB	Universal Inspection Repair Boom
USOC	U.S. Science Operations Center
USOS	United States On-orbit Segment
V	Volt
VC	Visiting Crew
VOA	Volatile organic analyzer
vs.	Versus
VTC	Vital Telemetry & Command Controller
W	Watts
WG	Working Group
WIF	Worksite Interface
WR	Wrist Roll
WS	Work Site
WS	Workstation
X	X-axis
X	XVV Flight Attitude
XPOP	X-Axis Perpendicular to the Orbital Plane
XVV	X-Axis into the Velocity Vector
Z	Zenith
Z1	Z1 Truss
Zero-g	Zero-gravity
ZSR	Zero-gravity Stowage Rack

APPENDIX B - GLOSSARY AND TERMS

ACCOMMODATIONS

Launch vehicles or ISS physical locations where utilization or system items are stowed or installed. The following specific types of accommodations are recognized (the unit of measure of the accommodation is shown in parentheses):

A. Rack locations (number)

B. MLEs

C. CTBEs

D. Pressurized volume (RVE)

E. Unpressurized volume (cubic feet)

F. Truss attach points (number)

G. Experiment Module Exposed Facility attach points (number)

H. Experiment Logistics Module Exposed Section attach points (number)

ALLOCATION

The portioning of resources and accommodations to the ISS users. Total ISS resources and accommodations are allocated between system and utilization. Utilization resources and accommodations are allocated between IPs.

ASSEMBLY PHASE

Refers to the time period starting with First Element Launch (FEL) and ending with the landing of the last flight in the assembly sequence.

CARGO CARRIER

Element of a transportation vehicle that provides capability to carry cargo.

CHECKOUT

To ensure that the rack performs its intended functions with respect to data, power, Thermal Control System (TCS), etc.

CONSOLIDATED OPERATIONS AND UTILIZATION PLAN

The strategic document that defines the system and utilization activities planned for the ISS. On a planning period basis, it establishes the amount of resources and accommodations allocated to and subscribed by system and each International Partner for utilization, and reflects the planned amounts of supporting services from other Programs that are available and subscribed. The Consolidated Operations and Utilization Plan also provides specific direction and guidance to tactical planning regarding Consolidated Operations and Utilization Plan implementation.

CONTINGENCY EXTRAVEHICULAR ACTIVITY

An unplanned EVA required to support the safe return of the vehicle and crew and/or restore critical systems/functions.

CREW DAYS IN SPACE

The time period from launch of a crew rotation vehicle to landing of the vehicle which returns that crew.

CREW DAYS ON THE ISS

The time period from docking of a crew rotation vehicle to undock of the vehicle which returns that crew.

EXECUTION PLANNING

The planning that occurs 18 months before the start of an increment through real-time operations.

FLIGHT

For Shuttle flights, the term “Flight” refers to the sequence of events that takes place between the lift-off and landing of the Shuttle. For permanent Russian Elements flights, the term refers to the sequence of events that takes place between the lift-off of the element through completion of docking to the ISS. For replaceable International Partner (IP) Element flights, the term refers to the sequence of events that take place between lift-off and entry/landing of the element.

HARD COMMIT

Amount of resources allocated to utilization based on specified ISS Program system capabilities.

INCREMENT

(Also known as Expedition.) A specific time period which combines different operations such as assembly, scientific research, testing, logistics, maintenance, and other ISS system and utilization operations. The initial unmanned timeframe and subsequently, the timeframe of each crew expedition. During the assembly phase, an increment is defined as a period supporting crew rotation. The duration of an increment is the time period from the launch of a designated Expedition crew to the undocking of the return vehicle for that Expedition crew.

INSTALL

Complete the structural attachment and, if applicable, connect utilities.

INTEGRATED TRUSS SEGMENT

An un-pressurized structural element of the ISS that includes ground-installed electrical, thermal, communications, command, and data components. Examples are Zenith (Z)1 and Starboard (S)0.

INTERNATIONAL PARTNER

Denotes the international space agencies that are jointly involved in the development of the ISS. These agencies include the Canadian Space Agency (CSA), European Space Agency (ESA), NASA, Japan Aerospace Exploration Agency (JAXA), and Federal Space Agency (Roscosmos).

JETTISON

The intentional manual release of an object during an EVA such that the object safely separates from ISS and eventually re-enters through earth's atmosphere. Jettisons may be planned, to achieve waste disposal or scientific objectives, or in response to a contingency, such as inability to install or safely stow or return an item.

Ku-Band

12.0 to 18.0 Gigahertz, frequencies used by the ISS Ku-band subsystem are an uplink frequency of 13.775 GHz and a downlink frequency of 15.0034 GHz.

LAUNCH VEHICLE

A booster vehicle that delivers the transportation vehicle from the launch pad to an insertion orbit in low earth orbit (Proton, Soyuz, Arian 5, or H_2 for example).

NONRECOVERABLE CARGO

Cargo that is designated as cargo that will either be destroyed upon reentry or when it is returned to Earth (e.g., Shuttle/ISS trash).

OBJECTIVES

High-level goals that do not specify any particular activity. For an IDRD, each increment will have objectives. During assembly, the main system objectives are building, activating, and supporting the ISS. Examples of utilization objectives during assembly are installing and activating research facility racks, and performing research operations.

PLANNING PERIOD

Approximately one calendar year of ISS activity. A planning period is comprised of one or more increments.

RACK VOLUME EQUIVALENT

A unit of volume that equals 36.0 cubic feet or 1.0193 cubic meters.

RECOVERABLE CARGO

Cargo that is removed from the ISS and returned to Earth to be refurbished for future use, samples for evaluation, or items to be examined as part of sustaining engineering.

RESOURCES

Identifies a particular subset of ISS on-orbit capabilities used in support of system and utilization operations. It includes the following:

A. Average power kW

B. Crew time (hours)

C. Communications

D. On-orbit accommodations (pressurized and unpressurized)

E. Transportation Mass

F. Transportation Volume

S-BAND

1550 to 5200 Megahertz

SCHEDULED EXTRAVEHICULAR ACTIVITY

An EVA planned prior to the start of an increment or flight/stage with nominal crew training and included in the nominal mission timeline.

SHORT DURATION BIOASTRONAUTICS INVESTIGATION

A medical research payload that will be flown and returned in a pressurized volume on the same Shuttle flight, involves a Shuttle (non-ISS) crewmember(s) as the test subject, and does not require any ISS resources (e.g., ISS crew time, ISS power, ISS communications) to accomplish the research objective. Responsibility for manifesting and prioritizing Short Duration Bioastronautics Investigations (SDBIs) with respect to the other ISS payloads resides with the ISS Payloads Office. However, responsibility for planning SDBI activities and resources during the mission, as well as Certification of Flight Readiness (CoFR) for the SDBIs, resides with the Space Shuttle Program and will be accomplished in accordance with Space Shuttle Program processes and procedures.

SOFT COMMIT

Amount of resources estimated to be available to utilization based on either estimated capabilities above specified conditions/assumptions, a reduction of system reserves, or both.

STAGE

Period of on-orbit configuration of the ISS after each flight which adds capability to the ISS. This can also refer to a designated period between launch vehicles defined by the ISS Program for requirement documentation and planning purposes.

SYSTEMS

A group of H/W that collectively supports or provides capabilities to the orbiting ISS. In general, anything other than utilization. Specifically included in this set are assembly, logistics/maintenance environmental support, power, etc.

TASK TYPE DESIGNATOR

Identifies categories for mission task requirements and include: [Extravehicular Activity (EVA)], [Intravehicular Activity (IVA)], [Robotics], [Robotic On-board Trainer (ROBoT)], [Utilization], [Ground], [Jettison] and [Imagery].

TRANSFER

To remove H/W and/or provisions from one vehicle or module and place onto another vehicle or module.

TRANSFER VEHICLE

A transportation vehicle that provides capability to move mass and volume from the insertion orbit to ISS and from ISS to reentry.

TRANSPORTATION VEHICLE

A vehicle that docks to the ISS to deliver provisions, cargo and/or crew for ISS operations.

UNSCHEDULED EXTRAVEHICULAR ACTIVITY

An EVA resulting from unforeseen developments during a mission and not included in the nominally scheduled mission activities, but which may be required to achieve ISS Program mission success.

USOS (UNITED STATES ON-ORBIT SEGMENT)

Term that generically describes ISS hardware and software systems manufactured and installed on-orbit by NASA. Within this document, examples of USOS include the truss solar arrays for the generation of power and the Joint Airlock, EMU suit, tools and associated hardware for NASA based EVAs.

UTILIZATION

The set of requirements associated with research experiment integration and operation.

VALIDATION

The process of formally approving the developed process, services, or products at the conclusion of operational test and evaluation. This approval indicates developed processes, services, or products satisfy their intended operational mission.

VERIFICATION

The activities which assure that each level of requirements (including test requirements) or specifications correctly echoes the intentions of the immediately superior level of requirements.

APPENDIX C - OPEN WORK

Table C-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 (i.e., **<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 marked "Closed" in the status column. 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 and the same TBD number cannot be used more than once. NOTE: TBDs incorporated into this document via the IDRD Flight Program will be preceded by "FP" (i.e. **<FP TBD 3-XX>**).

TABLE C-1 TO BE DETERMINED ITEMS (PAGE 1 OF 3)

TBD	Section	Description	Status
1-1	Table 3.3-1	The flight that returns the Increment 16/17 FE has not been determined	Open
1-2	2.1, Table 3.2-1	Increment Definition and Requirements Document for Increment 17 has not been developed	Open
1-3	1.2	Increment 16 has not been defined in SSP 54100	Closed
1-4	2.1, Table 3.2-1	Increment Definition and Requirements Document for Increment 15 has not been baselined.	Closed
1-5	1.2, 2.1	SSP 54016-15S has not been published.	Open
1-6	1.2, 2.1	SSP 54016-1E has not been published.	Closed
1-7	1.2, 2.1	SSP 54016-27P has not been published.	Closed
1-8	1.2, 2.1	SSP 54016-1J/A has not been published.	Closed
1-9	1.2, 2.1	SSP 54016-28P has not been published.	Open
1-10	1.2, 2.1	SSP 54016-1J has not been published.	Closed
1-11	1.2, 2.1	SSP 54016-ANX2 has not been published.	Open
1-12	1.2, 2.1	SSP 54016-ANX3 has not been published.	Open
1-13	1.2, 2.1	SSP 54016-ANX4 has not been published.	Open
1-14	1.2, 2.1, Table 3.3-1, 4.0, 4.1, 4.2, .4.5, 6.2	SSP 54016-ANX5 has not been published.	Closed
1-15	1.3	SSP 543XX, Post Increment Evaluation Report for Increment 16, has not been published.	Open
3-1	Table 3.3-1	Data for Table 3.3-1 will be provided when the IDRD is baselined or in a PAL addendum.	Closed
3-2	Table 3.3-1	Crew assignment is to be determined.	Closed
3-3	Table 3.3-1	Utilization objectives are to be determined.	Closed
3-4	Table 3.3-1	Addition of MISSE-6 and RIGEX payloads to Flight 1J/A is under review.	Closed
3-5	Table 3.3-1	Section 6 tasks for ATV1 undocking to be added for CR release.	Closed
3-6	Section 3.4	Need for deviation to be addressed prior to IOR GGR&C SSCN 9635 proposes relaxation of this constraint such that a deviation would not be required for 14S landing.	Closed

TABLE C-1 TO BE DETERMINED ITEMS (PAGE 2 OF 3)

TBD	Section	Description	Status
3-8	Section 3.4	Approval is pending and will be presented to the SRP	Closed
3-9	Table 3.2-1	27P undock date assumed, pending IDRD Flight Program update.	Open
4-1	Table 4.5-1	Data for this table will be provided at a later date.	Closed
4-2	Table 4.2-1	Crew time projections do not allow a commitment to meet utilization requirements.	Open
5-1	Table 5.0-1	Data to be worked as a PAL 16 addendum or through the IDRD process.	Closed
5-2	Table 5.0-1	Mass and Volume to be provided at a later date.	Open
5-3	Table 5.0-1	Flights 1J/A ascent/descent cargo and consumables transfer allocations are not fully defined.	Closed
5-4	Table 5.0-1A	Power requirements for Flight 1J/A payloads are not defined.	Closed
6-1	6.2	Inputs to be provided by RSC-E.	Closed
6-2	6.3.2, 6.8.2	Inputs to be submitted by OZ.	Closed
6-3	6.4.2, 6.6.2, 6.8.2, 6.10.2, 6.10.3	OBT time to be determined.	Open
6-4	6.5.2, 6.7.2, 6.9.2	Orbiter reboost requirement to be determined.	Closed
6-5	6.5.2	Determine U.S./Russian payload time allocation during Flight 1E.	Closed
6-6	6.5.2, 6.6.2	Determine proper wording and placement of ACBM C/Os, CPA installs, and ACBM petal/pin EVA tasks.	Closed
6-7	6.7.3.7, 6.10.3.7	Determine Solar Array Position for critical operations during Flight 1E.	Open
6-8	6.5.4.1, 6.5.4.2	Determine other requirements for Columbus Module.	Closed
6-9	6.4.4.2	Details of this task are TBD.	Open
6-10	6.5.6	Ground NASA facilities required by ESA is TBD.	Closed
6-11	6.6.2	Determine WS# location for SSRMS checkout in Stage 1E.	Closed
6-12	6.5.2	The priority of the tasks in Flight 1E are TBD.	Closed
6-13	6.8.4.2, 6.10.4.2	Determine objectives for Contingency Requirements.	Open
6-14	6.8.2	Determine WS# location for SSRMS in Stage 1J/A.	Closed
6-15	6.10.6	Determine Ground System Requirements for Stage 1J/A.	Open
6-16	6.3.2	Visiting crew operations during Flight 15S to be determined.	Closed
6-17	6.7.2	EVA working group to confirm EVA planning for this task. Task required prior to Flight 1J.	Closed
6-18	6.8.2	The RS EVA #20 will not be performed if the SMDP tasks are completed during Increment 15.	Closed
6-19	6.6.3.4	Work to transition this requirement from the IDRD to SSP 50669	Closed
6-20	6.5.2	Priority pending OZ requirements review of IDRD Blank Book Payload wording.	Closed
6-21	6.7.2	Locations of racks to be added.	Closed
6-22	6.9.2	Pending assessment of ability to do reconfiguration during stage.	Closed
6-23	6.5.2	Need to define Appendix H striation.	Closed
6-24	6.10.2, 6.10.3.4	ATV Docking/Undocking constraints have yet to be fully determined.	Open
6-25	6.7.2	Prioritized list of SPDM ORU tasks is in work.	Closed
6-26	6.4.3.1	Assessment in work to avoid the beta constraint by flying -XVV attitude.	Closed
6-27	6.9.2	Prioritization of utilization tasks vs. JEM RMS checkout is inconsistent with GGR&C.]	Closed

TABLE C-1 TO BE DETERMINED ITEMS (PAGE 3 OF 3)

TBD	Section	Description	Status
6-28	6.8.2, 6.9.2, 6.10.2	This SDTO is not currently certified for on-orbit operations.	Open
6-29	6.6.3.7, 6.10.3.7	The detailed P4, S4, and P6 BGA angles and time durations will be worked through the CHIT process and captured real time in the CSRD.	Open
6-30	6.8.2	Technical statement to confirm this task is still in review on the Russian side.	Open
6-32	6.9.2	To be provided by Change Engineer	Open
6-33	6.8.2	To be provided by Change Engineer	Open
6-31	6.6.2	Schedule and requirements for P6 battery reconditioning are in development.	Closed
A-1	Appendix A	To be provided by Change Engineer	Open
D-1	Appendix D	New topology format is under review and will be provided in January of 2007.	Closed
D-2	Appendix D	Topology update to reflect current rack location is in work.	Closed
H-1	6.10.2,	Appendix H has not been developed.	Closed
H-2	6.9.2, Appendix H	SPDM checkout plan has not reconciled proposed requirements with allocated stage crew time and training.	Closed
I-1	6.5.2, 6.7.2, 6.9.2, Appendix I	Appendix I has not been developed.	Closed
I-2	Appendix I	1J/A Transfer Priority List to be reviewed and approved with 1J/A LPM IPT	Closed
J-1	6.3.2, 6.4.2, 6.8.2, 6.9.2, 6.10.2, Appendix J	Appendix J has not been developed.	Open
K-1	6.3.2, Appendix K	Appendix K has not been developed.	Closed

Table C-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 (i.e., **<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 marked "Closed" in the status column. 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 and the same TBR number cannot be used more than once. NOTE: TBRs incorporated into this document via the IDRD Flight Program will be preceded by "FP" (i.e. **<FP TBR 3-XX>**).

TABLE C-2 TO BE RESOLVED ISSUES (PAGE 1 OF 4)

TBR	Section	Description	Status
FP 3-7	Table 3.2-1	Dates are under review to resolve GGR&C conflicts.	Open
FP 3-8	Figure 3.1-1, Table 3.2-1, Table 3.3-1, 6.10.2, 6.10.3	Russian Flight Program is under review. The Russian Flight Program may change due to absent Partner Commitments for Crew Rotation, Crew Rescue, and ISS habitation.	Open
FP 3-29	Table 3.3-1	Crew rotation plan is under review.	Closed
FP 3-32	Figure 3.1-1, Table 3.2-1	Proper lighting conditions required for visual monitoring of the final approach in the +XVV +Z Nadir attitude over Russian Ground Sites are not available on the proposed docking date.	Open
FP 3-33	Table 3.3-1, 6.4.2	Dates are under review to address planning for Stage 15S. Initial stage duration assessment results indicate a required minimum of 43 days, which is not provided by current planning. Strategic assessment and incorporation of maximum delay of 1E launch date to No Earlier Than 10/17/07 does not result in sufficient minimum stage duration; therefore, 15S launch date acceleration to 8/27/07 must also be addressed.	Closed
FP 3-34	Table 3.2-1	Increment 15 replanning will be addressed via SSCN 10277	Closed
FP 3-36	Figure 3.1-1, Table 3.2-1	Increment 16 stage designation for ATV1 undock is under review.	Closed
FP 3-37	Figure 3.1-1, Table 3.2-1, Table 3.3-1	Pending further discussions of optimizations of docking data with respect to increment planning, operational considerations, and simultaneous Shuttle operations	Closed
FP 3-38	Figure 3.1-1, Table 3.2-1, Table 3.3-1	Extension of ATV1 undock date will be determined pending Port Utilization analysis to maximize ATV1 and factor checkout completion, and propellant resources. or 28P docked phase into Increment 17 is under review.	Open
FP 3-42	Figure 3.1-1, Table 3.2-1, Table 3.3-1 Section 6.8.2	1 J/A launch will take precedence over ATV1 phasing and docking activities. If 1 J/A is scheduled to launch on time by 1 J/A launch minus TBD days, then ATV1 will park and loiter until the next ATV1 docking window is available after the 1 J/A mission (the next ATV1 docking window is March 2-9, 2008).	Open
FP 3-43	Figure 3.1-1, Table 3.2-1, Table 3.3-1, 6.8.2	Open work to determine if Progress exchange can occur during ATV1 phasing (simultaneous operations).	Open
FP 3-44	Figure 3.1-1, Table 3.2-1, Table 3.3-1, 6.8.2	Open work to determine latest recommended 28P docking before ATV1 Demo 1 day, considering trajectory updates, crew time and crew sleep shift.	Open
FP 3-45	Figure 3.1-1, Table 3.2-1	Open work to determine minimum crew sleep shifting between ATV1 Demo 2 day and 1 J/A docking.	Open
3-2	Fig 3.1-1, Table 3.2-1, Table 3.3.1	RSC-E Preliminary 2007 Flight Program shows 27 Progress docking during Flight 1J/A mission. For planning purposes, the launch and docking of 27P is assumed to be earlier in Stage 1E to avoid conflict with Flight 1J/A.	Closed
3-3	Fig 3.1-1, Table 3.3-1, 6.8.2	Deferral of SPDM EVA tasks from Flight 1J/A is under review pending a final Shuttle PRCB decision to fly the OBSS mini-boom.	Closed
3-4	Fig 3.1-1, Table 3.2.1, Table 3.3-1	Addition of 6th STS Crew Member (needed for Orbiter TPS Inspection) is under review due to Ascent Performance Margin concerns.	Closed
3-5	Fig 3.1-1, Table 3.3-1	Crew time is insufficient to perform three USOS Assembly EVAs and a Soyuz relocation in Stage 15S with 18 day spacing prior to Flight 1E arrival.	Closed
3-6	Figure 3.1-1, 6.5.2, 6.7.2	ISS FE-2 crew rotation on Flights 1E, and 1J in review	Closed

TABLE C-2 TO BE RESOLVED ISSUES (PAGE 2 OF 4)

TBR	Section	Description	Status
3-7	Table 3.3-1	Trilateral utilization agreements for Cell Wall/Resist Wall are in work.	Open
3-8	Table 5.0-1, 6.7.7	Addition of MISSE-6 and RIGEX payloads to Flight 1J/A is under review	Closed
3-9	Table 3.3-1	Identification of Utilization versus Systems activities for Columbus Module and Payload Facility Rack commissioning still pending further discussion on Columbus commissioning plan.	Closed
3-10	Table 3.3-1	Request to demanifest BxF from Flight 10A and delete Increment 16 operations is currently under review.	Closed
3-11	Table 3.3-1	Request to demanifest PSSC from Flight 1J/A is currently under review.	Closed
3-12	Table 3.3-1	Identification of Utilization versus Systems activities for Kibo Module and Payload Facility Rack commissioning still pending further discussion on Kibo commissioning plan.	Closed
3-38	6.10.3	Description to be provided by Change Engineer	Open
4-1	6.4.2, 6.5.2, 6.6.2, 6.8.2, 6.10.2	Resolve crew time systems exceedances and negative utilization allocation	Open
4-2	Table 4.1-1	Power Consumption Allocation to Systems and Power Margin Allocation to Utilization values need to be updated per JAXA LPM TIM #2 data.	Closed
4-3	Table 4.2-1	Crew time projections do not allow a commitment to meet utilization requirements.	Closed
5-1	Table 5.0-1	Baselining of the MPESS carrier has not been concurred by ESA. Possibility of using ICC-L is still under evaluation	Closed
5-2	Table 5.0-1	Baselining of the MPESS carrier has not been concurred by ESA. Possibility of using ICC-L is still under evaluation.	Closed
5-3	Table 5.0-1	ESA assessing requirements for return items that are not covered by existing agreements for utilization, maintenance, or trash disposal.	Closed
6-1	6.4.2	Radiator deployment requirements to be resolved, including the retraction of FGB arrays before radiator deployment.	Closed
6-2	6.10.2	Payload allocations to be resolved.	Closed
6-3	6.10.2	PAO allocations to be resolved.	Closed
6-4	6.4.4.2, 6.6.4.2	Tasks are not currently certified due to hardware unavailability and immature repair methodology.	Open
6-5	6.4.4.2	SAW retraction only approved safing method for SSU R&R. An SSU shunt plug is under development and may be used as an EVA tool to safe the SSU for R&R.	Open
6-6	6.4.4.2	On-Orbit hardware deficiencies may preclude successful Heat Exchanger R&R.	Open
6-7	6.5.2	If crew mobility aids were installed prior to launch then this step can be omitted.	Closed
6-8	6.5.4.1	ESA performing further analysis regarding payload power mode if water loop is not activated after 3 hours Columbus initialization.	Closed
6-9	6.7.6	Availability of SAMS and MAMS support pending funding transition.	Open
6-10	6.6.2	Determine payload crew time for Stage 1E.	Closed
6-11	6.5.2, 6.7.2	Pending Program decision to fly OBSS on 1E.	Closed
6-12	6.5.2	The priority of CMG and ESA external payload installation and activation in Flight 1E are under review.	Closed
6-13	6.9.2	This task will move to Increment 17 if there is no SSPTS available on Flight 1J.	Closed
6-14	6.3.2, 6.6.2, 6.10.2	GGR&C CR to reduce med ops allocation from 12 to 10 hours has not been approved.	Closed

TABLE C-2 TO BE RESOLVED ISSUES (PAGE 3 OF 4)

TBR	Section	Description	Status
6-15	6.6.2	Updated information pertaining to specified payload racks will be provided in late September 2006.	Closed
6-16	6.6.2	The install and configuration of the Regen ECLS mod kit #1 is dependant upon the relocation of racks.	Closed
6-17	6.6.2	EVA WG to determine how to perform this activity.	Closed
6-18	6.7.7	Confirm Columbus heater power requirements from Orbiter.	Closed
6-19	6.7.7	Task to be preformed once shuttle is undocked even if this is not within one hour.	Open
6-20	6.5.2	Priority of NTA and ESA external payload installation and activation to be resolved after 12A.1 EATCS system fill.	Closed
6-21	6.5.2	NTA to be replaced (P1 or S1) will be determined at a later date.	Closed
6-22	6.10.2	These stage requirements cannot be supported with the current Stage 1J duration.	Closed
6-23	6.9.4.2	Addition of the UIRB to Flight 1J is under review.	Closed
6-24	6.10.2	Timing of the EFBM checkout(s) is under review.	Closed
6-25	6.10.2	Installation of JPM trunnion and keel pin thermal covers is under review.	Closed
6-26	Table 3.3-1, 6.7.2	MISSE-6 installation location is under review between ESA and NASA for potential Columbus EF location.	Closed
6-27	Table 3.3-1, 6.7.2	NASA MSG Rack and ExPRESS Rack 3 relocation into Columbus during 1J/A Flight is currently under review. Current baseline is to move MSG Rack during 1J/A Stage and not to move ExPRESS Rack 3 during Increment 16.	Closed
6-28	6.9.2	Authorization of Boeing to update installed drawings is required.	Open
6-29	6.10.2	RS EVA #20 content has not been fully defined by the Russian side. Replanning of RS EVAs #18 and #19 in Increment 15 will affect the content of RS EVA #20. The Russian position is that this EVA should be higher priority than utilization, PAO and medium priority maintenance.	Closed
6-30	6.5.3.8	Loads analysis is being reviewed to determine if Beta Gimbal locking is required for this operation.	Open
6-31	6.7.5.2	Pending analysis and approval by Program that these items can be safely jettisoned.	Closed
6-33	6.7.2	Priority of SPDM OCRs vs payloads to be determined.	Closed
6-34	6.3.2, 6.5.2, 6.9.2	These tasks will be analyzed by RSC-E operations specialists for inclusion into the Joint 14S/15S flight timeframe.	Open
6-35	5.0-1, 6.9.2, I.3,	Middeck Stowage volume for MERLIN is under assessment.	Open

APPENDIX D - TOPOLOGIES

D.1 GENERAL

This appendix provides an overview of the internal on-orbit topologies for Node 1, Node 2, the U.S. Lab, the Joint Airlock, Columbus, the JLP and the JPM. Figures are included for each planned change of rack locations. Subrack topologies are included for the EXpedite the PRocessing of Experiments to the Space Station (EXPRESS) Racks located in the U.S. Lab. **<TBD D-1>**

D.2 ON-ORBIT RACK DESCRIPTIONS

Table D.2-1, On-Orbit Rack Descriptions, shows the description of the rack represented by each rack subelement number in the topologies contained in this appendix.

TABLE D.2-1 ON-ORBIT RACK DESCRIPTIONS

Rack SE Number	Rack Description
3	TCS
4	Avionics #1
5	Avionics #2
6	Avionics #3
7	DDCU#1
8	ARS
9	DDCU#2
11	MSS/AV
12	MSS/AV
13	HRF1
14	ER1
15	ER2
16	ER3
17	HRF2
17	ER4
18	MSG
23	ER5
25	MELFI
27	TeSS
28	CHeCS1
110	ZSR
111	ZSR
112	ZSR
113	ZSR
116	ZSR
117	ZSR
118	ZSR
120	ZSR
155	RSR

Rack SE Number	Rack Description
156	ZSR
191	Stowage
192	Stowage
193	CA Equip
194	Avionics
301	DDCU JEM1
302	DDCU JEM2
303	DDCU ESA1
304	DDCU ESA2
313	OGS
351	DMS1
353	JRSR-1
355	RMS
358	EPS1
360	ICS/PROX
362	W/S
364	RYUTAI
365	SAIBO
381	RSR
400	System
411	EDR
412	FSL
413	EPM
414	Bio Lab
415	ETC

D.3 FLIGHT AND STAGE RACK MOVES

This table summarizes the rack traffic during the Increment's flights and stages. Note that for prioritization order please refer to Section 6.0 for corresponding rack move tasks.

TABLE D.3-1 FLIGHT AND STAGE RACK MOVES

Flight and Stage Topology File	Racks Up		Rack Moves			Racks Down	
	Name	Location	Name	Location 1	Location 2	Name	Location
Stage 15S	N/A	N/A	NONE			N/A	
Flight 10A	ZSR DDCU JEM1 RSR DDCU ESA2 ZSR DDCU ESA1 RSR DDCU JEM2	NOD2O5 NOD2O4 NOD2P5 NOD2P4 NOD2D5 NOD2D4 NOD2S5 NOD2S4	NONE			NONE	
Stage 10A	N/A	N/A	NONE			NONE	
Flight 1E	ETC FSL EPM BIOLAB System System System EDR	COL1D4 COL1O1 COL1O3 COL1O2 COL1D3 COL1D2 COL1D1 COL1O4	 EPM BIOLAB EDR	 COL1O3 COL1O2 COL1O4 	 COL1A3 COL1A2 COL1F1	NONE	
Stage 1E	N/A	N/A	ZSR ZSR	COL1A2 COL1F3	COL1O3 COL1O4	N/A	
Flight 1J/A	RYUTAI EPS1 SAIBO DMS1 RMS JRSR-1 W/S ICS/PROX	JLP1F2 JLP1S2 JLP1A2 JLP1P2 JLP1F1 JLP1S1 JLP1A1 JLP1P1	 MSG EXPR#3	 LAB1S3 LAB1O3	 COL1F2 COL1A1	NONE	
Stage 1J/A	N/A	N/A	NONE			N/A	

D.4 FLIGHT/STAGE 10A TOPOLOGY

Figure D.4-1, Flight/Stage 10A Topology, shows a high level overview of the on-orbit topology at the beginning of the increment. Refer to Table D.2-1 for a definition of the rack SE numbers.

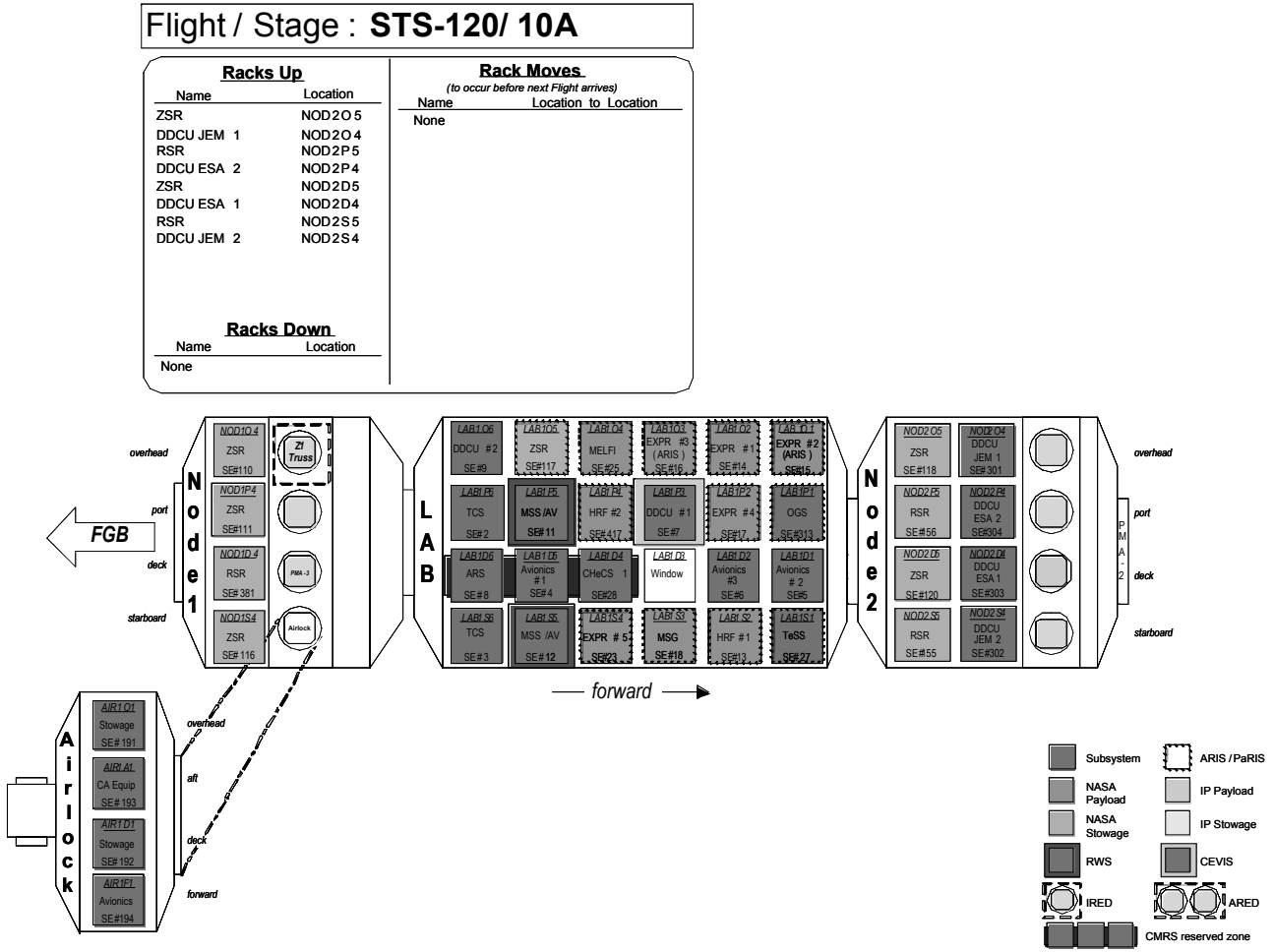


FIGURE D.4-1 FLIGHT/STAGE 10A TOPOLOGY <TBD D-2>

D.5 FLIGHT/STAGE 1E TOPOLOGY

Figure D.5-1, Increment 16 Flight/Stage 1E Topology, shows a high level overview of the on-orbit topology at the end of Flight 1E. Refer to Table D.3-1 for rack moves. Refer to Table D.2-1 for a definition of the rack SE numbers.

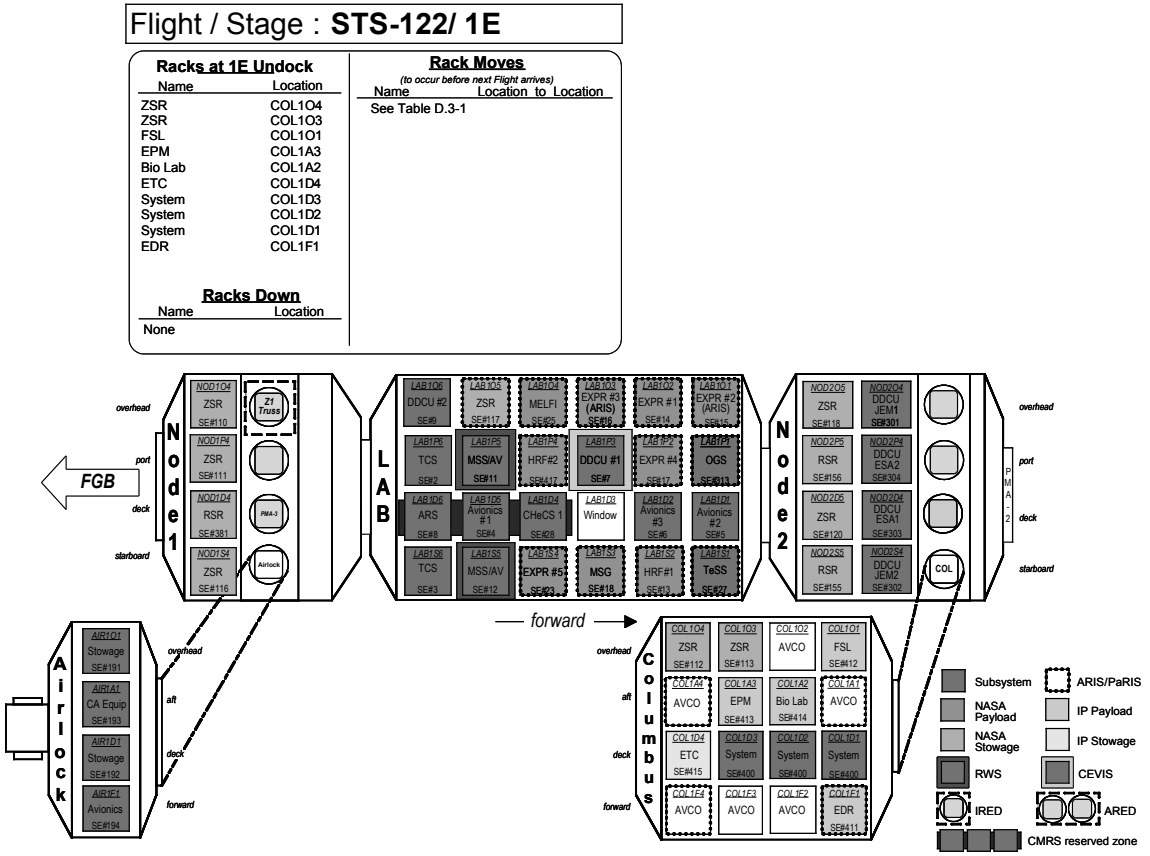


FIGURE D.5-1 INCREMENT 16 FLIGHT/STAGE 1E TOPOLOGY

D.6 FLIGHT/STAGE 1J/A TOPOLOGY

Figure D.6-1, Flight/Stage 1J/A Topology, shows a high level overview of Flight/Stage 1J/A on-orbit topology. Refer to Table D.2-1 for a definition of the rack SE numbers.

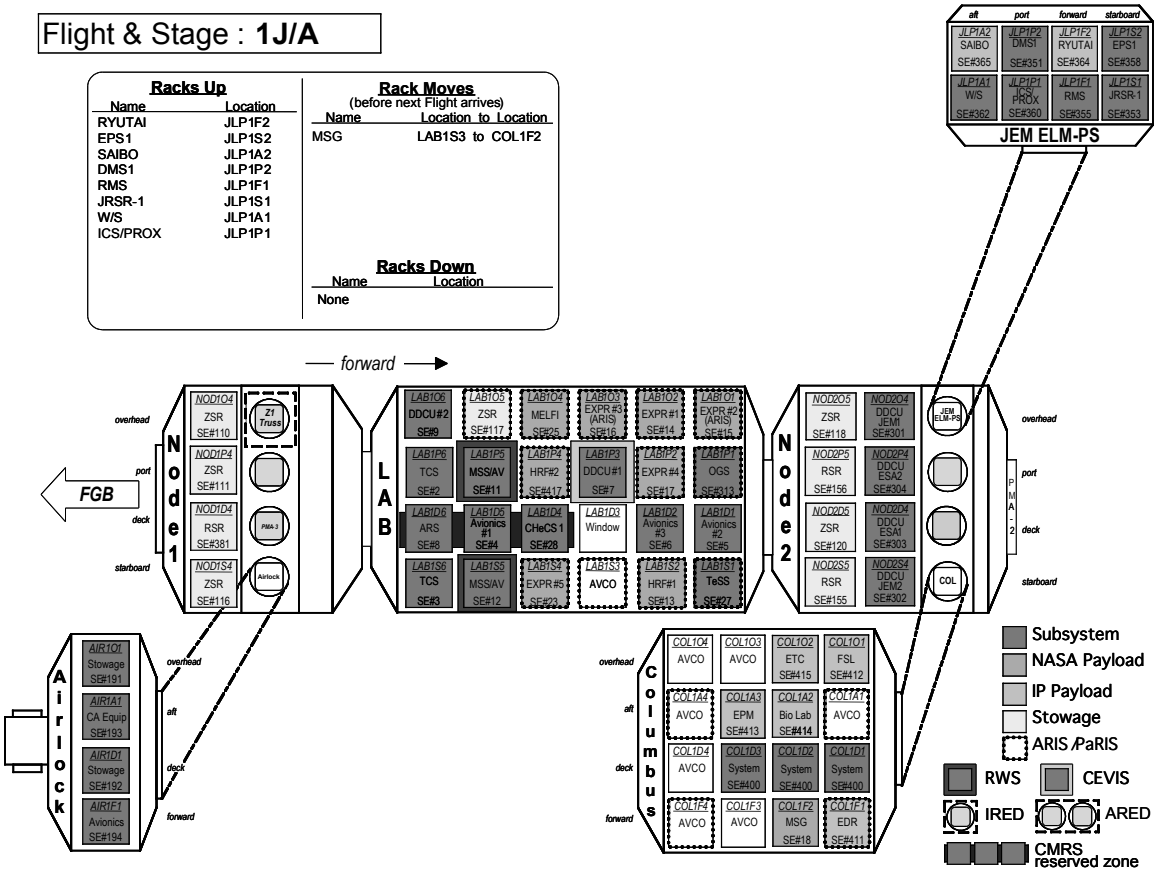


FIGURE D.6-1 FLIGHT/STAGE 1J/A TOPOLOGY <TBD D-2>

APPENDIX E - INCREMENT CONFIGURATIONS

The configuration plans for flight and stage are in JSC 26557, On-orbit Assembly, Modeling, and Mass Properties Data Book, also known as Blue Book, accessible through Electronic Document Management System (EDMS).

APPENDIX F - <DELETED>

APPENDIX G - <DELETED>

APPENDIX H - ON-ORBIT CHECKOUT REQUIREMENTS

Appendix H contains a listing of those Mobile Servicing System (MSS) On-orbit Checkouts (OCRs) that can be completed during this increment. All tables have been scrubbed to eliminate completed OCRs or OCRs that cannot be accomplished within this increment. Table H-1 Part 1 of this plan contains Space Station Remote Manipulator System (SSRMS) OCRs from the previous increment not completed and carried forward. Table H-2 contains Mobile Remote Servicer Base System (MBS) OCRs. With the exception of Periodic and Conditional OCRs, the tasks in this matrix, as well as those planned in other increments, must be completed for Canadian Space Agency (CSA) to consider the SSRMS and MBS fully commissioned. Periodic/Data Trending checkout tasks are described where 'start of life' baseline data sets are required in this increment. Periodic checkouts will be further addressed in the Increment Definition and Requirements Documents (IDRDs) for subsequent increments. Changes to requirements should be addressed to CSA via the Manager, Mission Operations. Changes to requirements during real time operations should be addressed to the International Space Station (ISS) Management Center.

TABLE H-1 REMAINING SSRMS ON-ORBIT CHECKOUT REQUIREMENT TASKS FROM PREVIOUS INCREMENTS

Part 1: OCR Number From SSP 54102	Checkout Task (Note 4)	Description	Type of OCR Required (Note 3)			Priority and Required Operations-Phase (Joint Operations/Stage Operations, Options) (Notes 5-8)			Comments	
			One-Time Activation	Periodic	Conditional	Desirable	Highly Desirable	Mandatory (Note 6)	Crew Time and Special MCC/ISS/ Shuttle Resources (Notes 10-13)	
45	FMS Saturation Troubleshooting on LEE A, Prime Channel	FMS Saturation troubleshooting was performed on June 9/10, 2003. This test determines if the FMS retains its calibration status when temperature falls below 5 degrees Celsius, and to check performance with the new Thermal Protection Kit	X					X	30 minutes (estimated). Unloaded operation	This OCR is required prior to proceeding with FMS/FMA commissioning OCR's (i.e. FMS-OCR-###) related to LEE A, Prime String to troubleshoot and implement a fix. Ref DN50023979 and 30821).

Part 1: OCR Number From SSP 54102	Checkout Task (Note 4)	Description	Type of OCR Required (Note 3)			Priority and Required Operations-Phase (Joint Operations/Stage Operations, Options) (Notes 5-8)			Comments	
			One-Time Activation	Periodic	Conditional	Desirable	Highly Desirable	Mandatory (Note 6)	Crew Time and Special MCC/ISS/ Shuttle Resources (Notes 10-13)	
FMS-OCR-004	FMS Thermal Drift Characterization	FMS Thermal protection kit is installed on Flight 12A.1. AHS patch is uplinked in February 2007. Characterization of the thermal drift is required on both strings (Prime & Redundant) of both LEE's to identify configuration parameters for the thermal compensation algorithms. Reference: CSA FMS Commissioning Plan for detailed description.	X					X	30 minutes crew time (estimated). Unloaded operation.	First in a series of dependent FMS/FMA commissioning activities. Required to be performed within 4 months of AHS patch uplink to avoid compression and delay of required follow-on OCR's and to accommodate pre/post processing. Readiness for HTV EP insertion (July 2009) will be impacted.
FMS-OCR-005	Wrist Roll Characterization	FMS Thermal Protection kit is installed on Flight 12A.1. AHS Patch is uplinked in February 2007. 360 degree WR maneuver required in both directions. Characterization of the wrist roll joint is required on both strings (Prime & Redundant) on both LEE's. Required to identify configuration parameters for the WR compensation algorithms.	X					X	30 minutes crew time (estimated). Unloaded operation.	First in series of dependent FMS/FMA commissioning activities. As this OCR must be performed on each LEE, each channel, start of this OCR shall be no later than 4 months after AHS patch is uplinked, and completion no later than 6 months after AHS patch is uplinked, to mitigate delay of follow-on OCR's and accommodate pre/post processing. Readiness for HTV EP insertion (July 2009) will be impacted.

Part 1: OCR Number From SSP 54102	Checkout Task (Note 4)	Description	Type of OCR Required (Note 3)			Priority and Required Operations-Phase (Joint Operations/Stage Operations, Options) (Notes 5-8)			Comments	
			One-Time Activation	Periodic	Conditional	Desirable	Highly Desirable	Mandatory (Note 6)	Crew Time and Special MCC/ISS/ Shuttle Resources (Notes 10-13)	
FMS-OCR-006	Wrist Roll Compensation Checkout	Dependent on completion of FMS-OCR-004 and FMS-OCR-005 and new FMS Config file uplinked.360 degree WR maneuver required in both directions, on both strings (Prime & Redundant) on both LEE's Verifies performance of WR compensation algorithm with tuned FMS configuration file parameters.	X		X (per description)			X	30 minutes crew time (estimated). Unloaded operation.	To be completed no later than 3 months after completion of FMS-OCR-004 and FMS-OCR-005 in order to mitigate delay of follow-on OCR's and to accommodate pre/post processing. Readiness for HTV EP insertion (July 2009)
FMS-OCR-007	FMS Thermal Drift Filter Checkout	Dependent on completion of FMS-OCR-004, FMS-OCR-005 and FMS-OCR-006 and new FMS Config file uplinked. Results of prior FMS-OCR's are checked out by performing same tasks as per FMS-OCR-004. Verify performance of thermal compensation algorithms with tuned FMS configuration file parameters.	X		X (per description)			X	30 minutes crew time (estimated). Unloaded operation	To be completed no later than 3 months after completion of FMS-OCR-006 in order to mitigate delay of follow-on OCR's and to accommodate pre/post processing. Readiness for HTV EP insertion (July 2009).
FMS-OCR-008	FMS Static Loading Checkout	Upon completion of FMS-OCR-006 and FMS-OCR-007. Grapple of FRGF, partial derigidize with SSRMS brakes on. Verifies FMS performance in end-to-end static operation.	X		X (per description)		X		60 minutes crew time (estimated).	Highly desirable to be performed NLT 5 months prior to EP insertion. (HTV Launch 2009)

Part 1: OCR Number From SSP 54102	Checkout Task (Note 4)	Description	Type of OCR Required (Note 3)			Priority and Required Operations-Phase (Joint Operations/Stage Operations, Options) (Notes 5-8)			Comments	
			One-Time Activation	Periodic	Conditional	Desirable	Highly Desirable	Mandatory (Note 6)	Crew Time and Special MCC/ISS/ Shuttle Resources (Notes 10-13)	
FMS-OCR-009	FMS Dynamic Loading Checkout	Upon completion of FMS-OCR-006 and FMS-OCR-007. Verifies FMS performance in end-to-end dynamic operation. Reference: CSA FMS Commissioning Plan for detailed description.	X		X (per description)		X		30 minutes crew time (estimated). Payload handling	Highly desirable to be performed NLT 5 months prior to EP insertion. (HTV Launch 2009)
FMS-OCR-010	FMA Force Following	Execution of FMS-OCR-008 and FMS-OCR-009. Manual snare of grapple fixture. Reference: CSA FMS Commissioning Plan for detailed description. Verifies FMA force-following compatibility.	X		X (per description)		X		60 minutes crew time (estimated).	Highly desirable to be performed NLT 3 months prior to EP insertion. (HTV Launch 2009)
FMS-OCR-011	FMA Active-Limping	Execution of FMS-OCR-010. Slow capture of grapple fixture. Verifies FMA active-limping compatibility.	X		X (per description)		X		60 minutes crew time (estimated).	Highly desirable to be performed NLT 3 months prior to EP insertion. (HTV Launch 2009)
57	Joint Direct Drive Test	SSRMS Joints are driven using modified JCS to provide direct drive to motors. This will provide individual joint performance baseline for trending and degradation assessment.	X					Within 1 year of uplink of required configuration file changes	60 minutes crew time (estimated); this could be reduced/ eliminated with MSS Ground Control	

TABLE H-2 MBS ON-ORBIT CHECKOUT REQUIREMENTS

Task Number	Checkout Task	Description	Type of OCR Required			Priority and Required Operations-Phase			Comments	
			Once	Per.	Cond.	Desirable	Highly Desirable	Mandatory	Execution Time est.	Ground Option
****** 1J/A Flight OCRs Required Prior to Start of SPDM Deployment ******										
MBS Payload/Orbital Accommodation (POA) 4.5	POA Load Cell offset Characterization	Characterizes the load cell within the MBS POA	X				1J/A Flight (Prior to Launch)	1J/A Flight (Prior to Orbiter Departure)	< 20 min	YES
MBS POA 4.6	POA Auto-Grapple/Release (de)mate (requires Payload)	Verifies the Capture and Release of a grapple fixture using the MBS POA	X				1J/A Flight (Prior to Launch)	1J/A Flight (Prior to Orbiter Departure)	< 10 min	YES
MBS POA 4.7	Umbilical mate and power feed capability	Verifies the mate and payload power feed from the MBS POA	X				1J/A Flight (Prior to Launch)	1J/A Flight (Prior to Orbiter Departure)	< 10 min	YES

TABLE H-3 PERIODIC ON-ORBIT CHECKOUT REQUIREMENTS

Task Number	Checkout Task	Description	Type of OCR Required			Priority and Required Operations-Phase			Comments	
			Once	Per.	Cond.	Desirable	Highly Desirable	Mandatory	Execution Time est.	Ground Option
N/A										

Special Purpose Dexterous Manipulator (SPDM) OCRs

The absolute minimum set of 1J/A Flight OCRs required to leave SPDM in a single-fault tolerant keep-alive state are listed as *Mandatory prior to Orbiter Departure*. Those 1J/A Flight OCRs that will be achieved as part of the planned nominal deployment sequence are listed as *Highly Desirable prior to Orbiter Departure*. Together these complete the first SPDM commissioning phase, i.e.: **1) Deployment Complete.** This phase includes commissioning of SPDM Latching End Effector (LEE), Camera/Light Assembly (CLA), and arm reconfiguration capability. Note that the OCRs required for use of SPDM as an extension to the SSRMS LEE (planned for 2J/A) are completed in this phase in addition to OCRs 7.3_055 and 7.4_056 listed in the second commissioning phase: **Initial Commissioning Complete.**

The second commissioning phase is: 2) Initial Commissioning Complete which requires commissioning of all fundamental SPDM functionality, connectivity, and hazard controls in order to enable use of SPDM for Extra Vehicular Activity (EVA) support (e.g. Flight Releaseable Attachment Mechanism (FRAM) Operations (Ops)). Note that Tool OCRs are included in this phase as they are the most efficient means of achieving the initial SPDM commissioning objectives. Phase 1 and 2 OCRs are listed in Table H-4.A.

Increment 17 will contain Table H-4.B which includes SPDM OCRs that could be performed during Increment 16 and that will contribute to the third and final phase of SPDM commissioning, i.e.: **3) Fully Commissioned**. Those OCRs listed as Highly Desirable for Inc 16 are those required to enable use of SPDM for autonomous external maintenance (e.g. Mobile Transporter (MT) Stop, Tether Shuttle Stop and Orbital Replacement Unit (ORU) Remove and Replace (R&R)). OCRs related to Cargo Transport Container (CTC) and Enhanced ORU/Tool Change-out Mechanism Electronics Unit (OEU) & Tool Platform (EOTP) Ops are not feasible in this Increment and are not yet included in this release of Table H-4.B.

With respect to Ground commanding and control capability, captured in the Ground Option column as YES items are those MSS functions currently approved for ground commanding and generically applicable to SPDM, i.e. safing, power commands, and camera operations. Those OCRs involving a current SPDM ground commanding capability that has yet to be approved and commissioned on-orbit are highlighted as such. The categories are: Following *Unloaded* SPDM Ground Control (GC) Commissioning, Following SPDM GC *Contact Ops* Commissioning, and Following SPDM GC *Loaded* Ops Commissioning. *Unloaded* SPDM Ground Control includes unloaded: body and arm free space motion. It is expected to be ready for commissioning at 1J/A with constraints identified. SPDM GC *Contact* Ops is limited to proximity or contact ops with fixed or fastened hardware such as: stabilization fixture, fastened tool or ORU. SPDM GC *Loaded* Ops includes manipulation of tools or ORUs.

OCR's which contain " * " at the beginning of the Task Number represent OCR's which verify Hazard Controls within the SPDM ETE Hazard Reports.

TABLE H-4.A SPDM 1J/A FLIGHT AND STAGE ON-ORBIT CHECKOUT REQUIREMENTS

Task Number	Checkout Task	Description	Type of OCR Required			Priority and Required Operations-Phase			Comments	
			Once	Per.	Cond.	Desirable	Highly Desirable	Mandatory	Execution Time est.	Ground Option
****** Stage OCRs Required Prior to Start of SPDM Deployment ******										
OCR Miscellaneous (MISC) 7 007	SPDM Display and Control Panel (DCP) Checkout (Switches)	Verifies that the DCP SPDM related switches are working correctly	X					1J/A Flight (Prior to Launch)	2 min	NO - Crew req. to toggle switches
****** 1J/A Flight OCRs performed during SPDM Deployment ******										
Power OCRs										
* OCR Portable Work Platform (PWR) 7.1 053 7.2 054	SPDM LEE Channel A & B (MSS Local Bus (MLB))	Demonstrates that the SPDM can be operated while positioned on the MSS Local Bus MLB from the LEE end using Channel A	X					1J/A Flight (Prior to Orbiter Departure)	2 min	YES
OCR PWR 9.2 065	SPDM Off to Operational Power Switching Unit (PSU) Redundant (LEE)	Verifies that the SPDM PSU can be commanded from Off to Operational on the Redundant string via the LEE Interface	X					1 J/A Flight (Prior to Orbiter Departure)	2 min	YES
OCR PWR 4.2 038	SPDM Power LEE PSU Redundant Operational to Off	Verifies that the SPDM can remove power on the redundant string for maintenance operations when LEE is the base.	X					1 J/A Flight (Prior to Orbiter Departure)	2 min	YES
OCR PWR 9.1 064	Off to Operational (LEE - PSU Primary)	Demonstrates the SPDM PSU can be commanded from Off to Operational on the Primary string via the LEE Interface.	X					1J/A Flight (Prior to Orbiter Departure)	2 min	YES
OCR PWR 1.9 009 1.10 010	SPDM Power LEE SPDM Arm Computer Unit (SACU1) & SACU 2 Off to Keep-Alive	Verifies that each SACU can be taken to Keep-Alive state from Off, using the LEE as base. It powers heaters, allowing subsystems to stay above their minimum survival limits	X					1J/A Flight (Prior to Orbiter Departure)	4 min	YES

Task Number	Checkout Task	Description	Type of OCR Required			Priority and Required Operations-Phase			Comments	
			Once	Per.	Cond.	Desirable	Highly Desirable	Mandatory	Execution Time est.	Ground Option
OCR PWR 1.1 001 1.2 002	SPDM Power LEE Arm1 & Arm2 Subsystem Off to Keep-Alive	Verifies that each SPDM Arm can be taken to Keep-Alive state from Off, using the LEE as base. It powers heaters, allowing subsystems to stay above their minimum survival limits, and communicates via 1553 with the SACU Safing Remote Terminal (SRT).	X					1J/A Flight (Prior to Orbiter Departure)	4 min	YES
OCR PWR 1.3 003	SPDM Power LEE Body Subsystem Primary Off to Keep-Alive	Verifies that the SPDM Body can be taken to Keep-Alive state from Off, on the Primary string and using the LEE as base. It powers heaters, allowing subsystems to stay above their minimum survival limits	X					1J/A Flight (Prior to Orbiter Departure)	2 min	YES
OCR PWR 1.4 004	SPDM Power LEE Body Subsystem Redundant Off to Keep-Alive	Verifies that the SPDM Body can be taken to Keep-Alive state from Off, on the Redundant string and using the LEE as base. It powers heaters, allowing subsystems to stay above their minimum survival limits	X					1J/A Flight (Prior to Orbiter Departure)	2 min	YES
OCR PWR 5.1 041 5.2 042	SPDM Power LEE Arm1 & Arm2 Subsystem Keep-Alive to Off	Verifies that each SPDM subsystem can be powered off from the Keep-Alive state when SPDM operating base is the LEE	X				1J/A Flight (Prior to Orbiter Departure)	For SPDM LEE Based Operations	4 min	YES
OCR PWR 5.7 047	SPDM Power LEE Body Subsystem Primary Keep-Alive to Off	Verifies the SPDM Primary body can be powered off from Keep-Alive when the SPDM operating base is the LEE	X				1J/A Flight (Prior to Orbiter Departure)	For SPDM LEE Based Operations	2 min	YES
OCR PWR 5.8 049	SPDM Power LEE Body Subsystem Redundant Keep-Alive to Off	Verifies the SPDM Redundant body can be powered off from Keep-Alive when the SPDM operating base is the LEE	X				1J/A Flight (Prior to Orbiter Departure)	For SPDM LEE Based Operations	2 min	YES
OCR PWR 4.1 037	SPDM Power LEE PSU Primary Operational to Off	Verifies that power can be removed for assembly and maintenance activities on the SPDM	X				1J/A Flight (Prior to Orbiter Departure)	For SPDM LEE Based Operations	2 min	YES
* OCR PWR 2.9 021 2.10 022	SPDM Power LEE SACU1 & SACU2 Keep-Alive to Operational	Verifies the startup sequence and communication with SACU1 & SACU2 Data Processing Remote Terminals (DPRTs) and all SPDM subunits when based on the LEE.	X				1J/A Flight (Prior to Orbiter Departure)	For SPDM LEE Based Operations	14 min	YES

Task Number	Checkout Task	Description	Type of OCR Required			Priority and Required Operations-Phase			Comments	
			Once	Per.	Cond.	Desirable	Highly Desirable	Mandatory	Execution Time est.	Ground Option
* OCR PWR 2.1 013 2.2 014	SPDM Power LEE Arm1 & Arm2 Subsystem Keep-Alive to Operational	Verifies the startup sequence and communication with Arm1 & Arm2 subunits when based on the LEE	X				1J/A Flight (Prior to Orbiter Departure)	For SPDM LEE Based Operations	10 min	YES
OCR PWR 3.1 025 3.2 026	SPDM Power LEE Arm1 & Arm2 Subsystems Operational to Keep-Alive	Verifies that the SPDM Arm1 & Arm2 communications are off and in Keep-Alive	X				1J/A Flight (Prior to Orbiter Departure)	For SPDM LEE Based Operations	4 min	YES
OCR PWR 3.9 033 3.10 034	SPDM Power LEE SACU1 & SACU2 Operational to Keep-Alive	Verifies that SACU1 & SACU2 communications are off and in Keep-Alive	X				1J/A Flight (Prior to Orbiter Departure)	For SPDM LEE Based Operations	4 min	YES
OCR PWR 9.4 068	SPDM Off to Operational PSU Redundant (Power and Data Grapple Fixture (PDGF))	Verifies that the SPDM PSU can be commanded from Off to Operational on the Redundant string via the PDGF Interface	X				1J/A Flight (Prior to Orbiter Departure)	For SPDM PDGF Based and 2J/A Operations	2 min	YES
OCR PWR 4.4 040	SPDM Power PDGF PSU Redundant Operational to Off	Verifies that the SPDM can remove power on the redundant string for maintenance operations when the PDGF is base.	X				1J/A Flight (Prior to Orbiter Departure)	For SPDM PDGF Based & 2J/A Operations	2 min	YES
OCR PWR 9.3 066	SPDM Off to Operational PSU Primary - PDGF	Verifies that the SPDM PSU can be commanded from Off to Operational on the Primary string via the PDGF Interface	X				1J/A Flight (Prior to Orbiter Departure)	For SPDM PDGF Based & 2J/A Operations	2 min	YES
OCR PWR 1.11 011 1.12 012	SPDM Power PDGF SACU1 & SACU2 Off to Keep-Alive	Verifies that each SACU can be taken to Keep-Alive state from off, using the PDGF as base. It powers heaters, allowing subsystems to stay above their minimum survival limits.	X				1J/A Flight (Prior to Orbiter Departure)	For SPDM PDGF Based & 2J/A Operations	4 min	YES
OCR PWR 1.7 007	SPDM Power PDGF Body Subsystem Primary Off to Keep-Alive	Verifies that the SPDM Body can be taken to Keep-Alive state from Off, on the Primary string and using the PDGF as base. It powers heaters, allowing subsystems to stay above their minimum survival limits.	X				1J/A Flight (Prior to Orbiter Departure)	For SPDM PDGF Based & 2J/A Operations	2 min	YES

Task Number	Checkout Task	Description	Type of OCR Required			Priority and Required Operations-Phase			Comments	
			Once	Per.	Cond.	Desirable	Highly Desirable	Mandatory	Execution Time est.	Ground Option
OCR PWR 1.8 008	SPDM Power PDGF Body Subsystem Redundant Off to Keep-Alive	Verifies that the SPDM Body can be taken to Keep-Alive state from Off on the Redundant string using the PDGF as base.	X				1J/A Flight (Prior to Orbiter Departure)	For SPDM PDGF Based & 2J/A Operations	2 min	YES
* OCR PWR 2.11 023 2.12 024	SPDM Power PDGF SACU1 & SACU2 Keep-Alive to Operational	Verifies that each SPDM SACU can be taken to Operational state from Keep-Alive, using the PDGF as base. It establishes full system operation state with telemetry and health monitoring.	X				1J/A Flight (Prior to Orbiter Departure)	For SPDM PDGF Based & 2J/A Operations	14 min	YES
* OCR PWR 2.5 017	SPDM Power PDGF Body Subsystem Primary Keep-Alive to Operational	Verifies that the SPDM Primary body subsystem can be taken to Operational state from Keep-Alive, using the PDGF as base. It establishes full system operation state with telemetry and health monitoring	X				1J/A Flight (Prior to Orbiter Departure)	For SPDM PDGF Based & 2J/A Operations	4 min	YES
* OCR PWR 2.3 015 2.4 016	SPDM Power PDGF Arm1 & Arm2 Subsystems Keep-Alive to Operational	Verifies that each SPDM Arm can be taken to Operational state from Keep-Alive, on the Primary string using the LEE as base. It establishes full system operation state with telemetry and health monitoring	X				1J/A Flight (Prior to Orbiter Departure)	For SPDM PDGF Based Operations	10 min	YES
OCR PWR 2.6 018	SPDM Power PDGF Body Subsystem Redundant Keep-Alive to Operational	Verifies that the SPDM Redundant Body can be taken to Operational state from Keep-Alive using the PDGF as base.	X				1J/A Flight (Prior to Orbiter Departure)	For SPDM PDGF Based & 2J/A Operations	4 min	YES
OCR PWR 13.4 081	SPDM Startup Body LEE (Redundant)	Verifies the SPDM Redundant Body LEE can be powered on again after a shutdown	X				1J/A Flight (Prior to Orbiter Departure)	SPDM LEE Based Operations	2 min	YES
OCR PWR 3.6 030	SPDM Power PDGF Body Subsystem Redundant Operational to Keep-Alive	Verifies that Redundant Body communication is off and in Keep-Alive with the PDGF as base.	X				1J/A Flight (Prior to Orbiter Departure)	For SPDM PDGF Based & 2J/A Operations	2 min	YES
OCR PWR 5.6 046	SPDM Power PDGF Body Subsystem Redundant Keep-Alive to Off	Verifies that the Redundant body subsystem can be powered off from Keep-Alive when the SPDM operating base is PDGF	X				1J/A Flight (Prior to Orbiter Departure)	For SPDM PDGF Based & 2J/A Operations	2 min	YES

Task Number	Checkout Task	Description	Type of OCR Required			Priority and Required Operations-Phase			Comments	
			Once	Per.	Cond.	Desirable	Highly Desirable	Mandatory	Execution Time est.	Ground Option
OCR PWR 3.3 027 3.4 028	SPDM Power PDGF Arm1 & Arm2 Subsystems Operational to Keep-Alive	Verifies that Arm1 & Arm2 can be transitioned from Operational state back to Keep-Alive state.	X				1J/A Flight (Prior to Orbiter Departure)	For SPDM PDGF Based Operations	4 min	YES
OCR PWR 3.5 029	SPDM Power PDGF Body Subsystem Primary Operational to Keep-Alive	Verifies that the Body can be transitioned from Operational state back to Keep-Alive	X				1J/A Flight (Prior to Orbiter Departure)	For SPDM PDGF Based & 2J/A Operations	2 min	YES
OCR PWR 3.11 035 3.12 036	SPDM Power PDGF SACU1 & SACU2 Operational to Keep-Alive	Verifies that the SACU1 & SACU2 can transition from Operational state to Keep-Alive.	X				1J/A Flight (Prior to Orbiter Departure)	For SPDM PDGF Based & 2J/A Operations	4 min	YES
OCR PWR 5.3 043 5.4 044	SPDM Power PDGF Arm1 & Arm2 Subsystems Keep-Alive to Off	Verifies power to the SPDM Arm1 & Arm2 can be removed.	X				1J/A Flight (Prior to Orbiter Departure)	For SPDM PDGF Based & 2J/A Operations	4 min	YES
OCR PWR 5.5 045	SPDM Power PDGF Body Subsystem Primary Keep-Alive to Off	Verifies power to the SPDM Primary Body subsystem can be removed	X				1J/A Flight (Prior to Orbiter Departure)	For SPDM PDGF Based & 2J/A Operations	2 min	YES
OCR PWR 4.3 039	SPDM Power PDGF PSU Primary Operational to Off	Verifies power to the SPDM PSU can be removed	X				1J/A Flight (Prior to Orbiter Departure)	For SPDM PDGF Based & 2J/A Operations	2 min	YES
OCR PWR 15 086	SPDM Operational to Off	Verifies the SPDM Operational to Off Portable Computer System (PCS) Graphic User Interface (GUI) button	X				1J/A Flight (Prior to Orbiter Departure)	For SPDM PDGF/LEE Based Operations	2 min	YES
OCR PWR 6.1 051	SPDM Power LEE Prime Off to Keep-Alive to Operational	Verifies the SPDM can be powered to fully operational based on the MBS and the LEE	X				1J/A Flight (Prior to Orbiter Departure)	For SPDM LEE Based Operations	40 min	YES
OCR PWR 3.8 032	SPDM Power LEE Body Subsystem Redundant Operational to Keep-Alive	Verifies that Redundant Body communication is off and in Keep-Alive with the LEE as base.	X				1J/A Flight (Prior to Orbiter Departure)	For SPDM LEE Based Operations	2 min	YES

Task Number	Checkout Task	Description	Type of OCR Required			Priority and Required Operations-Phase			Comments	
			Once	Per.	Cond.	Desirable	Highly Desirable	Mandatory	Execution Time est.	Ground Option
OCR PWR 6.2 052	SPDM Power LEE/PDGF Payload Local Bus (PLB) Prime Off to Keep-Alive to Operational	Verifies SPDM can be commanded to fully operational on the PDGF Local Bus (PLB)	X				1J/A Flight (Prior to Orbiter Departure)	For SPDM PDGF/LEE Based Operations	40 min	YES
* OCR PWR 7.5 057 7.6 058	SPDM PDGF Channel A & Channel B (PLB)	Verifies that the SPDM can be operated while positioned on the PLB via the PDGF on Channel A & Channel B	X				1J/A Flight (Prior to Orbiter Departure)	For SPDM PDGF Based Operations	2 min	YES
OCR PWR 2.8 020	SPDM Power LEE Body Subsystem Redundant Keep-Alive to Operational	Verifies that the SPDM Body can be taken to Operational state from Keep-Alive on the redundant string using the LEE as base.	X				1J/A Flight (Prior to Orbiter Departure)	For SPDM LEE Based Operations	4 min	YES
Brake Run-In OCRs										
OCR SJEU 2.1 003 2.2 004	SPDM Arm1 & Arm2 Joint Diagnostic Brake Run-in Test	OCR is designed to recover the brake performance to nominal levels after possible temporary degradation due to launch vibrations	X				1J/A Flight (Prior to Orbiter Departure)	Prior to SSRMS Translation or SPDM Arm Joint Motion unless rates provided by analysis	14 min	YES
Body LEE OCRs										
* OCR LEE 1.1 001	SPDM LEE Electronics Unit (LEU) Diagnostics Test on Primary String	Verifies the proper functionality of the motor drive, motor interface and brake drive of the SPDM Body LEE mechanisms (Snare, Latch and Rigidize).	X				1J/A Flight (Prior to Orbiter Departure)	Prior to SPDM LEE Capture & 2J/A Operations	5 min	YES
* OCR LEE 5.6 020	SPDM LEE Manual Primary, Retract Latches - Slow	Demonstrates that an SPDM LEE is able to manually retract its latches in the slow mode while on the primary string.	X				1J/A Flight (Prior to Orbiter Departure)	For SPDM Spacelab Logistics Pallet (SLP) Release	5 min	Following Unloaded SPDM GC Commiss.
OCR LEE 2.1 003	SPDM LEE Calibration - Primary	Demonstrates that the SPDM LEE is able to initiate and complete a Calibration of the LEE mechanisms and load cell on the Primary string.	X				1J/A Flight (Prior to Orbiter Departure)	Prior to SPDM LEE Capture & 2J/A Operations	5 min	YES

Task Number	Checkout Task	Description	Type of OCR Required			Priority and Required Operations-Phase			Comments	
			Once	Per.	Cond.	Desirable	Highly Desirable	Mandatory	Execution Time est.	Ground Option
* OCR LEE 3.1 005	SPDM LEE Checkout - Primary	Demonstrates that the SPDM LEE is able to initiate and complete a LEE Checkout command on the Primary String	X				1J/A Flight (Prior to Orbiter Departure)	Prior to SPDM LEE Capture & 2J/A Operations	10 min	YES
* OCR LEE 1.2 002	SPDM LEU Diagnostics on Redundant String	Verifies proper functionality of the motor drive, motor interface, and brake drive of the SPDM Body LEE mechanisms	X				1J/A Flight (Prior to Orbiter Departure)	Prior to PDGF Grapple & 2J/A Operations	5 min	YES
OCR LEE 2.2 004	SPDM OCR LEE Calibration - Redundant	Verifies that the SPDM LEE is able to perform a calibration command on the redundant string	X				1J/A Flight (Prior to Orbiter Departure)	Prior to PDGF Grapple & 2J/A Operations	5 min	YES
* OCR LEE 4.1 007	SPDM LEE Primary, Auto Capture - Force Based - Slow	Demonstrates the SPDM LEE is able to initiate and complete a slow automatic capture on the Primary string using force based termination.	X				1J/A Flight (Prior to Orbiter Departure)	For PDGF Grapple & 2J/A Operations	7 min	Following Unloaded SPDM GC Commiss.
* OCR LEE 4.3 009	SPDM OCR LEE Primary, Mate	Verifies an SPDM LEE mate operation on a PDGF	X				1J/A Flight (Prior to Orbiter Departure)	For PDGF Grapple	5 min	Following SPDM GC Contact Ops Commiss.
Video OCRs										
OCR Video (VID) 1 001	SPDM LEE Camera Basic Checkout	Demonstrates all LEE Camera related functions	X				1J/A Flight (Prior to Orbiter Departure)	For PDGF Grapple & 2J/A Operations	10 min	YES
OCR VID 4.2 004	SPDM Video System via PDGF Primary	Verifies the activation of the SPDM video system when based on the PDGF	X				1J/A Flight (Prior to Orbiter Departure)	For SPDM LEE Video, Camera/Light/ Pan-Tilt Unit Assembly (CLPA), & 2J/A Operations	15 min	YES

Task Number	Checkout Task	Description	Type of OCR Required			Priority and Required Operations-Phase			Comments	
			Once	Per.	Cond.	Desirable	Highly Desirable	Mandatory	Execution Time est.	Ground Option
OCR VID 9 013	SPDM Video Distribution Routing Test	Verifies that correct sync and video paths are available to the commanded camera and that when commanded, the returning video is directed to the appropriate monitor on the RWS	X				1J/A Flight (Prior to Orbiter Departure)	For SPDM LEE Video, CLPA, & 2J/A Operations	15 min	YES
* OCR VID 11.1 014 11.2 015	SPDM Video CLPA 1 & CLPA 2 Decaging	Verifies each CLPA Body has unlocked itself	X				1J/A Flight (Prior to Orbiter Departure)	Prior to Pan/Tilt Commanding	40 min	YES
OCR VID 6.1 007 6.2 008	SPDM Video CLPA 1 & CLPA 2 Basic Checkout	Verifies each CLPA is responding to basic camera functions such as Zoom/Focus.	X				1J/A Flight (Prior to Orbiter Departure)	For SPDM CLPA Operations	10 min	YES
* OCR VID 4.1 003	SPDM Video System Activation via LEE Primary	Verifies the SPDM video system works when based on the LEE.	X				1J/A Flight (Prior to Orbiter Departure)	For SPDM LEE Video, CLPA, & 2J/A Operations	15 min	YES
MISC OCRs										
OCR MISC 1.4 009	Remove Safing SPDM Body	Verifies the SPDM Body Safing can be removed	X				1J/A Flight (Prior to Orbiter Departure)	Prior to SPDM Release of SLP	1 min	YES
OCR MISC 1.1 001 1.3 009	SPDM Remove Safing Arm1 & Arm2	Demonstrates that SPDM can be commanded to remove safing on the SPDM Arm1 & Arm2 subsystems	X				1J/A Flight (Prior to Orbiter Departure)	Prior to SPDM Arm Joint Motion	2 min	YES
OCR MISC 1.7 012	Apply Safing Body (PCS)	Verifies the SPDM Body subsystem safing can be applied via the PCS	X				1J/A Flight (Prior to Orbiter Departure)	Following SPDM Release of SLP	2 min	Only GC until PCS R11
OCR MISC 1.5 010 1.6 011	Apply Arm1 & Arm2 Safing (PCS)	Verifies that safing can be applied to the SPDM Arm1& Arm2 subsystems via the PCS	X				1J/A Flight (Prior to Orbiter Departure)	Prior to SPDM Arm Joint Motion	4 min	Only GC until PCS R11
OCR MISC 1.2 002	SPDM Safe the MSS	Verifies that all the SPDM subsystems (Body, Arm1, and Arm2) are safed when MSS safing is applied.	X				1J/A Flight (Prior to Orbiter Departure)	Following SPDM Release of SLP	1 min	YES

Task Number	Checkout Task	Description	Type of OCR Required			Priority and Required Operations-Phase			Comments	
			Once	Per.	Cond.	Desirable	Highly Desirable	Mandatory	Execution Time est.	Ground Option
OCR MISC 6 006	SPDM Miscellaneous Thermal Data Analysis OCR	OCR is intended to gather thermal telemetry data from the SPDM in order to correlate existing thermal models and obtain a temperature baseline		X			1J/A Flight (Prior to Orbiter Departure)	Prior to Force-Moment Sensor (FMS)/Force-Moment Accommodation (FMA) Operations	Commanding = 2 min Data Collection = Multiple Orbits	YES
Arm Joint OCRs										
OCR SJEU 7.1 019 7.2 020	Verification of SPDM Brakes Commands for Arm1 & Arm2	Verifies that each SPDM Arm1 & Arm2 respond to the brake commands appropriately	X				1J/A Flight (Prior to Orbiter Departure)	Prior to SPDM Arm Joint Motion	3 min	Following Unloaded SPDM GC Commiss.
OCR SJEU 6.1 006	SPDM Servo Brake Checkout for an Unloaded Arm1 with no stabilization	Verifies that the SPDM Arm1 responds to a “Null” input by successfully applying the servo brakes when unloaded and no stabilization	X				1J/A Flight (Prior to Orbiter Departure)	For SPDM Arm Joint Motion	30 min	Following Unloaded SPDM GC Commiss.
* OCR SJEU 14.1 045 14.2 046 14.3 047 14.4 048 14.5 049 14.6 050 14.7 051	SPDM SJRM Checkout on Arm1 Shoulder Roll (SR) Arm1 Shoulder Yaw (SY) Arm1 Shoulder Pitch (SP) Arm1 Elbow Pitch (EP) Arm1 Wrist Pitch (WP) Arm1 Wrist Yaw (WY) Arm1 Wrist Roll (WR)	Verifies that the Shoulder Joint Rate Mode (SJRM) control mode is working properly with the required accuracy and resolution for Arm1 SR, SY, SP, EP, WP, WY, and WR meanwhile without affect to other joints.	X				1J/A Flight (Prior to Orbiter Departure)	For SPDM Arm Joint Motion	60 min	Following Unloaded SPDM GC Commiss.

Task Number	Checkout Task	Description	Type of OCR Required			Priority and Required Operations-Phase			Comments	
			Once	Per.	Cond.	Desirable	Highly Desirable	Mandatory	Execution Time est.	Ground Option
* OCR SJEU 14.8 052 14.9 053 14.10 054 14.11 055 14.12 056 14.13 057 14.14 058	SPDM SJRM Checkout on Arm2 SR Arm2 SY Arm2 SP Arm2 EP Arm2 WP Arm2 WY Arm2 WR	Verifies that the SJRM control mode is working properly with the required accuracy and resolution for Arm2 SR, SY, SP, EP, WP, WY, and WR meanwhile without affect to other joints.	X				1J/A Flight (Prior to Orbiter Departure)	For SPDM Arm Joint Motion	60 min	Following Unloaded SPDM GC Commiss.
* OCR SJEU 3.1 005 3.2 006	SPDM Arm1 & Arm2 Joint Diagnostic Brake Test	Verifies the proper functionality of the SPDM Joint Brakes on each Arm.	X				1J/A Flight (Prior to Orbiter Departure)	Prior to multiple Arm Joint motion	5 min	YES
* OCR SJEU 1.1 001 1.2 002	SPDM Arm1 & Arm2 Joint Diagnostics Unit Test	OCR Verifies proper functionality of the motor drive, brake drive, and motor interface of the SPDM Joints	X				1J/A Flight (Prior to Orbiter Departure)	Prior to multiple Arm Joint motion	5 min	YES
Body Joint OCRs										
* OCR Backup Drive Joint Electronics Unit (BJEU) 1.1 001	SPDM Body Roll Joint Diagnostics Unit Tests on Primary String	Verifies the proper functionality of the motor drive, motor interface and brake drive of the SPDM body joint.	X				1J/A Flight (Prior to Orbiter Departure)	Prior to SPDM Body Joint Operations	2 min	YES
* OCR BJEU 2.1 003	SPDM Body Roll Joint Diagnostic Brake Test on Primary String	Verifies the proper functionality of the motor drive, motor interface and brake drive of the SPDM body joint.	X				1J/A Flight (Prior to Orbiter Departure)	Prior to SPDM Body Operations	2 min	YES
* OCR BJEU 1.2 002	SPDM Body Roll Joint Diagnostics Unit Test on Redundant String	Verifies proper functionality of the motor drive, motor interface and brake drive of the SPDM Redundant Body Joint	X				1J/A Flight (Prior to Orbiter Departure)	Prior to SPDM Body Joint Operations	5 min	YES
* OCR BJEU 2.2 004	SPDM Body Roll Joint Diagnostic Brake Test on Redundant String	Verifies proper functionality of the SPDM Redundant Body Joint Brake	X				1J/A Flight (Prior to Orbiter Departure)	Prior to SPDM Body Joint Operations	5 min	YES

Task Number	Checkout Task	Description	Type of OCR Required			Priority and Required Operations-Phase			Comments	
			Once	Per.	Cond.	Desirable	Highly Desirable	Mandatory	Execution Time est.	Ground Option
OCR BJEU 6.2 014	SPDM BJEU Motion - Release Brakes	Verifies the SPDM Body Joint responds to the "Release Brakes" command appropriately.	X				1J/A Flight (Prior to Orbiter Departure)	Prior to SPDM Body Joint Operations	1 min	Following Unloaded SPDM GC Commiss.
* OCR BJEU 3 005	SPDM Body Joint Limited Range Test	Verifies the ability to rotate the body roll joint in both directions	X				1J/A Flight (Prior to Orbiter Departure)	For SPDM Body Joint Operations	10 min	Following Unloaded SPDM GC Commiss.
* OCR BJEU 13 023	SPDM SJRM Mode	Demonstrates the Body Joint in Single Joint Rate Mode	X				1J/A Flight (Prior to Orbiter Departure)	For SPDM Body Joint Operations	20 min	Following unloaded SPDM GC Commiss.
OCR BJEU 5.1 007	SPDM BJEU Servo Brake Checkout for an Unloaded Primary Body Joint PDGF End	Verifies the SPDM Primary Body joint responds to a "Null" input by successfully applying the servo brakes.	X				1J/A Flight (Prior to Orbiter Departure)	For SPDM Body Joint Operations	5 min	Following Unloaded SPDM GC Commiss.
OCR BJEU 6.1 013	SPDM BJEU Motion - Apply Brakes	Verifies the SPDM Body Joint responds to the "Apply Brakes" command as expected	X				1J/A Flight (Prior to Orbiter Departure)	Following SPDM Body Joint Operations	1 min	Following Unloaded SPDM GC Commiss.
FMS/FMA OCRs										
OCR SPDM FMS 3.1 005 3.2 006	SPDM FMS Arm1 & Arm2 FMS Drift	OCR tests and assesses the sensitivity of the FMS thermal variations on Arm1 & Arm2		X			1J/A Flight (Prior to Orbiter Departure)	Prior to FMS/FMA Operations	Commanding = 2 min Data Collection = 2-3 Orbits each	YES
***** OCRs Required for Initial Commissioning Complete *****										
Power OCRs										
* OCR PWR 7.3 055 7.4 056	SPDM PDGF Channel A & B (MLB)	Verifies that the SPDM can be operated while positioned on the MLB via the PDGF on Channel B	X			Inc 16	Prior to Deployment Complete	Prior to R&R & 2J/A Operations	2 min	YES
OCR PWR 10.1 068 10.2 069	SPDM Shutdown OTCM1 & OTCM2	Verifies the SPDM Arm1 & Arm2 OEUs can be commanded to power off.	X			Prior to Deployment Complete	Inc 16	Prior to SPDM OTCM Operations	5 min each	YES

Task Number	Checkout Task	Description	Type of OCR Required			Priority and Required Operations-Phase			Comments	
			Once	Per.	Cond.	Desirable	Highly Desirable	Mandatory	Execution Time est.	Ground Option
OCR PWR 10.3 070 10.4 071	SPDM Startup OTCM1 & OTCM2	Verifies the SPDM Arm1 & Arm2 OEUs can be commanded to startup again after a shutdown	X			Prior to Deployment Complete	Inc 16	Prior to SPDM OTCM Operations	10 min each	YES
PWR 14.1 082	SPDM Backup Drive Unit (BDU) Shutdown on Primary	Verifies the BDU can be powered off using the Primary string.	X			Prior to Deployment Complete	Inc 16	Prior to OTCM Operations	5 min	YES
PWR 14.2 083	SPDM BDU Startup Primary	Verifies the BDU can be powered on using the Primary string.	X			Prior to Deployment Complete	Inc 16	Prior to SPDM OTCM Operations	10 min	YES
PWR 14.3 084	SPDM BDU Shutdown on Redundant	Verifies the BDU can be powered off using the Redundant string.	X			Prior to Deployment Complete	Inc 16	Prior to SPDM OTCM Operations	5 min	YES
PWR 14.4 085	SPDM BDU Startup on Redundant	Verifies the BDU can be powered on using the Redundant string.	X			Prior to Deployment Complete	Inc 16	Prior to SPDM OTCM Operations	10 min	YES
OCR PWR 14.1 082 14.2 083	SPDM BDU Shutdown - Primary/Redundant	Verifies that the SPDM BDU can be shutdown	X			Prior to Deployment Complete	Inc 16	Prior to SPDM OTCM Operations	5 min	YES
OCR PWR 14.3 084 14.4 085	SPDM BDU Startup Primary/Redundant	Verifies that the SPDM BDU can be Started up again	X			Prior to Deployment Complete	Inc 16	Prior to SPDM OTCM Operations	10 min	YES
* OCR PWR 7.7 059 7.8 060	SPDM LEE Channel A & Channel B (PLB)	Verifies that the SPDM can be operated while positioned on the PLB via the LEE on Channel A & Channel B	X			Inc 16		Prior to R&R Operations	2 min each	YES
OCR PWR 11.1 072	SPDM Shutdown Body Joint (Primary)	Verifies the SPDM Primary Body Joint (BJEU2) can be powered off	X			Inc 16		Prior to ORU/Tool Platform (OTP) or Tool Holster Assembly (THA) Prior to Operations	5 min	YES
OCR PWR 11.2 073	SPDM Shutdown Body Joint (Redundant)	Verifies the SPDM Redundant Body Joint (BJEU1) can be powered off	X			Inc 16		Prior to OTP or THA Operations	5 min	YES
OCR PWR 11.3 074	SPDM Startup Body Joint (Primary)	Verifies the SPDM Primary Body Joint (BJEU2) can be powered back on after a shutdown	X			Inc 16		Prior to OTP or THA Operations	10 min	YES

Task Number	Checkout Task	Description	Type of OCR Required			Priority and Required Operations-Phase			Comments	
			Once	Per.	Cond.	Desirable	Highly Desirable	Mandatory	Execution Time est.	Ground Option
OCR PWR 11.4 075	SPDM Startup Body Joint (Redundant)	Verifies the SPDM Redundant Body Joint (BJEU1) can be powered back on after a shutdown	X			Inc 16		Prior to OTP or THA Operations	10 min	YES
OCR PWR 12.1 076	SPDM Shutdown SPDM Arm Joint	Verifies that an SPDM Arm Joint subunit can be shutdown	X			Inc 16		For R&R Operations	5 min	YES
OCR PWR 12.2 077	SPDM Startup SPDM Arm Joint	Verifies that an SPDM Arm Joint subunit can be powered back on after a shutdown	X			Inc 16		For R&R Operations	10 min	YES
Body Joint OCRs										
OCR BJEU 5.2 008	SPDM BJEU Servo Brake Checkout for an Unloaded Primary Body Joint PDGF End	Verifies the SPDM Primary Body joint responds to a "Null" input by successfully applying the servo brakes.	X				1J/A Flight (Prior to Orbiter Departure)	For SPDM Body Joint Operations	5 min	Following Unloaded SPDM GC Commiss.
OTCM OCRs										
* OCR OTCM 1.1 001 1.2 002	SPDM OTCM1 & OTCM2 Diagnostic Tests	Verifies the proper functionality of the motor drive, and motor interface of the SPDM OTCM1 & OTCM2 mechanisms	X			Prior to Deployment Complete	Inc 16	Prior to OTCM Operations	< 5 min each	YES
OCR OTCM 2.3 005 2.6 008	SPDM OTCM1 & OTCM2 Gripper Calibration	Verifies the SPDM OTCM1 & OTCM2 Calibration of the Gripper Mechanism	X			Prior to Deployment Complete	Inc 16	Prior to OTCM Operations	< 5 min each	Following Unloaded SPDM GC Commiss.
OCR OTCM 2.4 006 2.7 009	SPDM OTCM1 & OTCM2 Umbilical Calibration	Verifies the SPDM OTCM1 & OTCM2 calibration of the umbilical mechanism	X			Prior to Deployment Complete	Inc 16	Prior to Cargo Transport Carrier (CTC) Operations	< 5 min each	Following Unloaded SPDM GC Commiss.
* OCR OTCM 3.1 011 3.2 012	SPDM OTCM1 & OTCM2 Checkout	Verifies the SPDM all the OTCM1 & OTCM2 mechanisms are operating correctly	X			Prior to Deployment Complete	Inc 16	Prior to OTCM Operations	15 min each	Following Unloaded SPDM GC Commiss.
* OCR OTCM 4.1 021	SPDM OTCM Automatic Micro - Position Termination	Verifies an Auto Grip command using a Position Termination criteria on a micro fixture	X			Prior to Deployment Complete	Inc 16	For OTCM Operations	10 min	Following SPDM GC Contact Ops Commiss.
* OCR OTCM 4.2 022	SPDM OTCM Automatic Micro - Current Termination	Verifies an Auto Grip command using Current Termination on a micro fixture	X			Prior to Deployment Complete	Inc 16	For OTCM Operations	10 min	Following SPDM GC Contact Ops Commiss.

Task Number	Checkout Task	Description	Type of OCR Required			Priority and Required Operations-Phase			Comments	
			Once	Per.	Cond.	Desirable	Highly Desirable	Mandatory	Execution Time est.	Ground Option
* OCR OTCM 4.3 023	SPDM OTCM Automatic H - Position Termination	Verifies an Auto Grip command using Position Termination on an H-Fixture.	X			Prior to Deployment Complete	Inc 16	For OTCM Operations	10 min	Following SPDM GC Contact Ops Commiss.
* OCR OTCM 4.4 024	SPDM OTCM Automatic H - Current Termination	Verifies an Auto Grip command using Current Termination on an H-Fixture	X			Prior to Deployment Complete	Inc 16	For OTCM Operations	10 min	Following SPDM GC Contact Ops Commiss.
* OCR OTCM 4.5 025	SPDM OTCM Automatic Other - Position Termination	Verifies an Auto Grip command using Position Termination on an undefined fixture	X			Prior to Deployment Complete	Inc 16	For OTCM Operations	10 min	Following SPDM GC Contact Ops Commiss.
* OCR OTCM 4.6 026	SPDM OTCM Automatic Other - Current Termination	Verifies an Auto Grip command using Current Termination on an undefined fixture	X			Prior to Deployment Complete	Inc 16	For OTCM Operations	10 min	Following SPDM GC Contact Ops Commiss.
* OCR OTCM 4.7 027	SPDM OTCM Automatic Advance	Demonstrates that an SPDM OTCM is able to perform an advance maneuver automatically.	X			Prior to Deployment Complete	Inc 16	For OTCM Operations	5 min	Following Unloaded SPDM GC Commiss.
* OCR OTCM 4.8 028	SPDM OTCM Automatic Retract	Demonstrates that an SPDM OTCM is able to perform the retract maneuver automatically.	X			Prior to Deployment Complete	Inc 16	For OTCM Operations	5 min	Following Unloaded SPDM GC Commiss.
* OCR OTCM 4.11 031	SPDM OTCM Automatic Fasten	Demonstrates that an SPDM OTCM is able to perform a fasten maneuver automatically	X			Prior to Deployment Complete	Inc 16	For OTCM Operations	5 min	Following Unloaded SPDM GC Commiss.
* OCR OTCM 4.12 032	SPDM OTCM Automatic Unfasten	Demonstrates that an SPDM OTCM is able to perform an unfasten maneuver automatically	X			Prior to Deployment Complete	Inc 16	For OTCM Operations	5 min	Following Unloaded SPDM GC Commiss.
* OCR OTCM 5.1 033	SPDM OTCM Manual Micro - Position Termination	Demonstrates that an SPDM OTCM can perform a manual grip command on a micro-fixture using position termination.	X			Prior to Deployment Complete	Inc 16	For OTCM Operations	10 min	Following SPDM GC Contact Ops Commiss.
* OCR OTCM 5.2 034	SPDM OTCM Manual Micro - Current Termination	Demonstrates that an SPDM OTCM can perform a manual grip command on a micro-fixture using current Termination.	X			Prior to Deployment Complete	Inc 16	For OTCM Operations	10 min	Following SPDM GC Contact Ops Commiss.

Task Number	Checkout Task	Description	Type of OCR Required			Priority and Required Operations-Phase			Comments	
			Once	Per.	Cond.	Desirable	Highly Desirable	Mandatory	Execution Time est.	Ground Option
* OCR OTCM 5.3 035	SPDM OTCM Manual H - Position Termination	Demonstrates that an SPDM OTCM can perform a manual grip command on an H-Fixture using position termination	X			Prior to Deployment Complete	Inc 16	For OTCM Operations	10 min	Following SPDM GC Contact Ops Commiss.
* OCR OTCM 5.4 036	SPDM OTCM Manual H - Current Termination	Demonstrates that an SPDM OTCM can perform a manual grip command on an H-Fixture using current termination	X			Prior to Deployment Complete	Inc 16	For OTCM Operations	10 min	Following SPDM GC Contact Ops Commiss.
* OCR OTCM 5.5 037	SPDM OTCM Manual Other - Position Termination	Demonstrates that an SPDM OTCM can perform a manual grip command on an undefined fixture using position termination	X			Prior to Deployment Complete	Inc 16	For OTCM Operations	10 min	Following SPDM GC Contact Ops Commiss.
* OCR OTCM 5.6 038	SPDM OTCM Manual Other - Current Termination	Demonstrates that an SPDM OTCM can perform a manual grip command on an undefined fixture using current termination	X			Prior to Deployment Complete	Inc 16	For OTCM Operations	10 min	Following SPDM GC Contact Ops Commiss.
* OCR OTCM 5.7 039	SPDM OTCM Manual Advance	Demonstrates the SPDM OTCM manual advance command in preparation for fastening bolts	X			Prior to Deployment Complete	Inc 16	For OTCM Operations	5 min	Following Unloaded SPDM GC Commiss.
* OCR OTCM 5.8 040	SPDM OTCM Manual Retract	Demonstrates the SPDM OTCM manual retract command in preparation for unfastening bolts	X			Prior to Deployment Complete	Inc 16	For OTCM Operations	5 min	Following Unloaded SPDM GC Commiss.
* OCR OTCM 5.11 043	SPDM OTCM Manual Fasten	Demonstrates the SPDM OTCM manual fasten command for fastening bolts	X			Prior to Deployment Complete	Inc 16	For OTCM Operations	5 min	Following SPDM GC Contact Ops Commiss.
* OCR OTCM 5.12 044	SPDM OTCM Manual Unfasten	Demonstrates the SPDM OTCM manual unfasten command for unfastening bolts	X			Prior to Deployment Complete	Inc 16	For OTCM Operations	5 min	Following SPDM GC Contact Ops Commiss.
* OCR OTCM 3.3 013 3.6 016	SPDM OTCM1 & OTCM2 Gripper Checkout	Verifies the SPDM checkout of the OTCM1 & OTCM2 Gripper mechanism	X			Inc 16		Prior to OTCM Operations	15 min each	Following Unloaded SPDM GC Commiss.
* OCR OTCM 3.4 014 3.7 017	SPDM OTCM1 & OTCM2 Umbilical Checkout	Verifies the SPDM checkout of the OTCM1 & OTCM2 Umbilical mechanism	X			Inc 16		Prior to CTC Operations	< 5 min each	Following Unloaded SPDM GC Commiss.

Task Number	Checkout Task	Description	Type of OCR Required			Priority and Required Operations-Phase			Comments	
			Once	Per.	Cond.	Desirable	Highly Desirable	Mandatory	Execution Time est.	Ground Option
* OCR OTCM 3.5 015 3.8 018	SPDM OTCM1 & OTCM2 Advance Checkout	Verifies the SPDM Checkout of the OTCM1 & OTCM2 Advance mechanism	X			Inc 16		OTCM Operations	< 5 min each	Following Unloaded SPDM GC Commiss.
FMS/FMA OCRs										
OCR FMS 1.1 001 1.2 002	SPDM OTCM1 and OTCM2 FMS Calibration	Verifies that the FMS on both SPDM OTCMs can be calibrated successfully		X		Prior to Deployment Complete	Inc 16	Prior to FMS/FMA Operations	< 5 min each	YES
OCR SPDM FMS 2.1 003 FMS 2.2 004	SPDM FMS Arm1 & Arm2 Dynamic Loads Test	Verifies the FMS measurements and assesses the accuracy using OTCM as load.	X			Prior to Deployment Complete	Inc 16	For FMS/FMA Contact Operations	< 60 min each	Following Unloaded SPDM GC Commiss.
OCR SPDM FMA 1.1 001 FMA 1.2 002	SPDM FMA Arm1 & Arm2 Grasping	Verifies that the SPDM Arm1 & Arm2 can successfully backdrive the arm during capture operations.	X			Prior to Deployment Complete	Inc 16	For FMS/FMA Contact Operations	10 min each	Following SPDM GC Contact Ops Commiss.
OCR SPDM FMA 3.1 005 3.2 006	SPDM FMA Arm1 & Arm2 ORUs Insertion / Extraction with Stabilization	Demonstrates that FMA on Arm 1& Arm2 can assist in ORU insertion and extraction operations with stabilization.	X				Inc 16	For FMS/FMA Contact Operations	70 min each	Following SPDM GC Loaded Ops Commiss.
OCR SPDM FMA 4.1 007 4.2 008	SPDM FMA Arm 1 & Arm2 Constrained Motion -- Stabilized	OCR demonstrated that the SPDM Arm1 & Arm2 can, with FMA enabled, successfully complete a constrained motion task.	X				Inc 16	For FMS/FMA Contact Operations	70 min each	Following SPDM GC Contact Ops Commiss.
OCR SPDM FMA 2.1 003 FMA 2.2 004	SPDM FMA Arm1 & Arm2 Bolt Following	OCR assess the FMA performance for bolt following operations on Arm1 & Arm2	X			Inc 16		For FMS/FMA Contact Operations	45 min each	Following SPDM GC Loaded Ops Commiss.
OCR SPDM FMA 3.3 009 FMA 3.4 010	SPDM FMA Arm1 & Arm2 ORU Insertion / Extraction without Stabilization	Demonstrates that FMA on Arm1 & Arm2 can assist in ORU insertion and extraction operations without stabilization	X			Inc 16		For FMS/FMA Contact Operations	60 min each	Following SPDM GC Loaded Ops Commiss.

Task Number	Checkout Task	Description	Type of OCR Required			Priority and Required Operations-Phase			Comments	
			Once	Per.	Cond.	Desirable	Highly Desirable	Mandatory	Execution Time est.	Ground Option
Arm Joint OCRs										
* OCR SPDM Joint Electronics Unit (SJEU) 4.1 007 4.2 008	SPDM Arm1 & Arm2 Joint Limited Range Test	Verifies that each of the SPDM Arm1 & Arm2 joints can rotate in both directions	X			Prior to Deployment Complete	Inc 16	Prior to Stabilization / R&R Operations	< 30 min each	Following Unloaded SPDM GC Commiss.
OCR SJEU 6.3 013 6.4 014	SPDM Servo Brake Checkout for an Unloaded Arm1 & Arm2 with Stabilization	Verifies that each of the SPDM Arm1 & Arm2 respond to a "Null" input by successfully applying the servo brakes when unloaded with stabilization	X			Prior to Deployment Complete	Inc 16	For Stabilized SPDM Arm Operations	< 30 min each	Following Unloaded SPDM GC Commiss.
OCR SJEU 6.5 015 6.6 016	SPDM Servo Brake Checkout for a Loaded Arm1 & Arm2 with no Stabilization	Verifies that each of the SPDM Arm1 & Arm2 respond to a "Null" input by successfully applying the servo brakes when loaded with no stabilization	X			Prior to Deployment Complete	Inc 16	For Unstabilized SPDM Arm Operations	< 30 min each	Following Unloaded SPDM GC Commiss.
OCR SJEU 6.7 017	SPDM Servo Brake Checkout for a Loaded Arm1 & Arm 2 with Stabilization	Verifies that each of the SPDM Arm1 & Arm2 respond to a "Null" input by successfully applying the servo brakes when loaded with stabilization	X			Prior to Deployment Complete	Inc 16	For stabilized SPDM Arm Operations	< 30 min each	Following Unloaded SPDM GC Commiss.
OCR SJEU 7.3 056 7.4 057	SPDM Arm1 & Arm2 Joint Limp Commands	Verifies the SPDM Arm 1 & Arm2 joints can be commanded to limp and back to position hold.	X			Prior to Deployment Complete	Inc 16	Prior to R&R Operations	< 5 min each	YES
* OCR SJEU 29 048	SPDM Shoulder Cluster Internal Collision Check	Verifies the ability of the system to put the active SPDM arm in position-hold-submode when approaching a shoulder cluster internal collision limit	X			Prior to Deployment Complete	Inc 16		< 60 min	Following Unloaded SPDM GC Commiss.
* OCR SJEU 30 049	SPDM Wrist Cluster Internal Collision Check	Verifies the ability of the system to put the active SPDM arm in position-hold-sub-mode when approaching a wrist cluster internal collision limit.	X			Prior to Deployment Complete	Inc 16		< 60 min	Following Unloaded SPDM GC Commiss.
* OCR SJEU 31 050	SPDM Cross Cluster Collision Check	Verifies that the SPDM detects the Cross Cluster Collision and responds correctly to it.	X			Prior to Deployment Complete	Inc 16		< 60 min	Following Unloaded SPDM GC Commiss.
* OCR SJEU 13.1 041	SPDM Coarse/Vernier Rate Selection Static Rate	Verifies the operator can select the coarse/vernier maximum static rate for SPDM movement.	X			Prior to Deployment Complete	Inc 16	For R&R Operations	< 60 min	Following Unloaded SPDM GC Commiss.

Task Number	Checkout Task	Description	Type of OCR Required			Priority and Required Operations-Phase			Comments	
			Once	Per.	Cond.	Desirable	Highly Desirable	Mandatory	Execution Time est.	Ground Option
* OCR SJEU 15 019	SPDM Manual Augmented Mode (MAM) Checkout	Verifies that the MAM control mode is working with the required accuracy and resolution	X			Prior to Deployment Complete	Inc 16	For Unstabilized SPDM Arm Operations	< 60 min	Following Unloaded SPDM GC Commiss.
* OCR SJEU 16 020 16.1 020	SPDM Operator Commanded Point Of Resolution (POR) Mode (OCPM) Checkout Arm1 & Arm2	Verifies that the OCPM control mode is working with the required accuracy and resolution	X			Prior to Deployment Complete	Inc 16	For Unstabilized SPDM Arm Operations	< 60 min each	Following Unloaded SPDM GC Commiss.
* OCR SJEU 17 021	SPDM Operator Commanded Joint Commanded Mode (OCJM) Checkout	Verifies the OCJM control mode is working properly with the required accuracy and resolution	X			Prior to Deployment Complete	Inc 16	For Unstabilized SPDM Arm Operations	< 60 min	Following Unloaded SPDM GC Commiss.
OCR SJEU 21 026	SPDM BLOCS Coordinate Frame Checkout	Verifies the correct implementation of BLOCS frame for POR operations	X			Prior to Deployment Complete	Inc 16	For Unstabilized SPDM Arm Operations	< 60 min	Following Unloaded SPDM GC Commiss.
OCR SJEU 22 018	SPDM SOCS Coordinate Frame Checkout	Verifies the correct implementation of SOCS frame for POR operations	X			Prior to Deployment Complete	Inc 16	For Unstabilized SPDM Arm Operations	< 60 min	Following Unloaded SPDM GC Commiss.
OCR SJEU 27.1 043	SPDM Line Tracking using Joint Tracking	Verifies that the Line Tracking feature is working properly to correct POR trajectory errors during POR movement along a straight line.	X			Prior to Deployment Complete	Inc 16	For Unstabilized SPDM Arm Operations	< 60 min	Following Unloaded SPDM GC Commiss.
OCR SJEU 27.2 044	SPDM Line Tracking using POR Tracking	Verifies that the Line Tracking feature is working properly to correct POR trajectory errors during POR movement along a straight line.	X			Prior to Deployment Complete	Inc 16	For Unstabilized SPDM Arm Operations	60 min	Following Unloaded SPDM GC Commiss.
OCR SJEU 28 035	SPDM Base Joint Locking	Verifies that the Base Joint Lock control feature is working properly for Shoulder roll or yaw	X			Prior to Deployment Complete	Inc 16	For Unstabilized SPDM Arm Operations	30 min	Following Unloaded SPDM GC Commiss.

Task Number	Checkout Task	Description	Type of OCR Required			Priority and Required Operations-Phase			Comments	
			Once	Per.	Cond.	Desirable	Highly Desirable	Mandatory	Execution Time est.	Ground Option
OCR SJEU 5.1 009 5.2 010	SPDM Arm1 & Arm2 Joint Full Range Test	Demonstrates that each of the SPDM Arm1 & Arm2 Joints can rotate through their full range of motion	X			Prior to Deployment Complete	Inc 16	For Unstabilized SPDM Arm Operations	60 min each	Following Unloaded SPDM GC Commiss.
OCR SJEU 5.1 009 5.2 010	SPDM Arm 1 & Arm2 Joint Full Range Test	Verifies each of the SPDM Arm1 & Arm2 Joints to their +/- soft stops	X			Inc 16		For Unstabilized SPDM Arm Operations	60 min each	Following Unloaded SPDM GC Commiss.
OCR SJEU 8.1 021 8.2 022	SPDM Arm1 & Arm2 Limping Mode	Verifies that SPDM Arm1& Arm2 can operate in limp mode	X			Inc 16		For Unstabilized SPDM Arm Operations	5 min each	Following Unloaded SPDM GC Commiss.
* OCR SJEU 13.2 042	SPDM Coarse/Vernier Rate Selection “on-the-fly”	Verifies the operator can select the coarse/vernier maximum rate on the fly for SPDM movement	X			Inc 16		For R&R Operations	60 min	Following Unloaded SPDM GC Commiss.
OCR SJEU 9 023	SPDM SJEU - Pause, Resume, & Terminate	Verifies that the SPDM Arm can pause, resume and terminate an auto sequence	X			Inc 16		For Unstabilized SPDM Arm Operations	30 min	Following Unloaded SPDM GC Commiss.
OCR SJEU 10 024	SPDM POR Rate Limit Selection	Verifies that the operator is able to select SPDM POR translational and rotation rate limits	X			Inc 16		For Unstabilized SPDM Arm Operations	60 min	Following Unloaded SPDM GC Commiss.
OCR SJEU 11 014	SPDM Rate Input Scale Selection	Verifies the operator is able to set the Vernier and Coarse rate scale factors between min and max values.	X			Inc 16		For Unstabilized SPDM Arm Operations	60 min	Following Unloaded SPDM GC Commiss.
OCR SJEU 12 015	SPDM Rate Hold	Verifies the rate hold feature is able to hold the manipulator rate constant	X			Inc 16		For Unstabilized SPDM Arm Operations	60 min	Following Unloaded SPDM GC Commiss.
* OCR SJEU 18 022	SPDM Pre-stored POR Autosequence Mode (PPAM) Checkout	Verifies that the PPAM control mode is working with the required accuracy and resolution	X			Inc 16		For Unstabilized SPDM Arm Operations	60 min	Following Unloaded SPDM GC Commiss.

Task Number	Checkout Task	Description	Type of OCR Required			Priority and Required Operations-Phase			Comments	
			Once	Per.	Cond.	Desirable	Highly Desirable	Mandatory	Execution Time est.	Ground Option
* OCR SJEU 19 023	SPDM Pre-stored Joint Autosequence Mode (PJAM) Checkout	Verifies that the PJAM control mode is working with the required accuracy and resolution	X			Inc 16		For Unstabilized SPDM Arm Operations	60 min	Following Unloaded SPDM GC Commiss.
OCR SJEU 20.1 024	SPDM Hot Stick Position & Orientation Hold Selection	Verifies that the Hot Stick Position/Orientation Hold feature is working.	X			Inc 16		For Unstabilized SPDM Arm Operations	60 min	Following Unloaded SPDM GC Commiss.
OCR SJEU 20.2 025	SPDM Manual Position & Orientation Hold Selection	Verifies that the Manual Position/Orientation Hold Feature is working.	X			Inc 16		For Unstabilized SPDM Arm Operations	60 min	Following Unloaded SPDM GC Commiss.
OCR SJEU 23.1 028	SPDM Tip Speed Performance Test Min Joint Rate	Verifies Single Joint Rate Mode (SJRM) mode with minimum rate command for Tip Speed performance recording	X			Inc 16		For Unstabilized SPDM Arm Operations	60 min	Following Unloaded SPDM GC Commiss.
OCR SJEU 23.2 029	SPDM Tip Speed Performance Test Max Joint Rate	Verifies SJRM mode maximum rate command for Tip Speed performance recording	X			Inc 16		For Unstabilized SPDM Arm Operations	60 min	Following Unloaded SPDM GC Commiss.
OCR SJEU 24 030	SPDM Arm Pitch Plane Change (APPC)	Verifies that the APPC control mode is working with the required accuracy and resolution	X			Inc 16		For Unstabilized SPDM Arm Operations	30 min	No
OCR SJEU 26.1 032	SPDM Singularity Management (6 DOF)	Verifies that the SPDM singularity management is working when using a 6 DOF configuration	X			Inc 16		For Unstabilized SPDM Arm Operations	60 min	Following Unloaded SPDM GC Commiss.
OCR SJEU 26.2 033	SPDM Singularity Management (7 DOF)	Verifies that the SPDM singularity management is working when using a 7 DOF configuration	X			Inc 16		For Unstabilized SPDM Arm Operations	60 min	Following Unloaded SPDM GC Commiss.
OCR SJEU 34 040	SPDM Degraded Joint Operations (DJOPS) Checkout	Verifies the arm can work in DJOPS when one joint is failed.	X			Inc 16		For Unstabilized SPDM Arm Operations	60 min	Following Unloaded SPDM GC Commiss.

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			Once	Per.	Cond.	Desirable	Highly Desirable	Mandatory	Execution Time est.	Ground Option
Video OCRs										
OCR VID 5.1 005 5.2 006	SPDM Video ORU Television Camera (OTVC) #1 & OTVC #2 Full Checkout	Verifies OTVC #1 & OTVC #2 cameras features such as Near/Wide FOV, Auto-exposure, Manual and Auto-Iris, etc.	X			Prior to Deployment Complete	Inc 16	Prior to OTCM Operations	10 min each	YES
OCR VID 1 001	SPDM LEE Camera Basic Checkout	Verifies LEE CLA Video and Zoom working correctly	X				Prior to Deployment Complete	For SPDM LEE PDGF Grapple	10 min	YES
OCR VID 7.1 009 7.2 010	SPDM Video CLPA #1 & CLPA #2 Full Checkout	Verifies full CLPA #1 & CLPA #2 functionality (Pan/Tilt, Fast/Slow, zoom, focus, iris, etc.)	X			Prior to Deployment Complete		For Stabilization / R&R Operations	10 min each	YES
OCR VID 8.1 011 8.2 012	SPDM Video CLPA #1 & CLPA #2 Soft Stop Behaviour	Verifies that when Pan/Tilt approaches soft stop then reaches the soft stop the motion will stop	X			Inc 16		For Stabilization / R&R Operations	5 min each	YES
BDU OCRs										
OCR BDU 1.0 001	SPDM BDU Diagnostic Tests	Verifies the proper functionality of the motor drive and motor interface between the SPDM BDU and OTCM mechanisms.	X			Prior to Deployment Complete		Prior to R&R Operations	5 min	YES
* OCR BDU 2.1 002	SPDM BDU Command of OTCM Gripper, Advance and Umbilical at High Voltage	Verifies the capability of powering up/down the BDU and operating the SPDM OTCM Mechanisms using BDU at High Voltage	X			Prior to Deployment Complete		Prior to R&R Operations	15 min	Following Unloaded SPDM GC Commiss.
* OCR BDU 2.2 003	SPDM BDU Command of OTCM Gripper, Advance and Umbilical at Low Voltage	Verifies the capability of powering up/down the BDU and operating the SPDM OTCM Mechanisms using BDU at Low Voltage	X			Prior to Deployment Complete		Prior to R&R Operations	15 min	Following Unloaded SPDM GC Commiss.
* OCR BDU 2.3 004	SPDM BDU Command of OTCM Torquer at Low Voltage Clockwise	Verifies the capability of powering up/down the BDU and operating the SPDM OTCM Torquer using the BDU at Low Voltage	X			Prior to Deployment Complete		Prior to R&R Operations	15 min	Following Unloaded SPDM GC Commiss.
* OCR BDU 2.4 005	SPDM BDU Command of OTCM Torquer at High Voltage Counter Clockwise	Verifies the capability of powering up/down the BDU and operating the SPDM OTCM Torquer using the BDU at High Voltage	X			Prior to Deployment Complete		Prior to R&R Operations	15 min	Following Unloaded SPDM GC Commiss.
ROST Tool OCRs										

Task Number	Checkout Task	Description	Type of OCR Required			Priority and Required Operations-Phase			Comments	
			Once	Per.	Cond.	Desirable	Highly Desirable	Mandatory	Execution Time est.	Ground Option
OCR ROST 1.1 001	Robotic Offset Tool (ROST) Holster Checkout Acquisition Part	Verifies the acquisition and release of the ROST from the tool Holster	X			Prior to Deployment Complete	Inc 16	For ROST Operations	30 min	Following SPDM GC Loaded Ops Commiss.
OCR ROST 1.2 002	ROST Holster Checkout Stowage Part	Verifies the stowage of the ROST into the tool holster	X			Prior to Deployment Complete	Inc 16	For ROST Operations	60 min	Following SPDM GC Loaded Ops Commiss.
OCR ROST 2.1 003	ROST Dynamic Checkout Drive Mechanism	Verifies ROST Modified Micro-Fixture (MMF) Operations. Checkout on its drive mechanisms	X			Prior to Deployment Complete	Inc 16	For ROST Operations	60 min	Following SPDM GC Loaded Ops Commiss.
RMCT Tool OCRs										
OCR RMCT 1.1 001 1.2 002	Robot Micro Conical Tool (RMCT)1 & RMCT2 Dynamic Checkout	Verifies MCF Collocated bolt actuation, launch restraint mechanism release, preload and drive open the launch restraint arms	X			Prior to Deployment Complete	Inc 16	For RMCT Operations	60 min each	Following SPDM GC Loaded Ops Commiss.
OCR RMCT 2.1 003 2.3 005	RMCT Holster Checkout: Acquisition RMCT1 & RMCT2	Verifies RMCT Holster operations by releasing each RMCT from its Holster's MCF	X			Prior to Deployment Complete	Inc 16	For RMCT Operations	60 min each	Following SPDM GC Loaded Ops Commiss.
OCR RMCT 2.2 004 2.5 006	RMCT Holster Checkout: Stowage RMCT1 & RMCT2	Verifies RMCT Holster operations by stowing each RMCT to its Holster's MCF	X			Prior to Deployment Complete	Inc 16	For RMCT Operations	60 min each	Following SPDM GC Loaded Ops Commiss.
SET Tool OCRs										
* OCR SET 1.1 001	Socket Extension Tool (SET) Holster Checkout Acquisition Part	Verifies the release of the SET tool from the tool holster	X			Prior to Deployment Complete	Inc 16	For SET Operations	45 min	Following SPDM GC Loaded Ops Commiss.
* OCR SET 1.2 002	SET Holster Checkout Stowage Part	Verifies the re-securing of the SET tool into the tool holster	X			Prior to Deployment Complete	Inc 16	For SET Operations	60 min	Following SPDM GC Loaded Ops Commiss.

Task Number	Checkout Task	Description	Type of OCR Required			Priority and Required Operations-Phase			Comments	
			Once	Per.	Cond.	Desirable	Highly Desirable	Mandatory	Execution Time est.	Ground Option
* OCR SET 2.1 003	Unloaded SET Dynamic Checkout	Verifies unloaded SET mechanism movement	X			Prior to Deployment Complete	Inc 16	For SET Operations	45 min	Following SPDM GC Loaded Ops Commiss.
* OCR SET 2.2 004	Loaded SET Dynamic Checkout	Verifies loaded SET mechanism movement	X			Prior to Deployment Complete	Inc 16	For SET Operations	45 min	Following SPDM GC Loaded Ops Commiss.

TABLE H-5 FLIGHT 1E AND STAGE 1E COLUMBUS ON-ORBIT CHECKOUT REQUIREMENT TASKS (PAGE 1 OF 6)

Task Number	IDRD Section 6	Checkout Task	Description	Type of OCR Required			Priority and Required Operations-Phase (Joint Operations/Stage Operations, Options)			Comments	
	Task Reference [1]			One-Time Activation	Periodic	Conditional	Desirable	Highly Desirable	Mandatory	Special MCC/ISS/ Shuttle Resources	
ESA - 1	F12D	VDPU checkout	Checkout of VDPU switching and compression unit prior to first use	X					(during Flight 1E, before rack activations)		Includes use of internal redundancies. Either signal from VCA (preferred), recorded tape, USOS VSU, or EuTEF HRD is necessary to conduct checkout.
ESA - 2	F12D	Video equipment checkout	Checkout of video equipment VCA, VMN and VCR. Desire to test the equipment with VDPU	X				(VCR and VMN during Flight 1E)	(VCA during Flight 1E prior to VDPU checkout, VCR and VMN during Stage 1E)		VCA as preferred source for VDPU checkout
ESA - 3	F12D	MMU file transfer checkout	Checkout file uplink/ downlink on different paths (Ku-/S-Band).	X					(during Flight 1E, before rack activations)		Required before first CDI uplink.
ESA - 4	F31 S12A	SPC4 checkout	Verify redundancy of spare SPC	X				(during Flight 1E)	(during Stage 1E)		Boot SPC in checkout mode, SPC configuration remains as is
ESA - 5	F31 S12A	Vacuum/Venting system checkout	Characterize dump duration and leak rates	X				(during Flight 1E)	(during Stage 1E)		
ESA - 6	F31 S12A	Vacuum/Venting leak check	Quick disconnect seal verification	X				(during Flight 1E)	(during Stage 1E)		

TABLE H-5 FLIGHT 1E AND STAGE 1E COLUMBUS ON-ORBIT CHECKOUT REQUIREMENT TASKS (PAGE 2 OF 6)

Task Number	IDRD Section 6	Checkout Task	Description	Type of OCR Required			Priority and Required Operations-Phase (Joint Operations/Stage Operations, Options)			Comments	
	Task Reference [1]			One-Time Activation	Periodic	Conditional	Desirable	Highly Desirable	Mandatory	Special MCC/ISS/ Shuttle Resources	
ESA - 7	F31 S12A	HCU and Shell heater checkout	Checkout shell heaters Both HCUs activated during Berthed Survival Mode activation procedure; HCU2 switched off at final activation completion. HCUs swap suggested to verify functionality of HCU plus shell heaters chains	X				(during Flight 1E)	(during Stage 1E)		As a minimum, verify that shell heaters cycle once.
ESA - 8	F31 S12A	CFA 2 checkout	Verify critical redundancy	X				(during Flight 1E)	(during Stage 1E)		CFA1 switch off required
ESA - 9	F31 S12A	CWSA2 checkout	Verify CWSA redundancy for upcoming CHX dryout.		X			(during Flight 1E)	(during Stage 1E prior to first CHX dryout)		Needed prior next CHX dryout.
ESA - 10	F31 S12A	CTCU2 checkout	Verify CTCU redundancy, switchover to CTCU2.	X				(during Flight 1E)	(during Stage 1E)		
ESA - 11	F31 S12A	WPA 2 checkout	Verify critical redundancy. Power on electronic unit only.	X				(during Flight 1E)	(during Stage 1E)		Minimum checkout of electronic unit.

TABLE H-5 FLIGHT 1E AND STAGE 1E COLUMBUS ON-ORBIT CHECKOUT REQUIREMENT TASKS (PAGE 3 OF 6)

Task Number	IDRD Section 6	Checkout Task	Description	Type of OCR Required			Priority and Required Operations-Phase (Joint Operations/Stage Operations, Options)			Comments	
	Task Reference [1]			One-Time Activation	Periodic	Conditional	Desirable	Highly Desirable	Mandatory	Special MCC/ISS/ Shuttle Resources	
ESA - 12	F31 S12A	TCS/ECLSS valve cycling	Verify valves functionality TCS (IFHX) valves will be cycled during 1e stage due to risk assessment. WFSV as part of PL activation during/post 1E. WOOV 9/10 as part of CHX dryout (#9). ECLSS valves (except IMV, see 13) will probably not be cycled during 1e stage (following 12 months requirement after last cycling on ground).		X			(during Flight 1E)	(during Stage 1E/ Inc 16)		Excluding CDAs and valves cycled in activation, PPRA, WMVs and WOOV1/2 valves.
ESA - 13	F31 S12A	IMV SOV cycling	Verify command interface for valves after IMV valve installation.	X				(during Flight 1E)	(during Stage 1E)		Needed for automatic reaction in case of fire.
ESA - 14	F16B	FSL Activation/Check out		X					(during Flight 1E)		
ESA - 15	F19B	FSL Checkout of relevant subsystems and laptop		X					(during Flight 1E) \		
ESA - 16	F19B	FSL Optical performance checkout tests to support GEOFLOW		X					(during Flight 1E		

TABLE H-5 FLIGHT 1E AND STAGE 1E COLUMBUS ON-ORBIT CHECKOUT REQUIREMENT TASKS (PAGE 4 OF 6)

Task Number	IDRD Section 6	Checkout Task	Description	Type of OCR Required			Priority and Required Operations-Phase (Joint Operations/Stage Operations, Options)			Comments	
	Task Reference [1]			One-Time Activation	Periodic	Conditional	Desirable	Highly Desirable	Mandatory	Special MCC/ISS/ Shuttle Resources	
ESA - 17	F19B	FSL GEOFLOW checkout and performance		X				(checkout during Flight 1E)	(during Stage 1E)		
ESA - 18		(Reserved)									
ESA - 19	S24A	FSL MVIS checkout		X				(during Stage 1E)	(during Inc 16)		
ESA - 20	S24A	FSL Other optical performance checkout		X				(during Stage 1E)	(during Inc 16)		
ESA - 21	F16A	BIOLAB Activation/ Checkout		X					(during Flight 1E)		
ESA - 22	F19A	BIOLAB Checkout of relevant subsystems and laptop in support of WAICO		X					(during Flight 1E)		
ESA - 23	F19A S12B	BIOLAB functional tests		X				(during Flight 1E)	(during Stage 1E)		
ESA - 24	S12B	Performance of WAICO to USOC end to end communication check		X					(during Stage 1E)		CEF under review
ESA - 25	F16C	EDR/PCDF EU Activation/Check out		X					(during Flight 1E)		

TABLE H-5 FLIGHT 1E AND STAGE 1E COLUMBUS ON-ORBIT CHECKOUT REQUIREMENT TASKS (PAGE 5 OF 6)

Task Number	IDRD Section 6	Checkout Task	Description	Type of OCR Required			Priority and Required Operations-Phase (Joint Operations/Stage Operations, Options)			Comments	
	Task Reference [1]			One-Time Activation	Periodic	Conditional	Desirable	Highly Desirable	Mandatory	Special MCC/ISS/ Shuttle Resources	
ESA - 26	F19C	EDR/PCDF EU Checkout of relevant subsystems and laptop		X					(during Flight 1E)		
ESA - 27	F19C S12D	Testing of PCDF EU to USOC end to end communication check		X				(during Flight 1E)	(during Stage 1E)		Must be completed before Flight 1JA
ESA - 28	F19 (1JA)	EDR/PCDF-PU Activation/Check out		x					(during Flight 1J/A)		
ESA - 29	F16D	EPM Activation/Check out		X					(during Flight 1E)		
ESA - 30	F19D	EPM Carrier Checkout		X					(during Flight 1E)		
ESA - 31	F19D S14A	EPM Science Modules Checkout		X				(during Flight 1E)	(during Increment 16)		
ESA - 32	F14	EuTEF Activation/Check out		X					(during Flight 1E)		
ESA - 33	F14	SOLAR Activation/Check out		X					(during Flight 1E)		

TABLE H-5 FLIGHT 1E AND STAGE 1E COLUMBUS ON-ORBIT CHECKOUT REQUIREMENT TASKS (PAGE 6 OF 6)

Task Number	IDRD Section 6	Checkout Task	Description	Type of OCR Required			Priority and Required Operations-Phase (Joint Operations/Stage Operations, Options)			Comments	
	Task Reference [1]			One-Time Activation	Periodic	Conditional	Desirable	Highly Desirable	Mandatory	Special MCC/ISS/ Shuttle Resources	
ESA - 34	F14	System to external payload interface checkout	Activate SOLAR/EUTEF and verify system interfaces	X					(during Flight 1E)		Verify data / command interface. Does not include payload internal checkout
ESA - 35	F14 S10F	EuTEF Instruments Checkout		X					(during Flight 1E)		
ESA - 36	F14 S10G	SOLAR Instruments Checkout		X					(during Flight 1E)		
ESA - 37	F12D	System to payload file transfer checkout	MMU to payload onboard file transfer checkout	X					(during Flight 1E)		Valid for all ESA ISPRs and ext.PL
ESA - 38	F12D	LAN Rate Setting	Change of Payload LAN rate to support payload operations	X					(during Flight 1E)		Valid for all ESA ISPRs and ext.PL

[1] "IDRD Section 6 Task Cross Reference" for ESA tasks: F=Flight 1E, S=Stage 1E, ##=Section 6 task number, or ## x=task and subtask number

APPENDIX I - SHUTTLE FLIGHT TRANSFER PRIORITY LISTS

I.1 FLIGHT 10A MIDDECK LAUNCH AND RETURN PRIORITIES

Flight 10A										
Line Item	**Phase**	**GGR&C Priority**	**Group Rank**	**Sub Rank1**	**Part Number**	**Part Name**	**Qty**	**MR Number(s)**	**Mass (lbs)**	**Volume (ft3)**
	1 - Items required to ensure/maintain crew safety for the upcoming flight/stage (critical).									
1						**CHECS CMS HARDWARE**				
2	Ascent	1			SJG46119465-301	**GYROSCOPE MOUNT/CABLE SPARE PARTS KIT**	1	2007-06-041 (CLOSED)	0.5	0.001
3						**CHECS EHS HARDWARE**				
4	Ascent	1			SEZ33111519-315	CREW PASSIVE DOSIMETER (CPD) ASSEMBLY	1	2006-12-028A (CLOSED)	0.022	0.0
5	Ascent	1			SED46115801-305	ASSEMBLY, CSA-O_2 MONITOR	2	2007-07-086 (status NA)	2.8	0.04
6	Ascent	1			SJG46120019-302	CSA-CP TRANSPORT KIT	1	2007-06-027 (CLOSED)	11.1	0.934
7	Ascent	1			WLSK270387-301	STOWAGE BAG ASSEMBLY, PETRI DISH, SAB W/CH	1	2007-06-027 (CLOSED)	0.02	0.004
8	Ascent	1			SJG46120020-601	CSA-CP ASSEMBLY	4	2007-06-027 (CLOSED)	5.6	0.08
9	Ascent	1			WLSK270385-301	PACKET ASSEMBLY, PETRI DISH	5	2006-12-028A (CLOSED); 2007-06-027 (CLOSED)	1.1	0.15
10	Ascent	1			WLSK270387-302	PETRI DISH STOWAGE BAG ASSY	1	2007-06-027 (CLOSED)	0.02	0.004
11	Ascent	1			90-248	PLASTIC BAG, 6 X 6	4	2007-06-027 (CLOSED)	0.054	0.006
12	Ascent	1			SEG46117228-601	SPARE BATTERY ASSY	1	2007-06-027 (CLOSED)	0.217	0.006
13	Ascent	1			SEM46109455-308	KIT ASSEMBLY SURFACE SAMPLER	1	2006-12-028A (CLOSED)	2.2	0.159
14						**CHECS HMS HARDWARE**				
15	Ascent	1			SEG52100803-304	ISS MEDICAL ACCESSORY KIT ASSEMBLY	2	2006-10-021 (CLOSED)	6.614	0.46
16	Ascent	1			SJG42104616-301	ISS PCBA CARTRIDGE KIT ASSEMBLY	1	2006-10-021 (status NA); 2007-02-094 (CLOSED)	0.7	0.026
17	Ascent	1			SED42103593-304	KIT ASSEMBLY, RESUPPLY DEFIBRILLATOR	1	2006-10-021 (status NA)	6.7	0.153
18						**CREW CARE PACKAGES**				
19	Ascent	1			SEG46117193-302	CREW CARE PACKAGE ASSEMBLY, CARGO TRANSFER CASE ASSEMBLY HALF SIZE	1	2003-01-005 (status NA); 2006-11-002 (CLOSED); 2004-11-047C (status NA); 2007-02-132 (SUBMITTED)	33.069	0.461
20						**CREW ROTATION EQUIPMENT**				
Line Item	**Phase**	**GGR&C Priority**	**Group Rank**	**Sub Rank1**	**Part Number**	**Part Name**	**Qty**	**MR Number(s)**	**Mass (lbs)**	**Volume (ft3)**
21	Ascent	1			_39.000.00	KENTAVR DEVICE	1	2006-06-102B (CLOSED)	3.307	0.618

22	Ascent	1			115-9104-1000	IELK	1	2006-06-102B (CLOSED)	79.366	8.459
23						**MIDDECK ISS CONTENT**				
24	Ascent	1			SKG32999102-301	OPERATIONS DATA FILE ASSEMBLY OPS	1	2003-01-005 (status NA); 2004-11-047C (status NA)	26.01	1.0
25	Ascent	1			SKG32999102-301	OPERATIONS DATA FILE ASSEMBLY OPS	1	2007-08-079 (CLOSED)	26.01	1.0
26						**WATER TRANSFER EQUIPMENT**				
27	Ascent	1			SED46111879-301	**SILVER BIOCIDE SYRINGE KIT (20 ML)**	1	2003-01-005 (status NA); 2004-11-047C (status NA)	1.341	0.109
28	Ascent	1			10132-10032-04	CONTINGENCY WATER COLLECTION BAG ASSY	1	2003-01-005 (status NA); 2004-11-047C (status NA)	2.61	0.625
	3 - Items required to support primary mission objectives (flight/stage) stated in baselined program documentation, crew care packages and crew preference items to maintain crew mental health.									
29						**CREW PROVISIONS**				
30	Ascent	3			528-43059-77	TANI ATHLETIC SHOES	1	2006-12-030 (CLOSED)	2.0	0.35
31						**ECLSS**				
32	Ascent	3			SEG11100291-705	ASSEMBLY, CAFRAMO FAN	3	2006-09-071A (CLOSED); 2007-02-077 (CLOSED)	8.995	0.253
33	Ascent	3			2-255S0604	O-RINGS (FACE SEAL)	1	2007-07-034B (CLOSED)	0.025	0.002
34	Ascent	3			SEG33107630-301	BRACKET ASSY, FLEXIBLE	3	2006-09-071A (CLOSED)	2.1	0.126
35	Ascent	3			528-41350-5	BATTERY, ALKALINE	12	2006-09-071A (CLOSED)	3.72	0.026
36	Ascent	3			683-15016-1	CAP,V-FLANGE,INTERMODULE VENTILATION PORT	1	2007-07-034B (CLOSED)	1.16	0.054
37	Ascent	3			NAS1922-0525-3	CLAMP, HOSE, BAND, TANGENTIAL WORM	1	2007-07-034B (CLOSED)	0.054	0.007
38	Ascent	3			683-15016-1	CAP,V-FLANGE,INTERMODULE VENTILATION PORT	1	2007-07-109B (CLOSED)	1.16	0.054
39	Ascent	3			MS27115-21R	COUPLING-CLAMP, V-BAND	1	2007-07-034B (CLOSED)	1.0	0.023
40	Ascent	3			2-255S0604	O-RINGS (FACE SEAL)	1	2007-07-109B (CLOSED)	0.025	0.002
41	Ascent	3			2-248S0604	O-RING, (BORE SEAL)	1	2007-07-034B (CLOSED)	0.025	0.002
42	Ascent	3			2-248S0604	O-RING, (BORE SEAL)	1	2007-07-109B (CLOSED)	0.025	0.002
Line Item	**Phase**	**GGR&C Priority**	**Group Rank**	**Sub Rank1**	**Part Number**	**Part Name**	**Qty**	**MR Number(s)**	**Mass (lbs)**	**Volume (ft3)**
43	Ascent	3			1F93262-1	FLANGE, V-BAND COUPLING DUCT EXTENSION	1	2007-07-034B (CLOSED)	0.5	0.038
44	Ascent	3			SEG11100310-301	DESICCANT BAG ASSY	3	2006-09-071A (CLOSED)	18.6	2.521
45						**ELECTRICAL POWER**				

						SYSTEM(EPS)				
46	Ascent	3			R077417-61	RPCM TYPE II	1	2007-03-061 (status NA)	9.83	0.128
47	Ascent	3			R077419-61	REMOTE POWER CONTROLLER MODULE ASSY - TYPE V	1	2007-08-082 (CLOSED)	9.66	0.132
48						**ESEL-EMU**				
49	Ascent	3			10203-04	1.5" LEG SIZING RING	1	2007-06-036A (CLOSED)	3.1	0.148
50	Ascent	3			0101-10001-06	COMMUNICATIONS CARRIER ASSEMBLY WITH ELECTRONICS	4	2007-06-036A (CLOSED)	5.68	0.333
51	Ascent	3			0106-110106-10	EMU GLOVES, 12V HEATED, PHASE VI	2	2007-06-036A (CLOSED)	6.2	0.544
52	Ascent	3			10159-04	THIGH SIZING RING	1	2007-06-036A (CLOSED)	1.6	0.14
53	Ascent	3			SED13101715-708	BRIEF/WAIST BODY SEAL PROTECTIVE COVER	1	2007-06-036A (CLOSED)	0.5	
54	Ascent	3			TBD-0104-210895-XX	BOOT	2	2007-06-036A (CLOSED)	9.0	0.74
55	Ascent	3			SED13101713-702	0.5" THIGH SIZING RING PROTECTIVE POUCH	1	2007-06-036A (CLOSED)	0.551	
56	Ascent	3			SED13101715-707	THIGH FABRIC ATTACHMENT RING PROTECTIVE COVER	4	2007-06-036A (CLOSED)	1.0	
57	Ascent	3			SED13101526-306	LCVG W/BIO-MED	3	2007-06-036A (CLOSED)	24.75	3.512
58	Ascent	3			TBD-0104-210605-XX	WAIST/BRIEF ASSY, ADJUSTABLE	1	2007-06-036A (CLOSED)	35.5	1.833
59	Ascent	3			SJG13101833-305	EMU SERVICING KIT	1	2007-06-036A (CLOSED)	6.0	0.42
60	Ascent	3			0104-210575-07	LEG ASSY	1	2007-06-036A (CLOSED)	5.0	0.289
61	Ascent	3			SED13101715-705	COVER, PROTECTIVE, LOWER ARM FABRIC ATTACHMENT RING	6	2007-06-036A (CLOSED)	1.5	
62	Ascent	3			SED13101715-706	COVER, PROTECTIVE, LOWER ARM WRIST DISCONNECT	6	2007-06-036A (CLOSED)	1.5	
63	Ascent	3			0104-210575-08	LEG ASSY	1	2007-06-036A (CLOSED)	5.0	0.289
64	Ascent	3			SV792600-00-02	CONTAMINANT CONTROL CARTRIDGE	4	2007-06-036A (CLOSED)	25.44	0.815
65	Ascent	3			0107-10007-07	LCVG	1	2007-06-036A (CLOSED)	8.25	1.171
66	Ascent	3			528-21189-4	**EV CREW OPTIONS KIT**	1	2007-06-036A (CLOSED)	12.27	0.394
67	Ascent	3			0110-110110-03	DISPOSABLE INSUIT DRINK BAG	2	2007-06-036A (CLOSED)	0.76	0.185
Line Item	**Phase**	**GGR&C Priority**	**Group Rank**	**Sub Rank1**	**Part Number**	**Part Name**	**Qty**	**MR Number(s)**	**Mass (lbs)**	**Volume (ft3)**
68	Ascent	3			0106-110106-09	EMU GLOVES, 12V HEATED, PHASE VI	2	2007-06-036A (CLOSED)	6.2	0.544
69	Ascent	3			SED13101713-705	1.5" LEG SIZING RING PROTECTIVE POUCH	1	2007-06-036A (CLOSED)	0.25	0.139
70	Ascent	3			TBD-0103-212123-XX	LOWER ARM ASSY	2	2007-06-036A (CLOSED)	7.5	0.284
71						**ESEL-TOOLS**				

72	Ascent	3			SDG33108130-003	WIRE, EVA TIE	12	2007-08-084 (CLOSED)	1.2	0.133
73	Ascent	3			SED33105900-315	TOP ASSY 8, SAFER	1	2007-06-013 (status NA)	73.943	2.945
74	Ascent	3			V632-669200-013	PDU DISK/LOOP PIN PULLER TOOL CADDY	1	2007-08-084 (CLOSED)	2.366	0.099
75	Ascent	3			SDG33108130-003	WIRE, EVA TIE	6	2007-06-013 (CLOSED)	0.6	0.067
76	Ascent	3			SEG33114973-301	1.0" QD SPD ASSY	8	2003-06-056C (CLOSED); 2004-11-047C (status NA)	4.8	0.252
77	Ascent	3			SEG33106919-305	SCISSORS ASSEMBLY BILATERAL TOOLS	1	2007-08-084 (CLOSED)	0.5	0.019
78	Ascent	3			SEG33106164-385	EQUIPMENT TETHER 75/30 ASSY	8	2007-06-013 (CLOSED)	6.72	0.234
79	Ascent	3			SEG33106861-301	OIWIF SOCKET ASSY	3	2003-06-056C (CLOSED); 2004-11-047C (status NA)	3.45	0.165
80	Ascent	3			SEG33108446-701	SPOT BEAM REFLECTOR ASSY	5	2007-08-084 (CLOSED)	0.5	0.006
81	Ascent	3			V632-669200-025	TOOL CADDY, COMPOUND CUTTER/NEEDLE NOSE PLIERS	1	2007-08-084 (CLOSED)		0.119
82	Ascent	3			SDG33108130-001	WIRE, EVA TIE	87	2007-08-084 (CLOSED)	8.7	0.287
83	Ascent	3			SEG33106164-383	EQUIPMENT TETHER 75/30 ASSY	5	2007-06-013 (CLOSED)	2.85	0.169
84	Ascent	3			SJG39136050-302	**KIT, DETECTION, CONTAMINATION**	1	2007-06-013 (CLOSED)	7.2	0.333
85	Ascent	3			SEG33107831-303	CARRIER ASSY OIH, OSE	2	2003-06-056C (CLOSED); 2004-11-047C (status NA); 2007-08-084 (CLOSED)	14.0	4.667
86	Ascent	3			SEG33109930-305	ORBIT INSTALLED GAP SPANNER ASSY	3	2003-06-056C (CLOSED); 2004-11-047C (status NA); CR10581 - XA Eval (status NA); 2007-06-013 (CLOSED)	3.3	0.019
87	Ascent	3			SEG33109930-307	ORBIT INSTALLED GAP SPANNER ASSY	8	2007-06-013 (CLOSED)	9.2	0.042
88	Ascent	3			SED33119929-301	PLUG INSTALLATION AND VERIFICATION TOOL (PIVT)	1	2007-06-013 (CLOSED)	4.0	0.055
Line Item	**Phase**	**GGR&C Priority**	**Group Rank**	**Sub Rank1**	**Part Number**	**Part Name**	**Qty**	**MR Number(s)**	**Mass (lbs)**	**Volume (ft3)**
89	Ascent	3			SEG33110490-303	MODULAR MWS BASEPLATE ASSY	2	2007-08-084 (CLOSED)	8.8	0.46
90	Ascent	3			SDG33108130-001	WIRE, EVA TIE	12	2007-06-013 (CLOSED)	1.2	0.04
91	Ascent	3			SEG33106164-381	EQUIPMENT TETHER 75/30 ASSY	16	2007-06-013 (CLOSED)	9.12	0.733

92	Ascent	3			SEG33108851-303	5/32" BALL-END ALLEN DRIVE ASSY	1	2007-08-084 (CLOSED)	0.6	0.026
93						**INGRESS AND EGRESS EQUIPMENT**				
94	Ascent	3			2-248S0604	O-RING, (BORE SEAL)	2	2003-01-005 (status NA); 2004-11-047C (status NA)	0.05	0.003
95	Ascent	3			2-255S0604	O-RINGS (FACE SEAL)	2	2003-01-005 (status NA); 2004-11-047C (status NA)	0.05	0.004
96						**MIDDECK FOR NODE 2 END ITEM**				
97	Ascent	3			3150ND171-401	MLI BLANKET PORT MAINFITTING TRUNNION	1	2002-12-024B (CLOSED); 2004-11-047C (status NA); 2007-08-054A (CLOSED)	0.805	2.95
98	Ascent	3			3150ND161-401	MLI BLANKET STBD MAINFITTING TRUNNION	1	2002-12-024B (CLOSED); 2004-11-047C (status NA); 2007-08-054A (CLOSED)	0.794	2.95
99	Ascent	3			3150ND333	MLI BLANKET KEEL PIN	1	2002-12-024B (CLOSED); 2004-11-047C (status NA)	0.375	0.47
100	Ascent	3			3150ND261-401	MLI BLANKET PORT STABILIZER TRUNNION	1	2002-12-024B (CLOSED); 2004-11-047C (status NA); 2007-08-054A (CLOSED)	0.805	2.95
101	Ascent	3			3150ND251-401	MLI BLANKET STBD STABILIZER TRUNNION	1	2002-12-024B (CLOSED); 2004-11-047C (status NA); 2007-08-054A (CLOSED)	0.805	2.95
102						**MIDDECK ISS CONTENT**				
103	Ascent	3			SEG16102889-302	REMOTE SENSOR UNIT ASSEMBLY	1	2007-06-079 (CLOSED)	4.85	0.08
104	Ascent	3			1F16136-1	BLANKET ASSY, CETA LIGHT	1	2007-07-059 (CLOSED)	5.0	0.115
105						**NODE 2 TO LAB INTERFACE HARDWARE**				
Line Item	**Phase**	**GGR&C Priority**	**Group Rank**	**Sub Rank1**	**Part Number**	**Part Name**	**Qty**	**MR Number(s)**	**Mass (lbs)**	**Volume (ft3)**
106	Ascent	3			1F46395-1	WIRE HARNESS ASSY, W7002	1	2002-12-024B (CLOSED); 2004-11-047C (status NA)	2.04	0.116
107	Ascent	3			1F46413-1	WIRE HARNESS ASSY, W7011	1	2002-12-024B (CLOSED); 2004-11-047C (status NA)	1.45	0.139

108	Ascent	3			1F46415-1	WIRE HARNESS ASSY, W7012	1	2002-12-024B (CLOSED); 2004-11-047C (status NA)	1.45	0.139
109	Ascent	3			1F46393-1	WIRE HARNESS ASSY, W7001	1	2002-12-024B (CLOSED); 2004-11-047C (status NA)	2.04	0.145
110						**PCS**				
111	Ascent	3			SEZ33119834-301	16VDC POWER CABLE ASSY, A31P DOCKING STATION	1	2007-07-002 (CLOSED)	0.5	0.392
112	Ascent	3			SEG33116428-301	POWER SUPPLY ASSEMBLY-28VDC POWER SUPPLY	1	2005-04-030 (CLOSED); 2007-08-038 (CLOSED)	4.5	0.069
113	Ascent	3			SEZ12100588-301	**CD STOWAGE CASE ASSEMBLY**	1	2006-12-022 (CLOSED); 2005-04-030 (status NA)	3.0	0.319
114	Ascent	3			SEZ39134666-307	PRINTER ASSEMBLY, DTO AND ISS	1	2007-08-052 (CLOSED)	16.5	0.921
115	Ascent	3			SEG33115360-303	LAPTOP COMPUTER ASSY, IBM A31P	1	2005-04-030 (status NA)	7.935	0.171
116	Ascent	3			SEZ33119826-801	A31P DOCKING STATION	1	2007-07-002 (CLOSED)	5.732	0.468
117	Ascent	3			SEG33115360-303	LAPTOP COMPUTER ASSY, IBM A31P	1	2007-05-045 (CLOSED)	7.935	0.171
118						**PHOTO/TV EQUIPMENT**				
119	Ascent	3			528-21106-7	**ISS PHOTOGRAPHIC AND VIDEO EQUIPMENT ASSEMBLY KIT**	1	2003-01-005 (status NA); 2004-11-047C (status NA)	35.031	1.886
120						**STRUC & MECH**				
121	Ascent	3			1F15905-501	NETWORK CONTROL UNIT ASSEMBLY - EWIS	1	2007-06-077 (CLOSED)	12.025	0.347
122						**TCS-ITCS**				
123	Ascent	3			683-63436-2	ANTIMICROBIAL APPLICATORS	1	2007-05-049 (CLOSED)	16.73	0.608
124	Ascent	3			SEG46118247-303	COOLANT QUALITY MONITORING KIT	1	2007-06-002A (CLOSED)	1.882	0.289
125	Ascent	3			SEG46117689-301	BAG ASSEMBLY, RESTRAINT (RESERVOIR, PAYLOAD WATER)	1	2007-06-081 (CLOSED)	27.999	1.91
	4 - Samples									
126						**CHECS EHS HARDWARE**				
Line Item	**Phase**	**GGR&C Priority**	**Group Rank**	**Sub Rank1**	**Part Number**	**Part Name**	**Qty**	**MR Number(s)**	**Mass (lbs)**	**Volume (ft3)**
127	Descent	4			SEM46110793-306	WATER SAMPLER ASSY POTABLE, STERILE	4	2006-12-028A (CLOSED)	0.236	0.016
128	Descent	4			SEG46119988-309	PACKET ASSY, CHEMICAL SAMPLE, POST-FLIGHT ANALYSIS	4	2006-12-028A (CLOSED)	0.45	0.313
129	Descent	4			SEZ33111519-315	CREW PASSIVE DOSIMETER (CPD) ASSEMBLY	1	2006-12-028A (CLOSED)	0.022	0.0
130	Descent	4			WLSK270387-301	STOWAGE BAG ASSEMBLY, PETRI DISH, SAB W/CH	1	2006-12-028A (CLOSED)	0.02	0.004

131	Descent	4			SEM46109455-308	KIT ASSEMBLY SURFACE SAMPLER	1	2006-12-028A (CLOSED)	2.2	0.159
132	Descent	4			SDD46108778-301	VALVE ASSEMBLY, GRAB SAMPLER	7	2006-12-028A (CLOSED); 2007-02-023 (status NA); 2007-06-027 (CLOSED)	7.716	0.534
133	Descent	4			WLSK270387-302	PETRI DISH STOWAGE BAG ASSY	1	2006-12-028A (CLOSED)	0.02	0.004
134	Descent	4			SEG46119988-308	PACKET ASSY, MICRO SAMPLE, POST- FLIGHT ANALYSIS	2	2006-12-028A (CLOSED)	0.882	0.156
135	Descent	4			KLSK270206-306	ADAPTER ASSEMBLY, AIR FILTER, 0.22µm	6	2006-12-028A (CLOSED); 2007-02-023 (status NA)	0.595	0.077
136	Descent	4			KLSK270355-302	MEDIA SYRINGE CASE	2	2006-12-028A (CLOSED)	0.6	0.042
137	Descent	4			SED46115801-305	ASSEMBLY, CSA-O_2 MONITOR	2	2007-07-086 (CLOSED)	2.8	0.04
138	Descent	4			SEM46109455-308	KIT ASSEMBLY SURFACE SAMPLER	1	2007-06-027 (CLOSED)	2.2	0.159
139	Descent	4			90-242	MCD STOWAGE BAG	1	2006-12-028A (CLOSED)	0.013	0.014
140	Descent	4			SEM46110793-305	ADAPTER PROBE ASSY, SVO-ZV PORT	2	2006-12-028A (CLOSED)	0.2	0.002
141	Descent	4			SED46115801-304	ASSEMBLY, CSA-CP MONITOR	2	2007-06-027 (CLOSED)	2.8	0.04
142	Descent	4			SEG46119988-308	PACKET ASSY, MICRO SAMPLE, POST- FLIGHT ANALYSIS	1	2007-08-016 (CLOSED)	0.441	0.078
143						**CHECS HMS HARDWARE**				
144	Descent	4			SJG42104616-301	ISS PCBA CARTRIDGE KIT ASSEMBLY	1	2006-10-021 (CLOSED)	0.7	0.026
145	Descent	4			SEG46117646-307	**CARGO TRANSFER BAG, ACOUSTIC COUNTERMEASURE**	1	2007-04-062 (CLOSED)	11.464	0.996
146	Descent	4			SED42103593-304	KIT ASSEMBLY, RESUPPLY DEFIBRILLATOR	1	2006-10-021 (CLOSED)	6.7	0.153
147						**ITCS COOLANT SAMPLING**				
148	Descent	4			SEG46118278-702	RETURN ZIPLOCK BAG ASSY	1	2005-11-016 (CLOSED)	0.11	0.021
149						**RUSSIAN HARDWARE**				
Line Item	**Phase**	**GGR&C Priority**	**Group Rank**	**Sub Rank1**	**Part Number**	**Part Name**	**Qty**	**MR Number(s)**	**Mass (lbs)**	**Volume (ft3)**
150	Descent	4			LDM-IMM-B2	SARSTEDT 9 ML SYRINGE MONOVETTE WITH 2ML OF BLOOD	1	2007-08-060 (CLOSED)	0.033	0.001
151	Descent	4			LDM-IMM-U3	SARSTEDT 9 ML SYRINGE MONOVETTE WITH 9ML OF URINE	1	2007-08-060 (CLOSED)	0.033	0.001
152	Descent	4			LDM-IMM-U4	SARSTEDT 9 ML SYRINGE MONOVETTE WITH 9ML OF URINE	1	2007-08-060 (CLOSED)	0.033	0.001
153	Descent	4			LDM-IMM-U1	SARSTEDT 9 ML SYRINGE MONOVETTE WITH 9ML OF URINE	1	2007-08-060 (CLOSED)	0.033	0.001

154	Descent	4			LDM-IMM-B1	SARSTEDT 9ML SYRINGE MONOVETTE WITH 9ML OF BLOOD	1	2007-08-060 (CLOSED)	0.033	0.001
155	Descent	4			LDM-IMM-U2	SARSTEDT 9 ML SYRINGE MONOVETTE WITH 9ML OF URINE	1	2007-08-060 (CLOSED)	0.033	0.001
156						**WATER TRANSFER EQUIPMENT**				
157	Descent	4			SED46113541-302	ASSEMBLY, WATER SAMPLING KIT	5	2003-01-005 (status NA); 2004-11-047C (status NA)	3.525	0.209
158	Descent	4			SED46113541-302	ASSEMBLY, WATER SAMPLING KIT	3	2007-01-026 (SUBMITTED)	2.115	0.125
159	Descent	4			KLSJ320189-301	PURGE BAGS	3	2003-01-005 (status NA); 2004-11-047C (status NA)	2.4	0.091
160	Descent	4			10132-10032-04	CONTINGENCY WATER COLLECTION BAG ASSY	2	2003-01-005 (status NA); 2004-11-047C (status NA); 2007-01-093 (CLOSED)	14.0	1.25
161						**COLDBAG W ICEPACS**				
162	Descent	4	1		SEG39136374-301	DOUBLE COLD INSULATED SAMPLE BAG	2	2007-03-054 (CLOSED)	36.156	4.039
163						**INTEGRATED IMMUNE (ISS)**				
164	Descent	4	2		SDG46121531-301	BLOOD SAMPLE SLEEVE	1	2007-06-095 (CLOSED)	0.146	0.007
165	Descent	4	2		SDG46121524-301	SALIVA COLLECTION POUCH ASSY. (LABELED USED)	2	2007-08-087 (CLOSED)	0.485	0.005
166	Descent	4	2		SDG46121531-301	BLOOD SAMPLE SLEEVE	1	2007-07-080 (CLOSED)	0.154	0.007
167						**MSG SAME**				
168	Descent	4	3		60089MFHA436	SAMPLE CAROUSEL ASSEMBLY	1	2007-07-016 (CLOSED)	1.19	0.092
169	Descent	4	3		60089MFHA434	SAMPLE CAROUSEL ASSEMBLY	1	2007-07-016 (CLOSED)	1.19	0.092
170	Descent	4	3		60089MFHA435	SAMPLE CAROUSEL ASSEMBLY	1	2007-07-016 (CLOSED)	1.19	0.092
Line Item	**Phase**	**GGR&C Priority**	**Group Rank**	**Sub Rank1**	**Part Number**	**Part Name**	**Qty**	**MR Number(s)**	**Mass (lbs)**	**Volume (ft3)**
171	Descent	4	3		60089MFHA433	SAMPLE CAROUSEL ASSEMBLY	1	2007-07-016 (CLOSED)	1.19	0.092
172	Descent	4	3		60089MFHA437	SAMPLE CAROUSEL ASSEMBLY	1	2007-07-016 (CLOSED)	1.19	0.092
173	Descent	4	3		DVM80TR2	DIGITAL TAPE	1	2007-07-016 (CLOSED)	0.044	0.001
174						**CGBA SCIENCE INSERT-02**				
175	Descent	4	4		CSI-A440	CCHAB	1	2007-06-078 (CLOSED)	2.624	0.049
176	Descent	4	4		CSI-A204	C. ELEGANS HABITAT (C-HAB)	1	2007-06-078 (CLOSED)	2.535	0.049
177						**SWAB**				

178	Descent	4	5		SJG46119896-301	SWAB RETURN KIT	1	2006-06-117A (CLOSED); 2007-07-080 (CLOSED)	3.946	1.094
179						**UTILIZATION**				
180	Descent	4	6		1702646	KODAK CD-R	4	2007-06-028 (CLOSED)	0.529	0.025
	5 - Hardware items required for reflight (includes Utilization)									
181						**CHECS CMS HARDWARE**				
182	Descent	5			KLST410174-602	CHEST STRAPS	2	2007-02-098 (CLOSED)	0.26	0.009
183						**ECLSS**				
184	Descent	5			2352540-1-1	DESICCANT/ADSORBENT, ORU-OUTLINE	1	2006-11-114A (CLOSED)	94.0	2.951
185	Descent	5			B40204-12	VALVE, SOLENOID, DUAL COIL, 3-WAY,LATCHING, MANUAL OVERRIDE, POSITION INDICATION	1	2006-03-001A (CLOSED)	3.18	0.08
186	Descent	5			NATC-RPC-N-11-0	PROTECTIVE CAP	1	2007-01-069 (CLOSED)	0.038	0.001
187	Descent	5			NATC-RPC-N-19-0	PROTECTIVE CAP	1	2007-01-069 (CLOSED)	0.1	0.001
188						**ESEL-EMU**				
189	Descent	5			0107-10007-07	LCVG	3	2007-06-036A (CLOSED)	24.75	3.512
190	Descent	5			0103-212123-15	LOWER ARM, 12V	1	2007-06-036A (CLOSED)	3.75	0.142
191	Descent	5			SED13101526-306	LCVG W/BIO-MED	2	2007-06-036A (CLOSED)	16.5	2.341
192	Descent	5			0106-110106-10	EMU GLOVES, 12V HEATED, PHASE VI	6	2007-06-036A (CLOSED)	18.6	1.633
193	Descent	5			SEG33118472-301	EMU ION FILTER	2	2007-06-036A (CLOSED)	6.26	0.408
194	Descent	5			0101-10001-06	COMMUNICATIONS CARRIER ASSEMBLY WITH ELECTRONICS	4	2007-06-036A (CLOSED)	5.68	0.333
195	Descent	5			SJG13101833-305	EMU SERVICING KIT	1	2007-06-036A (CLOSED)	6.0	0.42
196	Descent	5			0103-212123-16	LOWER ARM, 12V	1	2007-06-036A (CLOSED)	3.75	0.142
197	Descent	5			0103-212123-18	LOWER ARM ASSY	2	2007-06-036A (CLOSED)	7.5	0.284
Line Item	**Phase**	**GGR&C Priority**	**Group Rank**	**Sub Rank1**	**Part Number**	**Part Name**	**Qty**	**MR Number(s)**	**Mass (lbs)**	**Volume (ft3)**
198	Descent	5			SED13101715-706	COVER, PROTECTIVE, LOWER ARM WRIST DISCONNECT	18	2007-06-036A (CLOSED)	4.5	
199	Descent	5			0103-212123-17	LOWER ARM ASSY	2	2007-06-036A (CLOSED)	7.5	0.284
200	Descent	5			SEG33118473-301	EMU 3-MICRON FILTER	2	2007-06-036A (CLOSED)	2.26	0.091
201	Descent	5			0106-110106-09	EMU GLOVES, 12V HEATED, PHASE VI	6	2007-06-036A (CLOSED)	18.6	1.633
202	Descent	5			SED13101715-705	COVER, PROTECTIVE, LOWER ARM FABRIC ATTACHMENT RING	6	2007-06-036A (CLOSED)	1.5	
203	Descent	5			528-21189-4	**EV CREW OPTIONS KIT**	3	2007-06-036A (CLOSED)	32.85	1.181

204						**ESEL-TOOLS**				
205	Descent	5			SEG33106164-381	EQUIPMENT TETHER 75/30 ASSY	16	2007-06-013 (CLOSED)	9.12	0.733
206	Descent	5			SEG33106164-383	EQUIPMENT TETHER 75/30 ASSY	5	2007-06-013 (CLOSED)	2.85	0.169
207	Descent	5			SJG39136050-302	**KIT, DETECTION, CONTAMINATION**	1	2007-06-013 (CLOSED)	7.2	0.333
208	Descent	5			SEG33110490-303	MODULAR MWS BASEPLATE ASSY	2	2007-08-084 (CLOSED)	8.8	0.46
209	Descent	5			SEG33106164-385	EQUIPMENT TETHER 75/30 ASSY	8	2007-06-013 (CLOSED)	6.72	0.234
210	Descent	5			SED33105900-315	TOP ASSY 8, SAFER	1	2007-06-013 (CLOSED)	73.943	2.945
211	Descent	5			SEG33107831-303	CARRIER ASSY OIH, OSE	1	2003-06-056C (CLOSED); 2004-11-047C (status NA); 2007-08-084 (CLOSED)	7.0	2.333
212						**EVA TOOLS AND DEVICES**				
213	Descent	5			683-52013-2	WIRE HARNESS- ORBITER SPDU-1 JUMPER, EXTERNAL, ELEMENT	1	2002-12-024B (CLOSED); 2004-11-047C (status NA)	2.15	0.129
214	Descent	5			683-52014-2	WIRE HARNESS- ORBITER SPDU-2 JUMPER, EXTERNAL, ELEMENT	1	2002-12-024B (CLOSED); 2004-11-047C (status NA)	1.99	0.143
215						**MIDDECK ISS CONTENT**				
216	Descent	5			10033177-1	ASSY. CONTINGENCY BASEBAND SIGNAL PROCESSOR (ACBSP)	1	2006-10-002 (CLOSED)	42.82	0.997
217						**PCS**				
218	Descent	5			SEZ12100588-301	**CD STOWAGE CASE ASSEMBLY**	1	2005-04-030 (CLOSED)	3.0	0.319
219	Descent	5			SEG33115356-301	BATTERY PACK ASSEMBLY, A31P	5		4.96	0.05
220	Descent	5			SEG33115360-302	LAPTOP COMPUTER ASSY, IBM A31P	1	2005-04-030 (CLOSED); 2007-06-033 (status NA)	7.935	0.171
Line Item	**Phase**	**GGR&C Priority**	**Group Rank**	**Sub Rank1**	**Part Number**	**Part Name**	**Qty**	**MR Number(s)**	**Mass (lbs)**	**Volume (ft3)**
221	Descent	5			SEZ39134666-307	PRINTER ASSEMBLY, DTO AND ISS	1	2007-08-052 (CLOSED)	16.5	0.921
222	Descent	5			SEG33115359-301	60 GB HARD DRIVE, A31P	9	2007-03-105 (CLOSED)	3.285	0.089
223						**PHOTO/TV EQUIPMENT**				
224	Descent	5			528-21106-8	**ISS PHOTOGRAPHIC AND VIDEO EQUIPMENT ASSEMBLY KIT**	1	2003-01-005 (status NA); 2004-11-047C (status NA)	43.484	1.886
225						**PMZ/SLEEP SHORT (SDBI)**				
226	Descent	5			SED46117957-301	ACTIWATCH	3	2007-07-080 (CLOSED)	0.152	0.006
227						**TCS-ITCS**				

228	Descent	5			683-62430-2	BUFFER DELIVERY APPLICATOR BuDA	1	2007-04-037 (CLOSED)	19.9	0.608
229	Descent	5			683-63436-1	PHOSPHATE REMOVAL ASSEMBLY	1	2007-04-037 (CLOSED)	19.96	0.608
230	Descent	5			683-63436-2	ANTIMICROBIAL APPLICATORS	1	2007-04-037 (CLOSED)	19.85	0.608
231						**WATER TRANSFER EQUIPMENT**				
232	Descent	5			SED46111879-301	**SILVER BIOCIDE SYRINGE KIT (20 ML)**	1	2003-01-005 (status NA); 2004-11-047C (status NA)	1.341	0.109
233						**UTILIZATION**				
234	Descent	5	1		03370	TDR BATTERY	1	2007-06-097 (CLOSED)	0.212	0.002
235						**MSG SAME**				
236	Descent	5	2		60089MFHA300	THERMAL PRECIPITATOR MODULE ASSEMBLY	1	2007-07-016 (CLOSED)	2.205	0.073
237	Descent	5	2		60089MFHA300	THERMAL PRECIPITATOR MODULE ASSEMBLY	1	2007-07-016 (CLOSED)	2.205	0.073
238	Descent	5	2		60089MFHA300	THERMAL PRECIPITATOR MODULE ASSEMBLY	1	2007-07-016 (CLOSED)	2.205	0.073
239	Descent	5	2		60089MFHA300	THERMAL PRECIPITATOR MODULE ASSEMBLY	1	2007-07-016 (CLOSED)	2.205	0.073
240	Descent	5	2		60089MFHA300	THERMAL PRECIPITATOR MODULE ASSEMBLY	1	2007-07-016 (CLOSED)	2.205	0.073
	6 - Utilization equipment required to support upcoming flight/increment science objectives or last flight opportunity before implementation									
241						**PMZ/SLEEP SHORT (SDBI)**				
242	Ascent	6			SED46117957-301	ACTIWATCH	1	2007-06-095 (CLOSED)	0.051	0.002
243						**UTILIZATION**				
244	Ascent	6			03370	TDR BATTERY	1	2007-06-097 (CLOSED)	0.212	0.002
245						**INTEGRATED IMMUNE (ISS)**				
246	Ascent	6	1		SJG46121520-301	BLOOD COLLECTION KIT	2	2007-06-095 (CLOSED)	7.778	0.268
247	Ascent	6	1		SJG46121521-301	**SALIVA COLLECTION KIT**	2	2007-06-095 (CLOSED)	4.555	0.125
Line Item	**Phase**	**GGR&C Priority**	**Group Rank**	**Sub Rank1**	**Part Number**	**Part Name**	**Qty**	**MR Number(s)**	**Mass (lbs)**	**Volume (ft3)**
248						**NUTRITION SAMPLE COLLECTION KIT**				
249	Ascent	6	2		SED46107193-306	**FLIGHT DAY ASSEMBLY, LARGE INFLIGHT BLOOD COLLECTION SYSTEM - SPACELAB**	1	2006-11-108 (CLOSED)	3.946	0.53
250	Ascent	6	2		SJG46116435-303	**URINE COLLECTION KIT ASSEMBLY**	1	2006-11-108 (CLOSED); 2007-07-080 (CLOSED)	4.409	0.319
251	Ascent	6	2		SJG46116435-303	**URINE COLLECTION KIT ASSEMBLY**	2	2007-06-095 (CLOSED)	8.818	0.637
252	Ascent	6	2		SJG46116435-303	**URINE COLLECTION KIT ASSEMBLY**	1	2007-06-095 (status NA)	4.409	0.318
	7 - Equipment required to support get-aheads as defined in IDRD (not in sub-priority order; sub-priorities will be determined based on mission, increment and stage requirements)									

253						**FLIGHT CREW EQUIPMENT**				
254	Ascent	7			SED33119859-301	FOAM APPLICATOR ASSEMBLY	1	2007-08-091 A (status NA)	0.3	0.116
255						**US IVA TOOLS**				
256	Ascent	7			SJG32110464-301	FIBER OPTICS CLEANING KIT	1	2007-06-091 (CLOSED)	0.57	
257	Ascent	7			87	SHUTTLE MULTIMETER	1	2006-08-100 (CLOSED)	1.35	0.015
	8 - Crew Preference Kits									
258						**CREW PROVISIONS**				
259	Descent	8			CREWPREF	CREW PREFERENCE ITEMS	1	2006-07-016 (CLOSED); 2007-01-050 (CLOSED); 2007-07-038 (CLOSED)	11.0	0.92
	11 - Miscellaneous items not required on-board									
260	Descent	11			17__.260_ 3200-0	FOOD RATIONS CONTAINERS	30	2003-01-005 (status NA); 2004-11-047C (status NA); 2007-07-043 (CLOSED); 2007-06-058 (CLOSED)	21.0	1.937
261						**CREW ROTATION EQUIPMENT**				
262	Descent	11			_39.000.00	KENTAVR DEVICE	1	2006-06-102B (CLOSED)	3.307	0.618
263	Descent	11			115-9104-1000	IELK	1	2006-06-102B (CLOSED)	79.366	8.459
264						**ELECTRICAL POWER SYSTEM(EPS)**				
265	Descent	11			R077417-61	RPCM TYPE II	1	2007-03-061 (CLOSED)	9.83	0.128
266	Descent	11			R077419-71	RPCM, TYPE V	1	2007-05-003 (CLOSED)	8.6	0.132
267	Descent	11			RE4572-05	BLANKET, THERMAL SSU HOUSING - ASSY OF	2	2007-04-028A (CLOSED)	6.0	2.422
268						**EPO KIT C**				
Line Item	**Phase**	**GGR&C Priority**	**Group Rank**	**Sub Rank1**	**Part Number**	**Part Name**	**Qty**	**MR Number(s)**	**Mass (lbs)**	**Volume (ft3)**
269	Descent	11			245125	STOWAGE STRAP	2	2007-01-058A (CLOSED)	0.026	0.0
270	Descent	11			245107	ASTRO GARDEN ASSEMBLY	2	2006-11-051 (CLOSED)	1.808	0.079
271	Descent	11			245020	SYRINGE ASSEMBLY	1	2006-11-051 (CLOSED)	0.088	0.013
272						**EVR**				
273	Descent	11			832281-502	RWS COLOR FLAT PANEL DISPLAY (CFPD)	1	2007-01-077 (CLOSED)	8.539	0.213
274	Descent	11			NZGL-RPC-N-15-0-LP	COVER	1	2007-01-051 (CLOSED)	1.0	0.006
275						**EXCESS INTEGRATION HARDWARE**				

276	Descent	11			SEG33111837-301	**CTB, FULL SIZE WITH WINDOWS**	1	2003-01-005 (status NA); 2004-11-047C (status NA)	40.0	1.867
277						**FLIGHT CREW EQUIPMENT**				
278	Descent	11			SED33119859-301	FOAM APPLICATOR ASSEMBLY	1	2007-08-091A (CLOSED)	0.3	0.116
279						**INGRESS AND EGRESS EQUIPMENT**				
280	Descent	11			2-255S0604	O-RINGS (FACE SEAL)	2	2003-01-005 (status NA); 2004-11-047C (status NA)	0.05	0.004
281	Descent	11			2-248S0604	O-RING, (BORE SEAL)	2	2003-01-005 (status NA); 2004-11-047C (status NA)	0.05	0.003
282						**MIDDECK FOR NODE 2 END ITEM**				
283	Descent	11			683-13603-1	CONTAMINATION COVER ASSEMBLY	2	2002-12-024B (CLOSED); 2004-11-047C (status NA)	3.68	0.156
284	Descent	11			683-13603-3	CONTAMINATION COVER ASSEMBLY	2	2002-12-024B (CLOSED); 2004-11-047C (status NA)	3.88	0.156
285	Descent	11			683-13603-2	CONTAMINATION COVER ASSEMBLY	2	2002-12-024B (CLOSED); 2004-11-047C (status NA)	3.88	0.156
286	Descent	11			683-13603-4	CONTAMINATION COVER ASSEMBLY	2	2002-12-024B (CLOSED); 2004-11-047C (status NA)	3.82	0.156
287	Descent	11			1J00375-1	WIRE HARNESS ASSY. W2018	1	2003-09-031 (CLOSED); 2004-11-047C (status NA)	1.852	0.047
288						**NUTRITION SAMPLE COLLECTION KIT**				
Line Item	**Phase**	**GGR&C Priority**	**Group Rank**	**Sub Rank1**	**Part Number**	**Part Name**	**Qty**	**MR Number(s)**	**Mass (lbs)**	**Volume (ft3)**
289	Descent	11			SEG46116931-331	TUBE DISPENSER ASSY, URINE ASSY	2	2006-06-117A (CLOSED)	1.896	0.249
290	Descent	11			SED46107193-306	**FLIGHT DAY ASSEMBLY, LARGE INFLIGHT BLOOD COLLECTION SYSTEM - SPACELAB**	1	2006-06-117A (CLOSED); 2006-11-108 (CLOSED)	3.946	0.531
291	Descent	11			SJG46116435-303	**URINE COLLECTION KIT ASSEMBLY**	3	2006-06-117A (CLOSED); 2006-11-108 (CLOSED); 2007-06-095 (CLOSED)	13.228	0.955
292	Descent	11			SED46105119-305	**SHARPS CONTAINER ASSEMBLY**	1	2006-06-117A (CLOSED); 2006-11-108 (CLOSED)	0.529	0.045

								(CLOSED)		
293						**US IVA TOOLS**				
294	Descent	11			87	SHUTTLE MULTIMETER	1	2006-08-100 (CLOSED)	1.35	0.015

FLIGHT 1E MIDDECK LAUNCH AND RETURN PRIORITIES

Flight 1E											
Line Item	**Phase**	**GGR&C Priority**	**Group Rank**	**Sub Rank1**	**Sub Rank2**	**Part Number**	**Part Name**	**Qty**	**MR Number(s)**	**Mass (lbs)**	**Volume (ft3)**
	1 - Items required to ensure/maintain crew safety for the upcoming flight/stage (critical).										
1							**CREW ROTATION EQUIPMENT**				
2	Ascent	1	1	1		115-9104-1000	IELK	1	2006-09-001 (CLOSED)	79.366	8.459
3	Ascent	1	1	2		_39.000.00	KENTAVR DEVICE	1	2006-09-001 (CLOSED)	3.307	0.618
4							**CHECS CMS HARDWARE**				
5	Ascent	1	3	1		SEG46120250-301	TREADMILL HARNESS	3	2007-05-111B (CLOSED)	15.013	1.079
6	Ascent	1	3	2		SED46115818-304	HEART RATE MONITOR KIT	1	2007-05-111B (CLOSED)	9.921	0.167
7	Ascent	1	3	3		SEG33116504-301	DIAL TORQUE WRENCH ASSY, 0-30 INLB	1	2007-07-093 (status NA)	1.146	0.093
8							**CHECS HMS HARDWARE**				
9	Ascent	1	5	1		SEG52100803-304	ISS MEDICAL ACCESSORY KIT ASSEMBLY	2	2006-10-058 (CLOSED)	6.614	0.46
10	Ascent	1	5	2		SEG52100802-303	DRUG PACK, ADVANCED LIFE SUPPORT PACK	1	2007-05-009 (status NA)	3.748	0.192
11	Ascent	1	5	3		SJG42104616-301	ISS PCBA CARTRIDGE KIT ASSEMBLY	1	2006-10-058 (status NA)	0.7	0.026
12							**CHECS EHS HARDWARE**				
13	Ascent	1	7	1		SJG46120020-302	RE-SUPPLY KIT, CSA-CP	1	2006-12-059 A (status NA)	4.321	0.363
14	Ascent	1	7	2		KLSK270355-302	MEDIA SYRINGE CASE	1	2006-10-040 (CLOSED)	0.3	0.021
15	Ascent	1	7	3		90-260	**ZIPLOCK, 9"x15"**	4	2006-10-040 (CLOSED)	0.4	0.312
16	Ascent	1	7	4		SEZ33111519-315	CREW PASSIVE DOSIMETER (CPD) ASSEMBLY	1	2006-10-040 (status NA); 2007-07-089 (CLOSED)	0.022	0.0
17	Ascent	1	7	5		90-260	**ZIPLOCK, 9"x15"**	2	2007-04-064 (CLOSED)	0.2	0.156
18	Ascent	1	7	6		SEG46121543-301	IN-FLIGHT GAS DELIVERY SYSTEM (IGDS)	1	2007-07-089 (CLOSED)	15.1	0.512
19	Ascent	1	7	7		SEG33120473-301	CSAS CALIBRATION ADAPTER ASSEMBLY	1	2007-07-089 (CLOSED)	2.0	
20	Ascent	1	7	8		SEG46119990-303	MICROBIOLOGY WATER ANALYSIS KIT	3	2007-07-089 (CLOSED)	1.19	0.197
21	Ascent	1	7	9		SDD46108778-301	VALVE ASSEMBLY, GRAB SAMPLER	4	2007-07-089 (CLOSED)	4.409	0.305

Line Item	Phase	GGR&C Priority	Group Rank	Sub Rank1	Sub Rank2	Part Number	Part Name	Qty	MR Number(s)	Mass (lbs)	Volume (ft3)
22	Ascent	1	7	10		SDD46108168-301	FORMALDEHYDE MONITOR KIT ASSY	1	2007-07-089 (status NA)	0.273	0.063
23	Ascent	1	7	11		SEG46116017-304	VOA OMI KIT	1	2007-07-089 (status NA)	25.574	1.157
	2 - Items required to ensure/maintain safety of on-orbit vehicle during current flight and stage (critical spares for immediate safety or survival of the on-orbit crew - to regain 1 fault tolerant of Crit 1 Station systems)										
24							**ESEL-EMU**				
25	Ascent	2	1	1		SED13101490-302	HELMET/EVVA ASSEMBLY	1	2007-08-042 (CLOSED)	10.14	0.0
26	Ascent	2	1	2		TBD-0104-110104-XX	LOWER TORSO ASSEMBLY (LTA)	1	2007-08-042 (CLOSED)	53.3	4.812
27	Ascent	2	1	3		SJG13101833-305	EMU SERVICING KIT	1	2007-08-042 (CLOSED)	6.0	0.42
28	Ascent	2	1	4		SV819600-02-00	BATTERY ASSEMBLY	2	2007-08-042 (CLOSED)	29.4	0.655
29	Ascent	2	1	5		SEG33118472-301	EMU ION FILTER	2	2007-08-042 (CLOSED)	6.26	0.408
30							**ESEL-TOOLS**				
31	Ascent	2	2	1		SEG33106869-308	MULTI-USE TETHER BASE ASSEMBLY	1	2007-08-095 (CLOSED)	12.5	
32	Ascent	2	2	2		SEG33110183-301	TORQUE WRENCH BAG	1	2007-08-095 (CLOSED)	1.5	0.344
33	Ascent	2	2	3		SEG33110490-303	MODULAR MWS BASEPLATE ASSY	1	2007-08-095 (CLOSED)	4.4	0.23
34	Ascent	2	2	4		SEG33119200-301	ORU TEMPORARY STOWAGE DEVICE (OTSD)	1	2007-08-095 (status NA)	80.0	11.32
35	Ascent	2	2	5		SDG33108130-001	WIRE, EVA TIE	52	2007-08-095 (CLOSED)	5.2	0.172
36	Ascent	2	2	6		SEG33106870-701	BALL STACK ASSY	3	2007-08-095 (CLOSED)	17.4	0.209
37	Ascent	2	2	7		SEG33114692-301	EXTENSION ASSY, SOCKET WOBBLE, 5/16 x 10	2	2007-08-095 (CLOSED)	2.0	
38	Ascent	2	2	8		SEB33100302-604	EVA CUFF CHECK LIST -310 LESS PAGES	4	2007-08-095 (CLOSED)	2.4	0.202
39							**CREW** PREFERENCE				
40	Ascent	2	7	1		528-43059-3	ATHLETIC SHOES, NEW BALANCE	1	2006-10-038 (CLOSED)	1.984	0.35
41	Ascent	2	7	2		CREWPREF	CREW PREFERENCE ITEMS	1	2006-10-038 (status NA)	11.0	0.92
42							**ECLSS**				
43	Ascent	2	8	1		SEG46117689-302	RESERVOIR, PAYLOAD WATER	1	2007-01-028 (CLOSED)	4.0	0.2
44	Ascent	2	8	2		683-52817-1	CHECK VALVE	1	2007-04-063 (CLOSED)	0.507	0.004
45	Ascent	2	8	3		AS5168K08	PLUG, FLARED TUBE FITTING	2	2007-04-063 (CLOSED)	0.441	0.001
46	Ascent	2	8	4		SECO7-S8	CONICAL SEAL, FLARED TUBE FITTING	2	2007-04-063 (CLOSED)	0.441	0.0

Line Item	Phase	GGR&C Priority	Group Rank	Sub Rank1	Sub Rank2	Part Number	Part Name	Qty	MR Number(s)	Mass (lbs)	Volume (ft3)
47							**WATER TRANSFER EQUIPMENT**				
48	Ascent	2	10	1		10132-10032-04	CONTINGENCY WATER COLLECTION BAG ASSY	1	2006-09-001 (status NA)	2.61	0.625
49	Ascent	2	10	2		SEG33113140-305	CONTINGENCY WATER CONTAINMENT ASSEMBLY	4	2007-01-092 (SUBMITTED)	12.0	4.63
50	Ascent	2	10	3		SED46111879-301	**SILVER BIOCIDE SYRINGE KIT (20 ML)**	1	2007-01-094 (CLOSED); 2006-09-001 (status NA)	1.341	0.109
51	Ascent	2	10	4		SED46109306-301	**POUCH ASSEMBLY MINERALIZATION KIT**	1	2006-09-001 (status NA)	4.136	0.167
52	Ascent	2	10	5		SED46111870-303	**SAMPLE/PURGE KIT ASSY., CWC**	1	2006-09-001 (status NA)	2.892	0.116
53							**INGRESS AND EGRESS EQUIPMENT**				
54	Ascent	2	12	1		33_.9962.003	**DOCKING MECHANISM ACCESSORY KIT**	1	2006-09-001 (status NA)	3.0	1.0
55							**IMV CAP O-RING REPLACEMENT HARDWARE**				
56	Ascent	2	12	2		601	BRAYCOTE 601	1	2006-09-001 (status NA)	0.13	0.013
57	Ascent	2	12	3		2-248S0604	O-RING, (BORE SEAL)	1	2006-09-001 (status NA)	0.025	0.002
58	Ascent	2	12	4		2-255S0604	O-RINGS (FACE SEAL)	1	2006-09-001 (status NA)	0.025	0.002
59	Ascent	2	12	5		2-248S0604	O-RING, (BORE SEAL)	1	2006-09-001 (status NA)	0.025	0.002
60	Ascent	2	12	6		2-255S0604	O-RINGS (FACE SEAL)	1	2006-09-001 (status NA)	0.025	0.002
61							**INGRESS AND EGRESS EQUIPMENT**				
62	Ascent	2	14	1		528-40805-3	TOWEL	1	2006-09-001 (status NA)	0.34	0.025
63	Ascent	2	14	2		528-50000-2	**ZIPLOCK/ZIP-LIP BAG/PRESS 'N' SEAL**	1	2006-09-001 (status NA)	0.022	0.0
64							**ODF**				
65	Ascent	2	30	1		SKG32999102-301	OPERATIONS DATA FILE ASSEMBLY OPS	1	2006-03-004 (status NA); 2006-09-001 (status NA)	26.01	1.0
66	Ascent	2	30	2		SKG32999102-301	OPERATIONS DATA FILE ASSEMBLY OPS	1	2006-09-001 (status NA)	26.01	1.0

Line Item	Phase	GGR&C Priority	Group Rank	Sub Rank1	Sub Rank2	Part Number	Part Name	Qty	MR Number(s)	Mass (lbs)	Volume (ft3)
	3 - Items required to support primary mission objectives (flight/stage) stated in baselined program documentation, crew care packages and crew preference items to maintain crew mental health.										
67							**PDGF**				
68	Ascent	3	1	1	1	51618-1006-1	GRAPPLE SHAFT ORU ASSY, PDGF ORU ASSEMBLY, PDGF MSS	1	2007-05-070 (CLOSED)	1.31	0.015
69	Ascent	3	1	1	2	51618-1000-1	PDGF, ORU ASSEMBLY MBS	1	2007-05-070 (CLOSED)	72.09	5.324
70							**COLUMBUS MODULE**				
71	Ascent	3	1	2		COF 12/94	COLUMBUS	1	2006-10-091 (CLOSED)	26742.95	4576.06
72							**ICC LITE**				
73	Ascent	3	1	3		683-97571-1	INTEGRATED ASSEMBLY, NTA FSE	1	2006-10-053 (CLOSED)	0.0	0.055
74	Ascent	3	1	4	1	TEF-DWG-200000-00-00-CGS	EUROPEAN TECHNOLOGY EXPOSURE FACILITY	1	2007-07-100 (status NA); 2006-10-039 (CLOSED)	655.875	50.093
75	Ascent	3	1	4	2	1000SE000	SOLAR MONITORING OBSERVATORY	1	2007-07-100 (CLOSED); 2006-10-039 (CLOSED)	793.664	70.667
76							**CREW CARE PACKAGES**				
77	Ascent	3	2			SEG46117193-302	CREW CARE PACKAGE ASSEMBLY, CARGO TRANSFER CASE ASSEMBLY HALF SIZE	1	2007-02-132 (SUBMITTED); 2006-09-001 (status NA)	33.069	0.461
78							**ESA HARDWARE**				
79	Ascent	3	4	1		51618-1018-1	PDGF PIGTAIL P400	1	2007-05-100 (CLOSED)	2.205	0.064
80	Ascent	3	4	2		51618-1018-3	PDGF PIGTAIL P401	1	2007-05-100 (CLOSED)	2.205	0.064
81							**TCS-ETCS**				
82	Ascent	3	6	1		1F16132-1	BLANKET ASSY - RIGHT, FLUID QUICK DISCONNECT, TYPE .25"	1	2007-07-057A (CLOSED)	0.342	
83	Ascent	3	6	2		1F16132-2	BLANKET ASSY - LEFT, FLUID QUICK DISCONNECT, TYPE .25"	1	2007-07-057A (CLOSED)	0.342	0.0
84							**MLI**				
85	Ascent	3	7	1		3140CA151-401	FWD STBD MLI TRUNNIONS COVER	1	2007-08-051 (CLOSED)	1.102	0.177
86	Ascent	3	7	2		3140CA151-402	AFT STBD MLI TRUNNIONS COVER	1	2007-08-051 (CLOSED)	1.102	0.177
87	Ascent	3	7	3		3140CA331-401	MLI FOR KEEN PIN	1	2007-04-140 (CLOSED)	0.0	0.0

Line Item	Phase	GGR&C Priority	Group Rank	Sub Rank1	Sub Rank2	Part Number	Part Name	Qty	MR Number(s)	Mass (lbs)	Volume (ft3)
88	Ascent	3	7	4		3140CA161-401	PORT MLI PIN COVER	2	2006-10-041A (CLOSED)	2.205	0.248
89	Ascent	3	7	7		3140CA261-401	AFT PORT MLI TRUNNIONS COVER	1	2006-10-041A (CLOSED)	1.102	0.177
90	Ascent	3	7	8		3140CA261-402	FWD PORT MLI TRUNNIONS COVER	1	2006-10-041A (CLOSED)	1.102	0.177
91	Ascent	3	7	9		3140CA265-401	STBD MLI PIN COVER	1	2006-10-041A (CLOSED); 2007-04-139 (CLOSED)	1.102	0.124
92	Ascent	3	7	10		3140CA265-401	STBD MLI PIN COVER	1	2006-10-041A (CLOSED)	1.102	0.124
93							**VESTIBULE OUTFITTING KIT**				
94	Ascent	3	12	1	1	1F46349-1	WIRE HARNESS ASSEMBLY, W5001	1	2007-04-101A (CLOSED)	1.0	0.078
95	Ascent	3	12	1	2	NATC-PPC-N-25-0	CAP, PROTECTIVE	2	2007-04-101A (CLOSED)	0.52	0.009
96	Ascent	3	12	2	1	1F46351-1	WIRE HARNESS ASSEMBLY, W5002	1	2007-04-101A (CLOSED)	1.0	0.078
97	Ascent	3	12	2	2	NATC-PPC-N-25-0	CAP, PROTECTIVE	2	2007-04-101A (CLOSED)	0.52	0.009
98	Ascent	3	12	3	1	1F46353-1	WIRE HARNESS ASSEMBLY, W5003	1	2007-04-101A (CLOSED)	0.8	0.057
99	Ascent	3	12	3	2	NATC-PPC-N-25-0	CAP, PROTECTIVE	2	2007-04-101A (CLOSED)	0.52	0.009
100	Ascent	3	12	4	1	1F46355-1	WIRE HARNESS ASSY, W5004	1	2007-04-101A (CLOSED)	1.0	0.167
101	Ascent	3	12	4	2	NATC-PPC-N-25-0	CAP, PROTECTIVE	2	2007-04-101A (CLOSED)	0.52	0.009
102	Ascent	3	12	5	1	1F46357-1	WIRE HARNESS ASSY, W5005	1	2007-04-101A (CLOSED)	0.8	0.029
103	Ascent	3	12	5	2	NATC-PPC-N-25-0	CAP, PROTECTIVE	2	2007-04-101A (CLOSED)	0.52	0.009
104	Ascent	3	12	6	1	1F46359-1	WIRE HARNESS ASSEMBLY, W5006	1	2007-04-101A (CLOSED)	0.8	0.035
105	Ascent	3	12	6	2	NATC-PPC-N-25-0	CAP, PROTECTIVE	2	2007-04-101A (CLOSED)	0.52	0.009
106	Ascent	3	12	7	1	1F46361-1	WIRE HARNESS ASSEMBLY, W5007	1	2007-04-101A (CLOSED)	0.8	0.035
107	Ascent	3	12	7	2	NATC-PPC-N-25-0	CAP, PROTECTIVE	2	2007-04-101A (CLOSED)	0.52	0.009
108	Ascent	3	12	8	1	1F46365-1	WIRE HARNESS ASSEMBLY, W5009	1	2007-04-101A (CLOSED)	1.0	0.167
109	Ascent	3	12	8	2	NATC-PPC-N-25-0	CAP, PROTECTIVE	2	2007-04-101A (CLOSED)	0.52	0.009
110	Ascent	3	12	9	1	1F46367-1	WIRE HARNESS ASSEMBLY, W5010	1	2007-04-101A (CLOSED)	0.8	0.057
111	Ascent	3	12	9	2	NATC-PPC-N-25-0	CAP, PROTECTIVE	2	2007-04-101A (CLOSED)	0.52	0.009
112	Ascent	3	12	10	1	1F46373-1	WIRE HARNESS ASSY, W5013	1	2007-04-101A (CLOSED)	2.5	0.235

Line Item	Phase	GGR&C Priority	Group Rank	Sub Rank1	Sub Rank2	Part Number	Part Name	Qty	MR Number(s)	Mass (lbs)	Volume (ft3)
113	Ascent	3	12	10	2	NATC-PPC-N-33-0	PROTECTIVE CAP	2	2007-04-101A (CLOSED)	4.0	0.006
114	Ascent	3	12	11	1	1F46377-1	WIRE HARNESS ASSEMBLY, W5015	1	2007-04-101A (CLOSED)	0.8	0.037
115	Ascent	3	12	11	2	NATC-PPC-N-13-0	PROTECTIVE CAP	2	2007-04-101A (CLOSED)	0.174	0.001
116	Ascent	3	12	12	1	683-13871-3	JUMPER, NODE 2 TO APM, MTCS SUPPLY	1	2007-04-101A (CLOSED)	10.0	0.123
117	Ascent	3	12	12	2	683-16348-809	COUPLING, QUICK DISCONNECT	2	2007-04-101A (CLOSED)	0.78	0.006
118	Ascent	3	12	13	1	683-13871-4	JUMPER, NODE 2 TO APM, MTCS RETURN	1	2007-04-101A (CLOSED)	10.0	0.123
119	Ascent	3	12	13	2	683-16348-809	COUPLING, QUICK DISCONNECT	2	2007-04-101A (CLOSED)	0.78	0.006
120	Ascent	3	12	14	1	683-13896-43	LTCS SUPPLY JUMPER ASSEMBLY	1	2007-04-101A (CLOSED)	10.0	0.123
121	Ascent	3	12	14	2	683-16348-809	COUPLING, QUICK DISCONNECT	2	2007-04-101A (CLOSED)	0.78	0.006
122	Ascent	3	12	15	1	683-13896-44	LTCS RETURN JUMPER ASSEMBLY	1	2007-04-101A (CLOSED)	10.0	0.123
123	Ascent	3	12	15	2	683-16348-809	COUPLING, QUICK DISCONNECT	2	2007-04-101A (CLOSED)	0.78	0.006
124	Ascent	3	12	16	1	1F46371-1	WIRE HARNESS ASSY, W5012	1	2007-04-101A (CLOSED)	2.5	0.235
125	Ascent	3	12	16	2	NATC-PPC-N-33-0	PROTECTIVE CAP	2	2007-04-101A (CLOSED)	4.0	0.006
126	Ascent	3	12	17	1	683-13870-70	JUMPER, NODE TO APM, LOW PRESSURE NITROGEN	1	2007-04-101A (CLOSED)	1.0	0.104
127	Ascent	3	12	17	2	683-16347-822	THREADED FLUID FITTING	2	2007-04-101A (CLOSED)	0.6	0.001
128	Ascent	3	12	18	1	683-13870-71	JUMPER, NODE TO APM, WASTE WATER	1	2007-04-101A (CLOSED)	0.34	0.104
129	Ascent	3	12	18	2	683-16347-818	THREADED FLUID FITTING	1	2007-04-101A (CLOSED)	0.023	0.001
130	Ascent	3	12	18	3	683-16348-811	PLUG, QUICK DISCONNECT	1	2007-04-101A (CLOSED)	0.206	0.002
131	Ascent	3	12	19	1	683-13870-72	JUMPER, NODE TO APM, AR SAMPLE	1	2007-04-101A (CLOSED)	1.5	0.104
132	Ascent	3	12	19	2	505905-061	SDS JUMPER DUST CAPS	2	2007-04-101A (CLOSED)	0.62	0.009
133	Ascent	3	12	20	1	683-13896-7	LTCS SUPPLY JUMPER ASSEMBLY	1	2007-04-101A (CLOSED)	4.0	0.1
134	Ascent	3	12	20	2	683-16348-809	COUPLING, QUICK DISCONNECT	2	2007-04-101A (CLOSED)	0.78	0.006
135	Ascent	3	12	21	1	683-13896-8	LTCS RETURN JUMPER ASSEMBLY	1	2007-04-101A (CLOSED)	4.0	0.1

Line Item	Phase	GGR&C Priority	Group Rank	Sub Rank1	Sub Rank2	Part Number	Part Name	Qty	MR Number(s)	Mass (lbs)	Volume (ft3)
136	Ascent	3	12	21	2	683-16348-809	COUPLING, QUICK DISCONNECT	2	2007-04-101A (CLOSED)	0.78	0.006
137	Ascent	3	12	23		2-161S0604-70	SILICON O-RING	4	2007-04-101A (CLOSED)	0.08	0.007
138	Ascent	3	12	24		528-50000-5	**ZIPLOCK/ZIP-LIP BAG**	9	2007-04-101A (CLOSED)	0.139	0.045
139	Ascent	3	12	25		683-13477-7	GROUND STRAP	2	2007-04-101A (CLOSED)	0.52	0.03
140	Ascent	3	12	26		683-13870-73	JUMPER, NODE TO APM, IMV SUPPLY	1	2007-04-101A (CLOSED)	6.38	0.104
141	Ascent	3	12	27		683-13870-74	JUMPER, NODE TO APM, IMV RETURN	1	2007-04-101A (CLOSED)	6.38	0.104
142	Ascent	3	12	28		683-13896-37	MITTEN, LTCS JUMPER	4	2007-04-101A (CLOSED)		0.128
143	Ascent	3	12	29		683-13896-4	MITTEN, LTCS JUMPER	4	2007-04-101A (CLOSED)		0.228
144	Ascent	3	12	30		683-60461-11	BARRIER ASSY - BVC, RADIAL	1	2007-04-101A (CLOSED)	2.63	0.234
145	Ascent	3	12	31		NATC-PPC-N-09-0	PROTECTIVE CAP, PLUG TYPE	3	2007-04-101A (CLOSED)	0.24	0.001
146	Ascent	3	12	32		NATC-PPC-N-11-0	PROTECTIVE CAP	2	2007-04-101A (CLOSED)	0.16	0.001
147	Ascent	3	12	33		NATC-RPC-N-09-0	PROTECTIVE CAP, RECEPTACLE	3	2007-04-101A (CLOSED)	0.09	0.001
148	Ascent	3	12	34		NATC-RPC-N-11-0	PROTECTIVE CAP	2	2007-04-101A (CLOSED)	0.075	0.002
149							**STRUC & MECH**				
150	Ascent	3	13	1		528-50000-5	**ZIPLOCK/ZIP-LIP BAG**	1	2007-04-040A (CLOSED)	1.303	0.005
151	Ascent	3	13	2		528-50000-8	**ZIPLOCK BAG**	1	2007-04-040 A (status NA)	0.07	0.033
152	Ascent	3	13	3		NATC-PPC-N-11-0	PROTECTIVE CAP	2	2007-04-040 A (status NA)	0.16	0.001
153	Ascent	3	13	4		NATC-RPC-N-11-0	PROTECTIVE CAP	2	2007-04-040 A (status NA)	0.075	0.002
154	Ascent	3	13	5		NATC-PPC-N-13-0	PROTECTIVE CAP	6	2007-04-040 A (status NA)	0.522	0.004
155	Ascent	3	13	6		NATC-RPC-N-13-0	PROTECTIVE CAP	6	2007-04-040A (CLOSED)	0.301	0.007
156	Ascent	3	13	7		NATC-PPC-N-15-0	PROTECTIVE CAP	1	2007-04-040 A (status NA)	0.11	0.001
157	Ascent	3	13	8		NATC-RPC-N-15-0	PROTECTIVE CAP	1	2007-04-040 A (status NA)	0.05	0.001
158	Ascent	3	13	9		528-50000-5	**ZIPLOCK/ZIP-LIP BAG**	1	2007-04-040 A (status NA)	1.303	0.005
159	Ascent	3	13	10		528-50000-8	**ZIPLOCK BAG**	1	2007-04-040 A (status NA)	0.07	0.033
160	Ascent	3	13	11		NATC-PPC-N-11-0	PROTECTIVE CAP	2	2007-04-040 A (status NA)	0.16	0.001
161	Ascent	3	13	12		NATC-RPC-N-11-0	PROTECTIVE CAP	2	2007-04-040 A (status NA)	0.075	0.002
162	Ascent	3	13	13		NATC-PPC-N-13-0	PROTECTIVE CAP	6	2007-04-040 A (status NA)	0.522	0.004

Line Item	Phase	GGR&C Priority	Group Rank	Sub Rank1	Sub Rank2	Part Number	Part Name	Qty	MR Number(s)	Mass (lbs)	Volume (ft3)
163	Ascent	3	13	14		NATC-RPC-N-13-0	PROTECTIVE CAP	6	2007-04-040 A (status NA)	0.301	0.007
164	Ascent	3	13	15		NATC-PPC-N-15-0	PROTECTIVE CAP	1	2007-04-040A (CLOSED)	0.11	0.001
165	Ascent	3	13	16		NATC-RPC-N-15-0	PROTECTIVE CAP	1	2007-04-040A (CLOSED)	0.05	0.001
166	Ascent	3	13	17		528-50000-5	**ZIPLOCK/ZIP-LIP BAG**	1	2007-04-040 A (status NA)	1.303	0.005
167	Ascent	3	13	18		528-50000-8	**ZIPLOCK BAG**	1	2007-04-040 A (status NA)	0.07	0.033
168	Ascent	3	13	19		NATC-PPC-N-11-0	PROTECTIVE CAP	2	2007-04-040A (CLOSED)	0.16	0.001
169	Ascent	3	13	20		NATC-RPC-N-11-0	PROTECTIVE CAP	2	2007-04-040A (CLOSED)	0.075	0.002
170	Ascent	3	13	21		NATC-PPC-N-13-0	PROTECTIVE CAP	6	2007-04-040A (CLOSED)	0.522	0.004
171	Ascent	3	13	22		NATC-RPC-N-13-0	PROTECTIVE CAP	6	2007-04-040 A (status NA)	0.301	0.007
172	Ascent	3	13	23		NATC-PPC-N-15-0	PROTECTIVE CAP	1	2007-04-040 A (status NA)	0.11	0.001
173	Ascent	3	13	24		NATC-RPC-N-15-0	PROTECTIVE CAP	1	2007-04-040 A (status NA)	0.05	0.001
174	Ascent	3	13	25		528-50000-5	**ZIPLOCK/ZIP-LIP BAG**	1	2007-04-040 A (status NA)	1.303	0.005
175	Ascent	3	13	26		528-50000-8	**ZIPLOCK BAG**	1	2007-04-040 A (status NA)	0.07	0.033
176	Ascent	3	13	27		NATC-PPC-N-11-0	PROTECTIVE CAP	2	2007-04-040 A (status NA)	0.16	0.001
177	Ascent	3	13	28		NATC-RPC-N-11-0	PROTECTIVE CAP	2	2007-04-040 A (status NA)	0.075	0.002
178	Ascent	3	13	29		NATC-PPC-N-13-0	PROTECTIVE CAP	6	2007-04-040 A (status NA)	0.522	0.004
179	Ascent	3	13	30		NATC-RPC-N-13-0	PROTECTIVE CAP	6	2007-04-040 A (status NA)	0.301	0.007
180	Ascent	3	13	31		NATC-PPC-N-15-0	PROTECTIVE CAP	1	2007-04-040 A (status NA)	0.11	0.001
181	Ascent	3	13	32		NATC-RPC-N-15-0	PROTECTIVE CAP	1	2007-04-040 A (status NA)	0.05	0.001
182							**PHOTO/TV EQUIPMENT**				
183	Ascent	3	15			528-21106-7	**ISS PHOTOGRAPHIC AND VIDEO EQUIPMENT ASSEMBLY KIT**	1	2006-09-001 (status NA)	3.7	1.886
184							**ESA HARDWARE**				
185	Ascent	3	16	1		683-62201-3	KBAR ASSEMBLY, IHI - LEFT	5	2006-10-041A (CLOSED)	4.74	0.228
186	Ascent	3	16	2		683-62201-4	KBAR ASSEMBLY, IHI - RIGHT	5	2006-10-041A (CLOSED)	4.74	0.228
187	Ascent	3	16	3		9233CA721	FDS COVER - 2	1	2006-10-041A (CLOSED)	8.818	1.589
188	Ascent	3	16	4		9233CA723	FDS COVER - 1	1	2006-10-041A (CLOSED)	8.818	1.589

Line Item	Phase	GGR&C Priority	Group Rank	Sub Rank1	Sub Rank2	Part Number	Part Name	Qty	MR Number(s)	Mass (lbs)	Volume (ft3)
189	Ascent	3	16	5		9233CA725	FDS COVER - 3	1	2006-10-041A (CLOSED)	8.818	1.589
190	Ascent	3	16	6		9233CA911	FDS COVER - 4	1	2006-10-041A (CLOSED)	8.818	1.589
191	Ascent	3	16	7		9233CA913	FDS COVER - 5	1	2006-10-041A (CLOSED)	8.818	1.589
192	Ascent	3	16	8		9233CA915	FDS COVER - 6	1	2006-10-041A (CLOSED)	8.818	1.589
193	Ascent	3	16	9		B40482-3	INTER MODULE VENTILATION SHUT OFF VALVE (ISOV)	2	2006-10-041A (CLOSED)	0.0	0.537
194	Ascent	3	16	10		SEG33115360-303	LAPTOP COMPUTER ASSY, IBM A31P	2	2006-10-041A (CLOSED)	15.87	0.341
195	Ascent	3	16	11		SEG33116412-303	120V DC POWER SUPPLY	2	2006-10-041A (CLOSED); 2007-04-139 (CLOSED)	8.818	0.15
196	Ascent	3	16	12		00624-4563-550	IMV CLAMP	2	2007-04-140 (CLOSED)		
197	Ascent	3	16	12		SEG33116459-301	ENHANCED CABLE ASSEMBLY, A31P 16V DC POWER	2	2006-10-041A (CLOSED)	1.0	0.139
198	Ascent	3	16	13		TBD-CDROM1	CD ROM - DOCUMENTATION	1	2006-10-041A (CLOSED)		
199	Ascent	3	16	13		180P001-001	IMV RETURN CAP-TBC	1	2007-04-140 (CLOSED)		
200	Ascent	3	16	16		7044.13.AG	E-BOX ASSEMBLY FUSE CARTRIDGE	1	2007-05-100 (CLOSED)	0.331	0.004
201	Ascent	3	16	17		A-153083-1	WPA FILTER CARTRIDGE	1	2007-05-100 (CLOSED)	13.265	0.058
202	Ascent	3	16	18		B41098	CDA/VVDD VENT CAP	1	2007-05-100 (CLOSED)	0.705	
203	Ascent	3	16	19		B41101	PPRA VENT CAP	1	2007-05-100 (CLOSED)	0.838	
204	Ascent	3	16	20		P.237442	IMV SUPPLY CAP-TBC	1	2007-04-140 (CLOSED)		
205	Ascent	3	16	21		SEG33107631-301	BRACKET ASSY, MULTI-USE	2	2007-05-100 (CLOSED)	5.027	0.129
206	Ascent	3	16	22		TBD-ADJ	ADJUSTABLE BELTS WITH RINGS, SEAT TRACK I/FS AND VELCRO STRAPS FOR TEMPORARY STO	5	2007-05-100 (CLOSED)	9.965	0.717
207	Ascent	3	16	23		TBD-CDROM2	CD - PAYLOAD	15	2007-04-140 (CLOSED)	4.96	0.033
208	Ascent	3	16	24		TBD-CDROM3	CD - MMU RESTORE IMAGE	1	2007-04-140 (CLOSED)	0.331	0.002
209	Ascent	3	16	25		TBD-CDROM4	CD - RESTORE BOOT	1	2007-04-140 (CLOSED)	0.331	0.002
210	Ascent	3	16	26		TBD-DVD1	DVD - PAYLOAD	15	2007-04-140 (CLOSED)	4.96	0.033

Line Item	Phase	GGR&C Priority	Group Rank	Sub Rank1	Sub Rank2	Part Number	Part Name	Qty	MR Number(s)	Mass (lbs)	Volume (ft3)
211	Ascent	3	16	27		TBD-DVD2	DVD - PWS RESTORE IMAGE	1	2007-04-140 (CLOSED)	0.331	0.002
212	Ascent	3	16	28		TBD-VENTCOVER1	COL CDA/VVDD VENT CAP COVER	1	2007-05-100 (CLOSED)		
213	Ascent	3	16	29		TBD-VENTCOVER2	COL PPRA VENT CAP COVER	1	2007-05-100 (CLOSED)		
214	Ascent	3	16	30		11-62101	FILTER ORU ICD	1	2007-06-023 (CLOSED)	15.609	1.961
215	Ascent	3	16	31		2310-610200BOOC	SECONDARY FILTER COMPLETE	1	2007-06-023 (CLOSED)	2.205	0.352
216							**BIOLAB HARDWARE**				
217	Ascent	3	16	32		500.104.AA	FRONT FILTERS	4	2007-06-019 (CLOSED); 2007-06-042 (CLOSED)	4.515	0.109
218	Ascent	3	16	33		7044.10.AC	INTERNAL CONTROL PANEL SENSOR BOX	1	2007-06-019 (CLOSED)	1.323	0.075
219	Ascent	3	16	34		7044.23.AA	BGB FILTER AREA SENSOR BOX	1	2007-06-019 (CLOSED)	0.992	0.019
220	Ascent	3	16	35		7044.26.BB	BGB REAR FILTER ASSY	4	2007-06-019 (CLOSED); 2007-06-042 (CLOSED)	4.409	0.087
221							**COLUMBUS INTERNAL OUTFITTING**				
222	Ascent	3	16	40		683-16348-811	PLUG, QUICK DISCONNECT	2	2007-08-050A (CLOSED)	0.355	0.004
223	Ascent	3	16	41		683-16348-809	COUPLING, QUICK DISCONNECT	2	2007-08-050A (CLOSED)	0.653	0.006
224	Ascent	3	16	42		1600CA595-401	PFEX KICK-LOAD COVER	2	2007-08-050A (CLOSED)	1.687	0.512
225							***PCS***				
226	Ascent	3	20	1		SEG33115359-301	60 GB HARD DRIVE, A31P	1	2006-09-001 (status NA)	0.365	0.01
227	Ascent	3	20	2		SDG39129273-301	ASSEMBLY, MIL-STD-1553 PCMCIA CARD, PCS	2	2006-09-001 (status NA)	1.124	0.002
228	Ascent	3	20	3		SEZ39131210-307	ASSEMBLY, PCS/OCA WRITABLE CD	2	2006-09-001 (status NA)	0.2	0.006
229	Ascent	3	20	4		SEG33116459-301	ENHANCED CABLE ASSEMBLY, A31P 16V DC POWER	1	2006-09-001 (status NA)	0.5	0.069
230	Ascent	3	20	5		SEG39129282-301	DATA CABLE ASSEMBLY - PCS - PDIP 1553 ORBITER	1	2006-12-022 (CLOSED); 2006-09-001 (status NA)	0.465	0.012
231	Ascent	3	20	6		SEG33115360-303	LAPTOP COMPUTER ASSY, IBM A31P	1	2006-09-001 (status NA)	7.935	0.171

Line Item	Phase	GGR&C Priority	Group Rank	Sub Rank1	Sub Rank2	Part Number	Part Name	Qty	MR Number(s)	Mass (lbs)	Volume (ft3)
232	Ascent	3	20	7		SEG39129264-303	POWER CABLE ASSEMBLY - DC POWER (SHUTTLE ORBITER) 28VC PCS/PGSC	1	2006-12-022 (CLOSED); 2006-09-001 (status NA)	0.46	0.037
233	Ascent	3	20	8		SEG33116428-301	POWER SUPPLY ASSEMBLY-28VDC POWER SUPPLY	1	2006-09-001 (status NA); 2007-08-038 (CLOSED)	4.5	0.069
234	Ascent	3	20	9		SEG39131206-303	POWER CABLE ASSY, UOP ETHERNET 10 BASE T DATA/120VDC	3	2007-03-083 (CLOSED)	1.501	0.086
235	Ascent	3	20	10		SEG39129282-301	DATA CABLE ASSEMBLY - PCS - PDIP 1553 ORBITER	1	2006-12-022 (status NA); 2006-09-001 (status NA)	0.465	0.012
236	Ascent	3	20	11		SEZ39129260-309	POWER CABLE ASSEMBLY, PCS-UOP 120 VDC-PCS-UOP	3	2007-06-100 (CLOSED)	0.96	0.3
237	Ascent	3	20	12		SEZ39129260-311	POWER CABLE ASSEMBLY, PCS-UOP 120 VDC-PCS-UOP	2	2007-06-100 (CLOSED)	2.0	0.166
238							**COSS/SSC**				
239	Ascent	3	20	13		SEZ12100588-301	**CD STOWAGE CASE ASSEMBLY**	1	2006-12-022 (CLOSED); 2006-09-001 (status NA)	3.0	0.319
240							**US IVA TOOLS**				
241	Ascent	3	75			87	SHUTTLE MULTIMETER	1	2006-08-100 (status NA)	1.35	0.015
242							**TCS-ITCS**				
243	Ascent	3	80			683-56147-1	SAMPLE ADAPTER ASSEMBLY, ITCS, .5 INCH	1	2007-03-077 (SUBMITTED)	5.0	0.281
244	Ascent	3	81			683-56836-31	INTEGRATED HOSE ASSEMBLY	2	2007-05-046 (CLOSED)	8.0	0.016
	4 - Samples										
245							**COLD STOWAGE**				
246	Descent	4	1	1		SEG39136374-301	DOUBLE COLD INSULATED SAMPLE BAG	1	2007-07-039 (CLOSED)	18.078	2.019
247	Descent	4	1	2		SEG39136374-301	DOUBLE COLD INSULATED SAMPLE BAG	1	2007-07-039 (CLOSED)	18.078	2.019
248							**INTEGRATED IMMUNE (ISS)**				
249	Descent	4	2	1		SDG46121524-301	SALIVA COLLECTION POUCH ASSY. (LABELED USED)	2	2007-06-043 (CLOSED)	0.503	0.005
250	Descent	4	2	2		SDG46121531-301	BLOOD SAMPLE SLEEVE	3	2007-06-043 (CLOSED)	0.437	0.021

Line Item	Phase	GGR&C Priority	Group Rank	Sub Rank1	Sub Rank2	Part Number	Part Name	Qty	MR Number(s)	Mass (lbs)	Volume (ft3)
251	Descent	4	2	3		SJG46121521-301	**SALIVA COLLECTION KIT**	1	2007-06-043 (CLOSED)	2.277	0.062
252							**CHECS EHS HARDWARE**				
253	Descent	4	3	1		90-242	MCD STOWAGE BAG	1	2006-12-059A (CLOSED)	0.013	0.014
254	Descent	4	3	3		SDD46108778-301	VALVE ASSEMBLY, GRAB SAMPLER	7	2006-10-040 (CLOSED); 2007-04-064 (CLOSED)	7.716	0.534
255	Descent	4	3	4		SEM46110793-306	WATER SAMPLER ASSY POTABLE, STERILE	4	2006-10-040 (CLOSED); 2006-12-059 A (status NA)	0.236	0.016
256	Descent	4	3	5		WLSK270387-301	STOWAGE BAG ASSEMBLY, PETRI DISH, SAB W/CH	1	2006-10-040 (CLOSED)	0.02	0.004
257	Descent	4	3	6		WLSK270387-302	PETRI DISH STOWAGE BAG ASSY	1	2006-10-040 (CLOSED)	0.02	0.004
258	Descent	4	3	7		SEM46109455-308	KIT ASSEMBLY SURFACE SAMPLER	1	2006-10-040 (CLOSED)	2.2	0.159
259	Descent	4	3	8		SEG46119988-308	PACKET ASSY, MICRO SAMPLE, POST- FLIGHT ANALYSIS	2	2006-10-040 (CLOSED)	0.882	0.156
260	Descent	4	3	9		SEG46119988-309	PACKET ASSY, CHEMICAL SAMPLE, POST-FLIGHT ANALYSIS	4	2006-10-040 (CLOSED)	0.45	0.313
261	Descent	4	3	10		SEZ33111519-315	CREW PASSIVE DOSIMETER (CPD) ASSEMBLY	1	2006-10-040 (CLOSED); 2007-07-089 (CLOSED)	0.022	0.0
262	Descent	4	3	11		SDD46108168-301	FORMALDEHYDE MONITOR KIT ASSY	1	2007-07-089 (CLOSED)	0.273	0.063
263							**TCS-ITCS**				
264	Descent	4	4	1		683-62430-2	BUFFER DELIVERY APPLICATOR BuDA	1	2006-11-147A (CLOSED)	19.9	0.608
265	Descent	4	4	2		683-63436-2	ANTIMICROBIAL APPLICATORS	1	2006-11-147A (CLOSED)	19.85	0.608
266	Descent	4	4	3		683-63436-1	PHOSPHATE REMOVAL ASSEMBLY	1	2007-02-068 (CLOSED)	19.96	0.608
267							**CHECS HMS HARDWARE**				
268	Descent	4	6	1		SJG42104616-301	ISS PCBA CARTRIDGE KIT ASSEMBLY	1	2006-10-058 (CLOSED)	0.7	0.026
269	Descent	4	6	2		SEG52100802-303	DRUG PACK, ADVANCED LIFE SUPPORT PACK	1	2007-05-009 (CLOSED)	3.748	0.192
270							**STABILITY**				
271	Descent	4	7			SEG46121480-301	**STABILITY TEST KIT ASSEMBLY**	1	2007-04-017 (CLOSED)	9.37	0.421

Line Item	Phase	GGR&C Priority	Group Rank	Sub Rank1	Sub Rank2	Part Number	Part Name	Qty	MR Number(s)	Mass (lbs)	Volume (ft3)
272							**EMCS MULTIGEN**				
273	Descent	4	9	1		401 000	EMCS EC	8	2007-06-074 (CLOSED)	27.337	0.473
274	Descent	4	9	2		154 100	VIDEO TAPE	10	2007-06-074 (CLOSED)	1.102	0.049
275							**LADA-MIS**				
276	Descent	4	11	1		36-0107	LADA-MIS (ORZS)	1	2006-10-061 (CLOSED)	39.683	1.245
277							**CREW ROTATION EQUIPMENT**				
278	Descent	4	12			_39.000.00	KENTAVR DEVICE	1	2006-09-001 (CLOSED); 2006-09-001 (status NA)	3.307	0.618
279							**SWAB**				
280	Descent	4	13	1		SJG46119896-301	SWAB RETURN KIT	1	2006-10-061 (CLOSED); 2007-06-043 (status NA); 2007-06-043 (CLOSED);	2.116	0.304
281	Descent	4	13	2		SJG46119896-301	SWAB RETURN KIT	1	2007-06-043 (CLOSED)	2.116	0.304
282							**THERMAL CONTROL SYSTEM**				
283	Descent	4	25			SEG46118278-702	RETURN ZIPLOCK BAG ASSY	1	2005-11-016 (CLOSED)	0.11	0.021
	5 - Hardware items required for reflight (includes Utilization)										
284							**ICC LITE**				
285	Descent	5	1			683-96701-3	CMG FSE INTEGRATED ASSY	1	2007-08-083 (CLOSED);	0.0	
286	Descent	5	2			683-97571-1	INTEGRATED ASSEMBLY, NTA FSE	1	2006-10-053 (CLOSED)	0.0	0.055
287							**CHECS EHS HARDWARE**				
288	Descent	5	3	1		KLSK270355-302	MEDIA SYRINGE CASE	1	2006-12-059A (CLOSED)	0.3	0.021
289	Descent	5	3	2		SJG46120020-302	RE-SUPPLY KIT, CSA-CP	1	2006-12-059A (CLOSED)	4.321	0.363
290	Descent	5	3	3		KLSK270206-306	ADAPTER ASSEMBLY, AIR FILTER, 0.22µm	6	2006-10-040 (CLOSED); 2007-04-064 (CLOSED)	0.595	0.077
291	Descent	5	3	4		SEM46110793-305	ADAPTER PROBE ASSY, SVO-ZV PORT	2	2006-10-040 (CLOSED)	0.2	0.002
292	Descent	5	3	5		SEG46116017-304	VOA OMI KIT	1	2007-07-089 (CLOSED)	25.574	1.157
293							**CHECS CMS HARDWARE**				
294	Descent	5	4			SEG33116504-301	DIAL TORQUE WRENCH ASSY, 0-30 INLB	1	2007-07-093 (CLOSED)	1.146	0.093
295							**ESEL-EMU**				

Line Item	Phase	GGR&C Priority	Group Rank	Sub Rank1	Sub Rank2	Part Number	Part Name	Qty	MR Number(s)	Mass (lbs)	Volume (ft3)
296	Descent	5	5	1		TBD-0104-110104-XX	LOWER TORSO ASSEMBLY (LTA)	1	2007-08-042 (CLOSED)	53.3	4.812
297	Descent	5	5	2		SV819600-02-00	BATTERY ASSEMBLY	2	2007-08-042 (CLOSED)	29.4	0.655
298	Descent	5	5	3		SED13101490-302	HELMET/EVVA ASSEMBLY	1	2007-08-042 (CLOSED)	10.14	0.0
299	Descent	5	5	4		SJG13101833-305	EMU SERVICING KIT	1	2007-08-042 (CLOSED)	6.0	0.42
300	Descent	5	5	5		528-21189-4	**EV CREW OPTIONS KIT**	1	2007-08-042 (CLOSED)	10.95	0.394
301	Descent	5	5	6		16843	SIGNAL CONDITIONER	2	2007-08-042 (CLOSED)	0.26	0.003
302	Descent	5	5	7		0101-10001-06	COMMUNICATIONS CARRIER ASSEMBLY WITH ELECTRONICS	2	2007-08-042 (CLOSED)	2.84	0.167
303	Descent	5	5	8		SV792600-00-02	CONTAMINANT CONTROL CARTRIDGE	4	2007-08-042 (CLOSED)	25.44	0.815
304	Descent	5	5	9		0107-10007-07	LCVG	1	2007-08-042 (CLOSED)	8.25	1.171
305	Descent	5	5	10		0106-110106-09	EMU GLOVES, 12V HEATED, PHASE VI	2	2007-08-042 (CLOSED)	6.2	0.544
306	Descent	5	5	11		0106-110106-10	EMU GLOVES, 12V HEATED, PHASE VI	2	2007-08-042 (CLOSED)	6.2	0.544
307	Descent	5	5	12		SED13101715-706	COVER, PROTECTIVE, LOWER ARM WRIST DISCONNECT	4	2007-08-042 (CLOSED)	1.0	
308	Descent	5	5	13		0104-210605-11	BRIEF/ WAIST ASSEMBLY	1	2007-08-042 (CLOSED)	35.5	
309	Descent	5	5	14		SED13101715-707	THIGH FABRIC ATTACHMENT RING PROTECTIVE COVER	1	2007-08-042 (CLOSED)	0.25	
310	Descent	5	5	15		SED13101715-708	BRIEF/WAIST BODY SEAL PROTECTIVE COVER	1	2007-08-042 (CLOSED)	0.5	
311	Descent	5	5	16		SED13101526-306	LCVG W/BIO-MED	1	2007-08-042 (CLOSED)	8.25	1.171
312							**ESEL-TOOLS**				
313	Descent	5	6	1		SEB33100302-604	EVA CUFF CHECK LIST -310 LESS PAGES	4	2007-08-095 (CLOSED)	2.4	0.202
314	Descent	5	6	2		SEG33110490-303	MODULAR MWS BASEPLATE ASSY	1	2007-08-095 (CLOSED)	4.4	0.23
315	Descent	5	6	3		SEG33110183-301	TORQUE WRENCH BAG	1	2007-08-095 (CLOSED)	1.5	0.344
316	Descent	5	6	4		SEG33106869-307	MULTI-USE TETHER BASE ASSEMBLY	1	2007-08-095 (CLOSED)	12.5	
317	Descent	5	6	5		SEG33106870-703	BALL STACK ASSY	3	2007-08-095 (CLOSED)	16.8	
318							**FOOD SUPPLY SYSTEM (___)**				

Line Item	Phase	GGR&C Priority	Group Rank	Sub Rank1	Sub Rank2	Part Number	Part Name	Qty	MR Number(s)	Mass (lbs)	Volume (ft3)
319	Descent	5	8			17__.260_ 3200-0	FOOD RATIONS CONTAINERS	30	2006-09-001 (status NA)	66.139	1.937
320							**US IVA TOOLS**				
321	Descent	5	9			87	SHUTTLE MULTIMETER	1	2006-08-100 (CLOSED)	1.35	0.015
322							**CONTROLLER PANEL ASSEMBLY**				
323	Descent	5	10	1	1	528-50000-8	**ZIPLOCK BAG**	1	2007-05-077 (CLOSED)	32.496	0.033
324	Descent	5	10	1	2	2355260-1-1	CONTROLLER PANEL OUTLINE-CBM	1	2007-04-041A (CLOSED)	32.0	0.567
325	Descent	5	10	2	1	528-50000-8	**ZIPLOCK BAG**	1	2007-05-077 (status NA)	32.746	0.033
326	Descent	5	10	2	2	2355260-3-1	CONTROLLER PANEL OUTLINE-CBM	1	2007-04-041A (CLOSED)	32.25	0.567
327	Descent	5	10	3	1	528-50000-8	**ZIPLOCK BAG**	1	2007-05-077 (status NA)	32.496	0.033
328	Descent	5	10	3	1	528-50000-8	**ZIPLOCK BAG**	1	2007-05-077 (status NA)	32.706	0.033
329	Descent	5	10	3	2	2355260-1-1	CONTROLLER PANEL OUTLINE-CBM	1	2007-04-041 A (status NA)	32.0	0.567
330	Descent	5	10	3	2	2355260-2-1	CONTROLLER PANEL OUTLINE-CBM	1	2007-04-041A (CLOSED)	32.21	0.567
331	Descent	5	10	5	1	528-50000-8	**ZIPLOCK BAG**	1	2007-05-077 (CLOSED)	32.496	0.033
332	Descent	5	10	5	2	2355260-1-1	CONTROLLER PANEL OUTLINE-CBM	1	2007-04-041 A (status NA)	32.0	0.567
333	Descent	5	10	6	1	528-50000-8	**ZIPLOCK BAG**	1	2007-05-077 (status NA)	32.746	0.033
334	Descent	5	10	6	2	2355260-3-1	CONTROLLER PANEL OUTLINE-CBM	1	2007-04-041 A (status NA)	32.25	0.567
335	Descent	5	10	7	1	528-50000-8	**ZIPLOCK BAG**	1	2007-05-077 (status NA)	32.706	0.033
336	Descent	5	10	7	2	2355260-2-1	CONTROLLER PANEL OUTLINE-CBM	1	2007-04-041 A (status NA)	32.21	0.567
337	Descent	5	10	8	1	528-50000-8	**ZIPLOCK BAG**	1	2007-05-077 (status NA)	32.496	0.033
338	Descent	5	10	8	2	2355260-1-1	CONTROLLER PANEL OUTLINE-CBM	1	2007-04-041 A (status NA)	32.0	0.567
339							**ECLSS**				
340	Descent	5	12	1		SEG11100291-703	ASSEMBLY, CAFRAMO FAN	4	2006-09-072 (CLOSED)	12.0	0.337
341	Descent	5	12	2		SEG11100310-301	DESICCANT BAG ASSY	4	2006-09-072 (CLOSED)	24.8	3.361
342							**COSS/SSC**				
343	Descent	5	15	1		SEZ12100588-301	**CD STOWAGE CASE ASSEMBLY**	1	2006-09-001 (status NA)	3.0	0.319

Line Item	Phase	GGR&C Priority	Group Rank	Sub Rank1	Sub Rank2	Part Number	Part Name	Qty	MR Number(s)	Mass (lbs)	Volume (ft3)
344							**PCS**				
345	Descent	5	15	2		SEG33115359-301	60 GB HARD DRIVE, A31P	1	2006-09-001 (status NA)	0.365	0.01
346	Descent	5	15	3		SDG39129273-301	ASSEMBLY, MIL-STD-1553 PCMCIA CARD, PCS	2	2006-09-001 (status NA)	1.124	0.002
347	Descent	5	15	4		SEZ39131210-307	ASSEMBLY, PCS/OCA WRITABLE CD	2	2006-09-001 (status NA)	0.2	0.006
348	Descent	5	15	5		SEG33116459-301	ENHANCED CABLE ASSEMBLY, A31P 16V DC POWER	1	2006-09-001 (status NA)	0.5	0.069
349	Descent	5	15	6		SEG39129282-301	DATA CABLE ASSEMBLY - PCS - PDIP 1553 ORBITER	1	2006-12-022 (status NA); 2006-09-001 (status NA)	0.465	0.012
350	Descent	5	15	7		SEG39129282-301	DATA CABLE ASSEMBLY - PCS - PDIP 1553 ORBITER	1	2006-12-022 (CLOSED); 2006-09-001 (status NA)	0.465	0.012
351	Descent	5	15	8		SEG33115360-303	LAPTOP COMPUTER ASSY, IBM A31P	1	2006-09-001 (status NA)	7.935	0.171
352	Descent	5	15	9		SEG39129264-303	POWER CABLE ASSEMBLY - DC POWER (SHUTTLE ORBITER) 28VC PCS/PGSC	1	2006-12-022 (CLOSED); 2006-09-001 (status NA)	0.46	0.037
353							**WATER TRANSFER EQUIPMENT**				
354	Descent	5	22	1		10132-10032-04	CONTINGENCY WATER COLLECTION BAG ASSY	1	2006-09-001 (status NA)	7.0	0.625
355	Descent	5	22	2		SED46109306-301	**POUCH ASSEMBLY MINERALIZATION KIT**	1	2006-09-001 (status NA)	4.136	0.167
356	Descent	5	22	3		KLSJ320189-301	PURGE BAGS	3	2006-09-001 (status NA)	2.4	0.091
357	Descent	5	22	4		SED46111870-303	**SAMPLE/PURGE KIT ASSY., CWC**	1	2006-09-001 (status NA)	2.37	0.116
358	Descent	5	22	5		SED46111879-301	**SILVER BIOCIDE SYRINGE KIT (20 ML)**	1	2006-09-001 (status NA)	1.536	0.109
359	Descent	5	22	6		SED46111879-301	**SILVER BIOCIDE SYRINGE KIT (20 ML)**	1	2007-01-094 (CLOSED); 2006-09-001 (status NA)	1.341	0.109
360	Descent	5	22	7		SED46113541-302	ASSEMBLY, WATER SAMPLING KIT	3	2007-01-026 (SUBMITTED)	2.115	0.125
361	Descent	5	22	8		SEG33113140-305	CONTINGENCY WATER CONTAINMENT ASSEMBLY	4	2007-01-092 (SUBMITTED)	28.0	6.296

Line Item	Phase	GGR&C Priority	Group Rank	Sub Rank1	Sub Rank2	Part Number	Part Name	Qty	MR Number(s)	Mass (lbs)	Volume (ft3)
	6 - Utilization equipment required to support upcoming flight/increment science objectives or last flight opportunity before implementation										
362							**INTEGRATED IMMUNE (ISS)**				
363	Ascent	6	2	1		SJG46121520-301	BLOOD COLLECTION KIT	1	2007-06-043 (CLOSED)	3.889	0.134
364	Ascent	6	2	2		SJG46121521-301	**SALIVA COLLECTION KIT**	2	2007-06-043 (CLOSED)	4.555	0.125
365							**COLD STOWAGE**				
366	Ascent	6	4			SEG33118113-325	ICEPAC ASSY, -32° C	18	2007-07-039 (CLOSED)	51.191	1.371
367							**WAICO**				
368	Ascent	6	10	1		SEG39136374-301	DOUBLE COLD INSULATED SAMPLE BAG	1	2007-07-116 (CLOSED)	18.078	2.019
369	Ascent	6	10	2		1141400	BIOLAB WAICO DOUBLE SEALED INTEGRATED EXPERIMENT CONTAINER (I-ECDS)	8	2007-07-116 (CLOSED)	26.455	0.349
370	Ascent	6	10	3		1158958	ATCS LOWER INSULATION	1	2007-07-116 (CLOSED)	0.551	0.011
371	Ascent	6	10	4		1158959	WAICO SEED CONTAINER	8	2007-07-116 (CLOSED)	3.175	0.057
372	Ascent	6	10	5		1141551	BIOLAB AUTOMATIC AMBIENT STORAGE (AAS) INSERT	1	2007-07-116 (CLOSED)	7.606	0.164
373	Ascent	6	10	6		1158970	**WAICO TOOLKIT**	1	2007-07-116 (CLOSED)	1.102	0.026
374	Ascent	6	10	7		1158971	BIOLAB WAICO VIDEOTAPE	2	2007-07-116 (CLOSED)	0.309	0.01
375	Ascent	6	10	8		1158972	BIOLAB WAICO CD-ROM	1	2007-07-116 (CLOSED)	0.198	0.006
	8 - Crew Preference Kits										
376							**CREW PREFERENCE**				
377	Descent	8	1			CREWPREF	CREW PREFERENCE ITEMS	2	2007-07-032 (CLOSED); 2006-10-038 (CLOSED)	22.0	1.84
	9 - Other Preposition hardware										
378							**R-ECLSS RACK INTEGRATION, US LAB**				
379	Ascent	9	1			683-63461-10	MTL SUPPLY, WRS-1 RACK	1	2007-05-084 (CLOSED)	1.78	0.065
380	Ascent	9	2			683-63461-11	POTABLE WATER, WRS-1 RACK	1	2007-05-084 (CLOSED)	1.54	0.065
381	Ascent	9	3			683-63461-12	MTL SUPPLY, WRS-2 RACK	1	2007-05-084 (CLOSED)	1.73	0.065
382	Ascent	9	4			683-63461-13	MTL RETURN, WRS-2 RACK	1	2007-05-084 (CLOSED)	1.61	0.065
383	Ascent	9	5			683-63461-14	WASTE WATER, WRS-2 RACK	1	2007-05-084 (CLOSED)	2.35	0.089

Line Item	Phase	GGR&C Priority	Group Rank	Sub Rank1	Sub Rank2	Part Number	Part Name	Qty	MR Number(s)	Mass (lbs)	Volume (ft3)
384	Ascent	9	6			683-63461-15	PROCESS WATER A, WRS-1/WRS-2 RACK	1	2007-05-084 (CLOSED)	2.46	0.116
385	Ascent	9	7			683-63461-16	PROCESS WATER B, WRS-1/WRS-2 RACK	1	2007-05-084 (CLOSED)	2.46	0.116
386	Ascent	9	8			683-63461-17	PROCESS WATER C, WRS-1/WRS-2 RACK	1	2007-05-084 (CLOSED)	2.5	0.116
387	Ascent	9	9			683-63461-18	PROCESS WATER D, WRS-1/WRS-2 RACK	1	2007-05-084 (CLOSED)	2.46	0.116
388	Ascent	9	10			683-95125-1	WIRE HARNESS ASSY - MIL-STD-1553 BUS A TO WRS1 RACK W5125	1	2007-05-084 (CLOSED)	0.4	0.029
389	Ascent	9	11			683-95126-1	WIRE HARNESS ASSY - MIL-STD-1553 BUS B TO WRS1 RACK W5126	1	2007-05-084 (CLOSED)	0.4	0.029
390	Ascent	9	12			683-95127-1	WIRE HARNESS ASSY - MIL-STD-1553 BUS A TO WRS2 RACK W5127	1	2007-05-084 (CLOSED)	0.6	0.034
391	Ascent	9	13			683-95128-1	WIRE HARNESS ASSY - MIL-STD-1553 BUS B TO WRS2 RACK W5128	1	2007-05-084 (CLOSED)	0.4	0.034
392	Ascent	9	14			683-95129-1	WIRE HARNESS ASSY - S/E TO WRS2 RACK W5129	1	2007-05-084 (CLOSED)	0.32	0.034
393	Ascent	9	15			683-95130-1	WIRE HARNESS ASSY - 120V POWER FROM WRS2 TO WRS1 W5130	1	2007-05-084 (CLOSED)	1.77	0.089
394	Ascent	9	17			683-95131-1	WIRE HARNESS ASSY - POWER/DATA WRS1 J6 TO WRS2 J7 W5131	1	2007-05-084 (CLOSED)	0.75	0.067
395	Ascent	9	18			683-95133-1	WIRE HARNESS ASSY - S/E WRS1 J8 TO WRS2 J9 W5133	1	2007-05-084 (CLOSED)	3.9	0.116
396	Ascent	9	19			683-64400-1	PANEL ASSEMBLY, WRS RACK CLOSEOUT, U.S. LAB	1	2007-05-084 (CLOSED)	1.09	0.116
397	Ascent	9	20			683-64400-3	SEAT TRACK ATTACH BEAM	1	2007-05-084 (CLOSED)	4.48	0.233
398	Ascent	9	21			683-64400-2	SEAT TRACK ATTACH BEAM	1	2007-05-084 (CLOSED)	4.48	0.233
399	Ascent	9	22			683-64400-4	CROSS BRACES	1	2007-05-084 (CLOSED)	1.08	0.031

Line Item	Phase	GGR&C Priority	Group Rank	Sub Rank1	Sub Rank2	Part Number	Part Name	Qty	MR Number(s)	Mass (lbs)	Volume (ft3)
400	Ascent	9	23			683-64403-1	BETA CLOTH ASSY, WRS CLOSEOUT - SOFT COVER	1	2007-05-084 (CLOSED)	1.52	0.074
401	Ascent	9	24			P-213	TAPE, GLASS	1	2007-05-084 (CLOSED)	0.55	
402	Ascent	9	25			T50R2HAL	CABLE TIE	20	2007-05-084 (CLOSED)	2.0	
403	Ascent	9	26			256H	LACING TAPE	16	2007-05-084 (CLOSED)	0.16	
404	Ascent	9	27			HT-TMS-CM-1/2-6H-9	LABEL	2	2007-06-056 (CLOSED)	0.2	0.0
405							**ORBITAL SUPPORT EQUIPMENT, R-*ECLSS***				
406	Ascent	9	28			683-64443-3	EDV FLANGE BRACKET ASSY	1	2007-04-049B (CLOSED)	2.16	0.61
407	Ascent	9	29			683-64443-4	EDV SADDLE BRACKET ASSY	1	2007-04-049B (CLOSED)	1.89	0.124
408	Ascent	9	30			683-64443-5	COMPRESSOR BRACKET ASSY	1	2007-04-049B (CLOSED)	4.0	0.415
409	Ascent	9	31			683-64432-1	TUBE ASSEMBLY, FLOW METER	1	2007-04-049B (CLOSED)	3.62	0.11
410	Ascent	9	32			683-64435-1	PURGE/FILL ADAPTER, POTABLE WATER, MALE	1	2007-04-049B (CLOSED)	2.6	0.189
	10 - SDTO										
411							**SDTO HARDWARE**				
412	Ascent	10	1			SEG33120425-301	PORTABLE RFID READER	1	2007-08-062 (CLOSED)	5.0	0.17
	11 - Miscellaneous items not required on-board										
413							**EXCESS INTEGRATION HARDWARE**				
414	Descent	11	1			SEG33111837-301	**CTB, FULL SIZE WITH WINDOWS**	1	2006-09-001 (status NA)	3.7	1.867
415							**ESA HARDWARE**				
416	Descent	11	1	1		683-16348-808	COUPLING-QUICK DISCONNECT FLUID SELF-SEAL	4	2007-04-154 (CLOSED)	2.6	0.019
417	Descent	11	1	2		683-50249-3	KNEE BRACE SET	4	2007-04-154 (CLOSED)	46.72	21.354
418	Descent	11	1	3		9231CA155-401	BRACKET ASSY	2	2007-04-154 (CLOSED)	1.874	0.063
419	Descent	11	1	4		9231CA153-401	BRACKET ASSY	2	2007-04-154 (CLOSED)	1.874	0.05
420	Descent	11	1	5		9226CA157-401	ROD	2	2007-04-154 (CLOSED)	0.937	0.057
421	Descent	11	1	6		9226CA155-401	CENTRAL PLATE	2	2007-04-154 (CLOSED)	0.937	0.008
422	Descent	11	1	7		9226CA153-401	PLATE	4	2007-04-154 (CLOSED)	1.874	0.02

Line Item	Phase	GGR&C Priority	Group Rank	Sub Rank1	Sub Rank2	Part Number	Part Name	Qty	MR Number(s)	Mass (lbs)	Volume (ft3)
423	Descent	11	1	8		15230C18660A	STOWAGE ASSY (VCA)	2	2007-04-155 (CLOSED)	7.011	2.981
424	Descent	11	1	9		40483-1	NPRV	2	2007-04-155 (CLOSED)	3.968	0.287
425	Descent	11	1	10		3110CA413	HATCH LATERAL MLI	2	2007-04-154 (CLOSED)	5.908	0.413
426	Descent	11	1	11		3110CA411	HATCH CENTRAL MLI	1	2007-04-154 (CLOSED)	2.954	2.966
427							**INGRESS AND EGRESS EQUIPMENT**				
428	Descent	11	2			33_.9962.003	**DOCKING MECHANISM ACCESSORY KIT**	1	2006-09-001 (status NA)	3.0	1.0
429							**CHECS CMS HARDWARE**				
430	Descent	11	3			SEG46116961-304	SERIES BUNGEE SYSTEM ASSEMBLY	4	2007-05-111B (CLOSED)	5.997	0.438
431							**VESTIBULE OUTFITTING KIT**				
432	Descent	11	3	1	1	683-13896-43	LTCS SUPPLY JUMPER ASSEMBLY	1	2007-04-101A (CLOSED)	10.0	0.123
433	Descent	11	3	1	2	683-16348-809	COUPLING, QUICK DISCONNECT	2	2007-04-101A (CLOSED)	0.78	0.006
434	Descent	11	3	2	1	683-13896-44	LTCS RETURN JUMPER ASSEMBLY	1	2007-04-101A (CLOSED)	10.0	0.123
435	Descent	11	3	2	2	683-16348-809	COUPLING, QUICK DISCONNECT	2	2007-04-101A (CLOSED)	0.78	0.006
436	Descent	11	3	3		683-13896-4	MITTEN, LTCS JUMPER	4	2007-04-101A (CLOSED)		0.228
437							**PHOTO/TV EQUIPMENT**				
438	Descent	11	4			528-21106-8	**ISS PHOTOGRAPHIC AND VIDEO EQUIPMENT ASSEMBLY KIT**	1	2006-09-001 (status NA)	3.7	1.886
439							**STRUC & MECH**				
440	Descent	11	5			1F92502-1	TARGET ASSEMBLY - PMA CENTERLINE	1	2007-02-044 (CLOSED)	14.0	2.042
441							**ODF**				
442	Descent	11	9			SKG32999102-301	OPERATIONS DATA FILE ASSEMBLY OPS	1	2006-03-004 (status NA); 2006-09-001 (status NA)	26.01	1.0
443							**CREW ROTATION EQUIPMENT**				
444	Descent	11	11			115-9104-1000	IELK	1	2006-09-001 (CLOSED)	63.934	7.786
445							**HUMAN RESEARCH PROGRAM**				

446	Descent	11	13			SJG46120230-301	SWAB TUBE KIT	1	2007-06-043 (CLOSED)	3.153	0.211
	12 - Trash										
447							**IMV CAP O-RING REPLACEMENT HARDWARE**				
Line Item	**Phase**	**GGR&C Priority**	**Group Rank**	**Sub Rank1**	**Sub Rank2**	**Part Number**	**Part Name**	**Qty**	**MR Number(s)**	**Mass (lbs)**	**Volume (ft3)**
448	Descent	12	1	1		601	BRAYCOTE 601	1	2006-09-001 (status NA)	0.13	0.013
449	Descent	12	1	2		2-248S0604	O-RING, (BORE SEAL)	1	2006-09-001 (status NA)	0.025	0.002
450	Descent	12	1	3		2-255S0604	O-RINGS (FACE SEAL)	1	2006-09-001 (status NA)	0.025	0.002
451	Descent	12	1	4		2-248S0604	O-RING, (BORE SEAL)	1	2006-09-001 (status NA)	0.025	0.002
452	Descent	12	1	5		2-255S0604	O-RINGS (FACE SEAL)	1	2006-09-001 (status NA)	0.025	0.002
453							**INGRESS AND EGRESS EQUIPMENT**				
454	Descent	12	2			528-50000-2	**ZIPLOCK/ZIP-LIP BAG/PRESS 'N' SEAL**	1	2006-09-001 (status NA)	0.022	0.0
455	Descent	12	3			528-40805-3	TOWEL	1	2006-09-001 (status NA)	0.34	0.025

I.3 FLIGHT 1 J/A MIDDECK LAUNCH AND RETURN PRIORITIES

The following items comprise the Flight 1 J/A Transfer Priority List. Items that are transferred from ISS to Shuttle are differentiated by the **(r)** designation from those transferred from Shuttle to ISS. The transfer items are grouped according to the transfer priorities and reference associated mission priorities as specified in Section 6.

Mission Priority #2 - Mandatory Crew Rotation Cargo

1. Russian Crew Rotation Hardware (required on FD3 per Ballasting Plan)
   a. IELK
   b. Kentvar Device

Mission Priority #3 - Transfer Items per Ballasting Plan

2. Transfer additional items required per Ballasting Plan (FD3)
   a. Crew Provisions (6 Food Containers)
   b. CLPA w/Protective Box

Mission Priority #8 - Mandatory Water Transfer

Mission Priority #9 - Transfer Critical items

3. Crew Health Care System (CHeCS) Cargo Transfer Bag (CTB)
4. Crew Care Package
5. Crew Provisions
6. ODFs
7. Compact Disk (CD) Carrying Case Contents
8. Minimum EVA Support Equipment List (ESEL) Tools required to support EVA-1
9. Minimum EMU ESEL required to support EVA-1
10. Vestibule Outfitting Kit (VOK)
    a. Node 2 to JLP Power Supply Jumper
    b. JLP-PDB/HTCL Power Cable
    c. IMV Jumpers (2)
    d. Vestibule Barrier Assy
    e. CBM Ground Straps (2)
    f. O-Rings (12)
    g. Protective Caps (72 total caps)
    h. Desiccant Bags (4)
    i. PPRV Caps (2)
    j. Contingency Heater Cable
    k. A31p and associated cables
11. WAICO **<TBR 6-35>**

Mission Priority #17 - Utilization Hardware

12. Double Cold Bag with Samples (2) (r)
13. Protein Crystallization Diagnostic Facility (PCDF) Process Unit (PU)

Mission Priority #18 - Transfer Remaining Items

14. Remaining ESEL Tools
15. Remaining EMU Tools
16. EVA Installed Hardware:
    a. Orbital Replaceable Unit Tool Changeout Mechanism(OTCM) Handling Tool (OHT) and Thermal Blankets
    b. OBSS Keep Alive Umbilical
17. Remaining JAXA Middeck Hardware
18. CHeCS CTB **(r)**
19. Utilization
20. Russian Crew Rotation Hardware **(r)**
    a. IELK
    b. Kentvar Device
21. Increment Photo/Television (TV) CTB Swap
22. Operations Data File (ODF) **(r)**
23. Any remaining Ascent Items
24. Any remaining Descent Items **(r)**

APPENDIX J - OFF-NOMINAL SITUATIONS

TABLE J-1 FLIGHT *XX* OFF-NOMINAL SITUATIONS MATRIX

ONS Number	Task	Cause	Consequences	Response/Task
XX-1				
XX-2				
XX-3				
XX-4				
XX-5				
XX-6				
XX-7				
XX-8				
XX-9				
XX-10				

APPENDIX K <TBD K-1> - <RESERVED>

Table K-1, USOS Resources to be Provided for 15S taxi Crewmember, is limited to the below-listed and agreed-to resources that NASA will provide to the 15S taxi crewmember during this mission on 15 Soyuz. The listing of utilization to be performed during the 15 Soyuz mission will be provided via Rocket Space Corporation - Energia (RSC-E) and is listed in the main document under Section 6.2, Increment 16 Specific Requirements. NASA agrees to provide the following resources and will be compensated by *X*.

TABLE K-1 USOS RESOURCES TO BE PROVIDED FOR 15S TAXI CREWMEMBER

Resource	Agreements
E-mail	None
IP Phone	None
Timeline	None
Procedures	None
Lab Facilities	None
Ham * Not solely a USOS resource - International Hardware	None
Imagery	None
PAO	None
Medical	Medications for previously known needs will be provided via Russian resources
Crew Provisions:	No U.S. provisions required
Exercise Equipment	No USOS exercise (TVIS, CEVIS, IRED) devices will be used
Video Down	None
Up/Downlink Data (includes OCA)	None
Ground Support	None
Preflight Crew Training for Prime and Backup *X* Crewmembers	Standard Soyuz Taxi crew USOS training. No training on USOS resources listed in this table.